



Pune Vidyarthi Griha's

COLLEGE OF SCIENCE & COMMERCE

(Accredited by NAAC)

(Affiliated to Savitribai Phule Pune University & Approved by Govt. of Maharashtra)

S.No.44, Vidyanagari, Parvati, Pune- 411009

Telephone: (020) 2422 1484, Website: www.pvgcsc.ac.in

NAAC - CYCLE 2 - SSR

2.6.2. Attainment of POs and COs are evaluated.

A.Y. 2022 to 2024

2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

S.Y.B.Sc (CS) 2023-24
CS-232 -SOFTWARE ENGINEERING

Course Outcome

1. Compare and chose a process model for a software project development.
2. Identify requirements analyze and prepare models.
3. Prepare the SRS, Design document, Project plan of a given software system

Programme Outcomes

1. To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
2. To train students in professional skills related to Software Industry.
3. To prepare necessary knowledge base for research and development in Computer Science.
4. To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.

1. Problem definition, scope of proposed system

2. Requirement Specification

3. ER Diagram

4. Use Case Diagram

5. Class Diagrams

Course Outcome 1: Compare and choose a process model for a software project development.

- CO1 → PO1: To build the necessary skill set and analytical abilities for developing computer-based solutions for real-life problems.
- CO1 → PO2: To train students in professional skills related to Software Industry.

Course Outcome 2: Identify requirements, analyze, and prepare models.

- CO2 → PO1: To build the necessary skill set and analytical abilities for developing computer-based solutions for real-life problems.



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- **CO2 → PO4:** To help students build a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.

Course Outcome 3: Prepare the SRS, Design document, Project plan of a given software system.

- **CO3 → PO1:** To build the necessary skill set and analytical abilities for developing computer-based solutions for real-life problems.
- **CO3 → PO2:** To train students in professional skills related to Software Industry.
- **CO3 → PO3:** To prepare the necessary knowledge base for research and development in Computer Science.
- **PO1 → CO1:** Compare and choose a process model for a software project development.
- **PO1 → CO2:** Identify requirements, analyze, and prepare models.
- **PO1 → CO3:** Prepare the SRS, Design document, Project plan of a given software system.

PO2: To train students in professional skills related to Software Industry.

- **PO2 → CO1:** Compare and choose a process model for a software project development.
- **PO2 → CO2:** Identify requirements, analyze, and prepare models.
- **PO2 → CO3:** Prepare the SRS, Design document, Project plan of a given software system.
- **PO3 → CO2:** Identify requirements, analyze, and prepare models.
- **PO3 → CO3:** Prepare the SRS, Design document, Project plan of a given software system.



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SY-BSC Internal Assignment 15 marks
Software Engineering cd-23

161	AADITYA MANOJ KUTE	14
36	ADESH SOMNATH PAWAR	15
78	ADITYA GANESH BHOJ	14
39	ADITYA SURESH UJGAONKAR	13
167	ADITYA VINOD BET	13
132	AGATKAR SWAPNIL SUNIL	14
127	AKSHAT NISHANT TASKAR	15
74	ANANDE SNEHA SATISH	15
121	ANAWALIKAR NILAJA ANANDRAJ	15
163	ANIKET SHANTARAM KHOPADE	13
1	ANKITA ANKUSH GHOGARE	15
38	ARNAV GOPI NALAWADE	13
67	ARYA RAHUL SUBHAGADE	15
79	ARYAN SANTOSH MANE	12
69	ATHARV NILESH GOTAD	13
166	BADHE RACHANA YASHWANT	14
115	BADODKAR GAYATRI SACHIN	12
89	BANSOD AKSHATA ANAND	11
2	BARGE ABHISHEK MILIND	15
148	BHARGUDE NIKITA PARBATI	12
46	BHISE VIVEK YASHWANT	13
123	BHORDE KOMAL CHANDRAKANT	11
158	BONGALE PURVA DHANVAKUMAR	15
153	BORA RONAK SACHIN	11
170	CHAVAN SUBODH SANJAY	12
87	CHAVAN VISHWADEEPTI AJAY	15
30	CHAVARE SOUMITRA SAMEER	12
84	CHETANA SACHIN DHINDALE	13
51	CHOUDHARI MRUNAL VITTHAL	15
177	DASIM SATVILKAR	13
94	DAYAL SHRAVANI NARENDRA	10
15	DEO NIKHIL GIRISH	15
75	DEO SWARADA SUHAS	15
50	DESHMUKH ATHARVA MANGESH	14
151	DESHMUKH SRUSHTI VINAYAK	11
42	DEVANG GOPINATH DATIR	15
126	DEVDAAS GORAKSHNATH KHANEKAR	14
135	DEVEN MAHESH KULKARNI	14
62	DEWALE SNEHAL MANOHAR	15
29	DHAMAL VEDANT SANTOSH	9
40	DHANDE NARAYAN RAJABHAU	15
164	DHAVADE SUDIKSHA DEEPAK	11
16	DHEBE SAMEER SITARAM	11
90	DHIWAR MUGDHA SUNIL	14
28	DHOTRE SAKSHI SANTOSH	15
85	DHRUV MANOJ DESHPANDE	13
137	DUDHAL ISHITA KISHOR	13



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80	GADEKAR PRATIKSHA ANIL	15
43	GAIKWAD NAMRATA NITIN	15
47	GAIKWAD OMKAR MILIND	14
52	GANESH KALIDAS NAGTILAK	11
81	GAVAND SHRAVANI ANIL	15
116	GAVHANE ATHARVA PANDURANG	12
174	GHABADE SAKSHI ATUL	A
105	GHALME SUJIT VIJAY	12
142	GHODEKAR OM BALASAHEB	14
71	GHULE VINAYAK SANJAY	10
99	HARSHAD SUNIL BANGALE	13
136	HARSHAVARDHAN TATYASO ZAMBRE	14
13	HOLKAR SHRAVANI SANTOSH	13
8	HOMKAR PRATIK MAHADEV	14
65	HONRAO RUDRESH LALIT	15
162	HRISHIKESH VIJAY ZUNGARE	15
169	JADHAV PRATHAMESH GANESH	A
53	JADHAV RUTUJA AJIT	15
147	JAGTAP NANDINI DEEPAK	14
122	JANGAM SIDDHI SANDIP	11
173	JANHAVI PRADIP JOSHI	15
64	JARANDE TEJAS SURYAKANT	15
103	JEENA LOKESH GOPAL SINGH	13
131	JOSHI KARAN JHUMBERLALI	10
82	JOSHI OMKAR ANIRUDDHA	A
97	JOSHI SUSHRUT SACHIN	8
159	KADAM AVDHoot SHRIKANT	13
73	KADAM KAJAL KISHOR	15
41	KADAM KARAN JALINDAR	15
6	KADAM SOURAV SACHIN	10
4	KALBHOR RADHIKA SACHIN	14
119	KALE ATHARV AVINASH	14
149	KAMBLE TANUJA RAJU	14
48	KAMBLE VISHWAS MARUTI	12
133	KARANDE PRATIK BABURAO	14
179	KARBHARI PARTHIV	14
49	KARPE ATHARVA DEEPAK	12
34	KEDARI SAKSHI SANTOSH	15
7	KHADE TANUJA SATISH	13
112	KHADKE SAKSHI PRAKASH	11
156	KHAROTE SAHIL RAJESH	14
171	KHEDEKAR PRATHAMESH SHASHIKANT	12
21	KHOPADE OMKAR DNYANESHWAR	15
101	KHOSE AKANKSHA CHANDRAKANT	12
110	KOLAGE SUPRIYA HANUMANT	15
17	KONDHALKAR SAE MADHUKAR	14
143	KULKARNI MEGHANA ANIL	12



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125	KUMBHAR DIKSHA KISHOR	14
106	KUSUMALE SHRIKANT BHARAT	12
59	LOUKIK DATTATRAY LANGHI	14
26	MAHTO ABHILASHA ARJUN	12
57	MANDEKAR SIDDHI SAMEER	15
100	MANE AISHWARYA ANIL	11
107	MANE VIDHI SUNIL	15
roll_no	member	internal marks
111	MIHIR PRAKASH RAJGURU	13
12	NAIK ADITI MILIND	12
9	NAIR ABHINAV ACHUTHAN	14
86	NALAWADE TANMAY TATYASO	13
5	NANAWARE SURAJ DIPAK	13
144	NANGARE SHRADDHA CHANDRAKANT	15
68	NEHA SUHAS REPALE	14
70	NIBANDHE PRATHAMESH PRADIP	12
3	NIKAM SAKSHI VASUDEO	15
152	NOORJAHN NOORMOHAMMAD SHAIKH	13
60	OMKAR VIJAY NIMBALKAR	15
128	PAIGUDE NEEL MILIND	15
45	PANCHAL RUTUJA DATTATRAY	13
27	PANGARE VISHWAJA VIJAY	15
117	PANGUL ABHIJEET DATTATRAYA	13
22	PANSARE AMIR HARUN	15
102	PARDESHI TANISHA KAMLESH	12
176	PATASKAR ANISH	13
32	PATIL PRANALI RAVINDRA	15
25	PATIL YASH SACHIN	15
23	PAWAR APURVA RAJENDRA	15
35	PAWAR SAKSHI JAYWANT	13
92	PAWAR SANGHARSH BHAJANDAS	9
33	PHALKE NAYAN DHANANJAY	15
58	PISE AAKASH PRAVIN	14
37	PRANAV MHASKU PISAL	15
175	Prathamesh Jadhav	15
95	PRATHMESH RAJU INGOLE	15
160	PUSHKAR PURUSHOTTAM JOSHI	12
140	RUTUJA RAJENDRA BHADIRGE	14
54	RUTVIK PARSHURAM VEER	14
157	SAHANI HARSHVARDHAN DURGESHKUMA	11
154	SAHIL NITIN SAWANT	10
98	SAHIL SUNIL KAWADE	10
19	SAKPAL SNEHA ANIL	13
130	SALUNKE SWARAJ SURYAKANT	10
120	SAMAL ISHWAR AMAR	14
134	SANIKA JAGTAP	15
77	SANSKRUTI VINDO VEYWHARE	14



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141	SARTHAK SOMNATH PAIGUDE	14
66	SAWANT ADITYA ANAND	15
10	SAWANT TEJAS SATISH	13
76	SAYYAD SARFARAZ SALIM	11
83	SHELAR SUJAL SHAILESH	14
20	SHETE SARTHAK SHIVAJI	15
31	SHINDE ADITYA DHANAJI	15
113	SHINDE PRAGATI MANOJ	15
24	SHINDE PRANAV DHANAJI	15
14	SHINDE RIYA MANOJ	14
11	SHIRURE KAUSHIK KONDIBA	14
72	SHRAVAN RAMESH NALAWADE	10
114	SHREYA PRITHVIRAJ CHAVAN	15
124	SHRIMAY HARISH PADHYE	12
146	SOHAM MAHESH KET	11
91	SOHAM MANOJ TAGADE	14
104	SOHAM PRAKASH LOLE	11
139	SONAWANE RIYA PANDHARINATH	A
88	SUMIT PAVAN SUPEKAR	15
138	SURVE PRATIK PRAVIN	14
118	SURYAWANSHI PRITAM	11
145	SUVARNA DHANUSH PADMANABHA	14
18	THOPATE SANIKA SANJAY	15
172	TIWARI MANSI RAJESH KUMAR	13
155	UGHADE ADITYA NITIN	15
168	VAIDYA SIDDHESH SHASHANK	12
129	VAISHNAVI BALASAHEB MATE	14
56	VATTURKAR ARYAN HARSHAL	12
55	VHARKAT BHAVANA MAHESH	14
109	VIBHUTE ASHUTOSH SANJAY	14
150	WAGHMARE NEHA SHANKAR	14
44	WALAMBE SHREYAS SACHIN	10
93	YADAV NITISH RAMSAGAR	10
61	YADAV SHLOK DNYANESHWAR	12
63	YASH DATTATRAY KUDALE	15
108	YEDE VISHAL ANKUSH	15
96	YELWANDE HARSHADA SHIVAJI	14
165	YENPURE SIDDHESH PRASHANT	12
178	YOGESH KATE	13



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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

**F.Y.B.Sc(CS) 2023-24
CS-112-DATABASE MANAGEMENT SYSTEM**

Course Outcomes

1. Solve real world problems using appropriate set, function, and relational models.
2. Design E-R Model for given requirements and convert the same into database tables.
3. Use SQL.
4. Programme Objectives:
5. To develop problem solving abilities using a computer.

Programme Outcomes

1. To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
2. To train students in professional skills related to Software Industry.
3. To prepare necessary knowledge base for research and development in Computer Science.
4. To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.

1. TYPES OF ENTITY SETS(CO1,PO1)
2. Difference between strong and weak entity set(CO1,PO2)
3. Strong Entity Set (CO1PO2)
4. Weak Entity Set (CO1,PO1)
5. CASE STUDIES ON E-R MODEL(CO1,PO1,PO2)
6. SYMBOLS USED IN E-R DIAGRAM(CO1,CO2,PO3,PO4)



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FYBSc(CS) - Semester I AY 2023-24 Internal Evaluation (CS111, CS112, CS113 - Int & Ext)

Seat no.	Student Name	Roll No.	Internal marks			
			CS1 (CS 111) out of 15	CS2 (CS112) out of 15	CSP CS 113 out of 15	CSP CS113 out of 35
58106	CHAVAN ABHISHEK VISHWAMBAR	28	14	15	14	35
58107	WAIDANDE ADITYA VIJAY	242	6	7	10	2
58108	AGRESAR SWARALI KAMALKAR	4	13	15	13	23
58109	PAVAN RAMDAS AHERKAR	155	13	14	14	25
58110	JADHAV AJAY RAJARAM	67	10	13	11	15
58111	ALATE SOHAM PRASANNA	6	13	14	13	27
58112	SHAIKH AMAAN EJAZ	193	10	14	10	14
58113	SHUBHAM PARGONDA ANAJE	215	10	15	12	22
58114	ANANYA KAMALAKAR KAMTHE	7	9	14	13	22
58115	VIGHNESH SHASHIKANT ARU	238	10	13	13	16
58116	TIDKE ARYAN YOGESH	235	6	13	10	3
58117	BADADHE PRANJALI KIRAN	15	10	14	12	7
58118	BADE RUSHIKESH MACCHINDRANATH	16	14	15	10	14
58119	BANDAL PRANAV RAVINDRA	17	6	15	12	21
58120	BANGALE SHRAVANI BHAGYESH	18	14	13	14	34
58121	BARAVKAR SWAPNIL SATISH	19	9	15	14	14
58122	BENDRE PAYAL RAJENDRA	21	11	13	14	29
58123	BHAGYSHREE VIJAY KHATPE	22	9	13	10	16
58124	SNEHA SANTOSH BHANDALKAR	221	10	12	12	19
58125	HARSHAD SUNIL BHARMAL	65	6	9	7	ab
58126	BHASALE SAMARATH DHANANJAY	23	11	13	11	8
58127	ARYA SANDESH BHAYGUDE	11	10	12	13	5
58128	BHOITE RITESH JITENDRA	24	10	12	12	14
58129	ANUSHKA DINU BHOKARE	10	13	14	13	19
58130	BHOLE VISHWATEJ BABASAHEB	25	10	13	10	22
58131	SHRAVANI SAGAR BHOSALE	214	10	14	14	32
58132	YASH JAYRAM BHOSALE	246	8	13	10	6
58133	BHOSURE BHUSHAN BHANUDAS	26	10	11	11	20
58134	BHUMKAR PRANITA SANDIP	27	10	13	10	16
58135	CHAVAN AISHWARYA DNYANESHWAR	29	13	15	13	28
58136	MAYUR SURESH CHAVAN	129	10	13	10	17
58137	CHAVAN PRATHMESH PANKAJ	30	11	13	13	14
58138	CHAVAN PRATIMA DEEPAK	31	13	13	7	3
58139	CHAVAN SAKSHI ASHOK	32	12	12	12	25
58140	CHHAJED YATISH RAJKUMAR	34	13	10	14	19
58141	MANISH BHANWARLAL CHOUDHARY	126	9	15	11	19
58142	DAMAL ADITYA SURESH	35	10	14	10	14
58143	ERANDE DARSHAN UMESH	49	6	10	10	1
58144	DAVE PRATHAM RAJESH	36	14	15	14	30
58145	RUTUJA PRASAD DESAI	175	13	13	11	27
58146	DESHMUKH ANJALI SANTOSH	38	14	14	12	30
58147	DESHMUKH GAURAV BHAGWAN	39	9	12	11	22
58148	DESHMUKH SWARAJ PRAVIN	40	12	13	10	24



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Seat no.	Student Name	Roll No.	Internal marks			
			CS1 (CS 111) out of 15	CS2 (CS112) out of 15	CSP CS 113 out of 15	CSP CS113 out of 35
58149	DESHPANDE SHUCHI SACHIN	42	13	14	13	22
58150	DEVENDRA KARUNA GANESH	44	10	6	9	14
58151	AAKASH ANKUSH DHADE	2	7	14	7	1
58152	DHALGADE RUSHIKESH BAPUSAHEB	45	12	9	11	27
58153	SIDDHANT DHAMAL	218	14	14	11	20
58154	DISHA DINESH DHAWADE	47	12	15	12	16
58155	DEV VIKRANT DHENE	43	7	12	7	2
58156	PAWAR DHIRAJ ANIL	158	9	12	11	16
58157	DIMBLE AMAN NITIN	46	10	12	10	14
58158	GAIKWAD OM GANESH	51	9	13	10	14
58159	GANDHI KASHISH VITTHAL	53	9	12	14	26
58160	GARDI HARSHAL HANUMANT	54	13	15	12	28
58161	AVDHOT SANJAY GARGATE	13	ab	ab	7	ab
58162	GARUD SARVESH VIJAY	55	9	13	8	5
58163	GAURARAM MEGHNA NARESH	56	12	15	14	35
58164	PRAGATI GANESH GEJAGE	168	13	13	12	2
58165	GHULE VAIBHAV RAMKISAN	57	14	13	11	16
58166	GODASE VIVEK SATISH	58	12	15	11	23
58167	GONDE RANJIT KESHAV	59	6	12	11	14
58168	GOPALE SRUSHTI PRAKASH	60	12	14	13	32
58169	GORE VAIBHAV EKNATH	61	11	13	11	17
58170	GUPTA MUSKAN RAKESHKUMAR	62	14	12	13	33
58171	HARSH SANDEEP DAVE	64	7	11	11	17
58172	HIPPARKAR SEEMA VIJAY	66	13	15	12	17
58173	JADHAV ATHARVA RAHUL	68	10	14	10	20
58174	JADHAV HARSHADA SUDHAN	69	11	15	14	30
58175	JADHAV MAHESH MOHAN	70	12	12	10	26
58176	JADHAV ONKAR TUKARAM	71	13	14	10	23
58177	PIYUSH PRAKASH JADHAV	165	15	13	14	31
58178	JADHAVRAO RUDRA SANGRAM	72	11	13	10	18
58179	SHINDE JAGDISH VIKAS	203	6	10	7	ab
58180	JAGTAP AYUSH ATUL	74	10	10	9	0
58181	JAGTAP DIYA SUNIL	73	10	9	11	14
58182	JAGTAP OMKAR NITIN	75	10	12	10	1
58183	JAGTAP SHRUTI VIJAY	76	12	13	13	18
58184	JAMDADE MUGDHA SUBHASH	77	12	15	14	23
58185	JANA JANHAVI VENKATESH	78	ab	ab	7	ab
58186	KULTHE JANHAVI JITENDRA	116	14	15	12	23
58187	JARAD SAHIL BALASAHEB	79	9	14	12	26
58188	JAYDEEP AJIT PAWAR	80	6	14	7	1
58189	JOSHI BHAKTI MAHENDRA	81	10	15	10	10
58190	KABADE SAHIL AMOL	82	12	14	12	29
58191	DNYANESHWAR PRABHAKAR KADAM	48	12	15	13	25
58192	KADAM MANTHAN RAKESH	83	12	14	12	22
58193	KADAM SIDDHANT SHASHANK	84	8	12	9	14



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Seat no.	Student Name	Roll No.	Internal marks			
			CS1 (CS 111) out of 15	CS2 (CS112) out of 15	CSP CS 113 out of 15	CSP CS113 out of 35
58194	KADRE ARPITA MACHHINDRA	85	15	15	13	34
58195	KADUSKAR NISARGA SANJOG	86	11	14	13	28
58196	KALE DEVANSHI SATYAJIT	87	12	13	12	29
58197	KALE KSHIPRA AJIT	88	10	13	12	14
58198	NIRANJAN RAJKUMAR KALE	143	12	14	11	24
58199	KALE SHRAVANI SACHIN	89	13	14	14	31
58200	KAMBLE SHRUTIKA RAJENDRA	90	14	15	11	17
58201	KAMTHE DEVENDRA BAPU	91	10	11	10	4
58202	KAMTHE SIDDHI SAMBHAJI	92	12	14	11	22
58203	YOGITA HANUMANT KAMTHE	248	13	15	13	24
58204	KARALE ADITYA KAILASH	93	14	14	11	26
58205	KARANDE SAKSHI BHASKAR	94	13	14	11	18
58206	KARPE KARTIK VINAYAK	95	10	9	8	6
58207	KASKAR MANDAR PRASHANT	96	11	15	12	19
58208	KATRE SHRAVANI SACHIN	97	13	14	13	33
58209	KATTIMANI ASHWINI BAILAPPA	98	13	15	13	31
58210	SAKSHI SANJAY KATURDE	180	14	15	13	20
58211	SANKET SANTOSH KATURDE	186	15	13	7	35
58212	KHAIRMODE YASH JAYENDRA	99	13	14	11	
58213	KHANDAVE SHRAVANI RAJENDRA	100	10	15	11	16
58214	KHEDKAR SIDDHI MILIND	101	8	15	13	27
58215	KHOLE TANVI RAJENDRA	102	12	13	10	14
58216	KHOPADE SHABDALI UMESH	103	12	14	10	33
58217	KHOT ABHINAV ANILKUMAR	104	10	10	7	ab
58218	KHUTWAD ADITYA PRADEEP	105	9	12	10	25
58219	KIRDAK AJIT SANTOSH	106	9	12	9	14
58220	KIRVE ATHARV SHIVAJI	107	7	13	8	14
58221	KONDE DIKSHA ASHOK	108	13	11	10	19
58222	ESHWARI SUBHASH KONDE	50	13	14	12	21
58223	KONDE PRANAV NANDKUMAR	109	13	15	10	17
58224	KONDE RAJWARDHAN SUNIL	110	10	12	10	22
58225	SHWETA RAJENDRA KONDE	217	13	14	10	24
58226	KONDE VIGHNESH VIJAY	111	12	12	10	22
58227	KOTWAL OM SAINATH	112	12	12	7	6
58228	KOTWAL TANISHKA RAHUL	113	13	15	13	24
58229	ANURAG MAHESH KULKARNI	9	12	12	12	15
58230	KULKARNI OJASWI KIRAN	114	13	15	13	33
58231	KULKARNI TANISHQ SANDEEP	115	9	10	11	19
58232	KUMBHAR SHRUSHTI SHEKHAR	117	6	12	11	17
58233	LAKADE PRIYANKA VIJAY	118	12	15	12	29
58234	MADCHETTY NUPUR KISHOR	119	14	15	13	29
58235	MAGAR PRANAV ANIL	120	12	13	12	24
58236	MALANI BHARAT ASHOK	121	11	15	14	34
58237	PRAJAKTA RAMESH MALI	169	14	14	13	29
58238	MALUSARE OM DNYANESHWAR	122	11	15	10	33



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Pune - 411 009.

Seat no.	Student Name	Roll No.	Internal marks			
			CS1 (CS 111) out of 15	CS2 (CS112) out of 15	CSP CS 113 out of 15	CSP CS113 out of 35
58239	MANDHARE ARPITA SANJAY	123	6	15	7	3
58240	MANDHARE SANKET SAMBHAJI	124	13	12	9	14
58241	MANE ADITYA HANMANT	125	11	13	9	9
58242	MANORE BHAGYASHREE SATISH	127	12	14	7	24
58243	MARAL SIDDHANT ATUL	128	9	13	10	21
58244	SANKET SHARAD MHASKE	187	11	14	7	ab
58245	NEEL HEMKANT MHATRE	140	8	8	7	26
58246	MOHAMMED AKIF NAZIR NADAF	131	6	12	11	2
58247	MOHITE SNEHAL TANAJI	132	11	12	11	17
58248	MORE SALONI DEEPAK	134	12	15	13	32
58249	SWARALI LAXMAN MORE	228	10	14	11	8
58250	MUDALIAR VIGNESH CHANDRAN	136	12	13	10	14
58251	MUJUMALE GEETA PANDURANG	137	12	15	12	14
58252	MULE VIRENDRA VAJJINATH	138	13	13	12	24
58253	NALAGE VAISHNAVI SUNIL	139	6	15	7	0
58254	NETAKE SAHIL NITIN	141	6	10	10	7
58255	DESHPANDE NIHAR KEDAR	41	14	15	14	34
58256	AKSHAT GAJANAN NIKAM	5	12	13	14	20
58257	NIMBALKAR NISHIGANDHA NILESH	142	14	12	11	17
58258	NIRGUDWAR PRAPTI SUBHASH	144	12	10	14	25
58259	OM ARUN JAGDALE	145	11	8	10	14
58260	PALASKAR PRASAD SUBHASH	148	13	15	11	25
58261	VIRENDRA SHRIVKANT PANCHAGALLE	239	6	13	11	15
58262	PAPAT PRADNYA KISHOR	149	12	12	7	29
58263	TANVI SOHANLAL PARDESHI	231	14	14	14	33
58264	PARDESHI YASH SANTOSH	150	15	15	14	28
58265	PARIHAR HITESH MULARAM	151	11	12	12	18
58266	SIDDHI MANGESH PASHILKAR	220	14	14	14	4
58267	SAHIL PANDURANG PATIL	179	10	12	14	20
58268	PATIL SHREYASH RANAKAR	152	9	13	7	5
58269	PATIL SHRUTIKA TANAJI	153	11	15	14	32
58270	PATNE PRITISH AVINASH	154	12	14	13	19
58271	PAWAR ADITYA SAMEER	156	8	13	12	24
58272	ANIKET BHARAT PAWAR	8	6	12	9	18
58273	PAWAR BHAKTI DATTATRAY	157	10	13	13	23
58274	PAWAR GHANSHYAM PRAKASH	159	10	14	11	18
58275	PAWAR PRATHAMESH PRAVIN	160	11	15	10	14
58276	PAWAR SWAMIRAJ HEMANT	161	13	15	13	19
58277	PHANSALKAR RAMANI SHAILENDRA	162	12	14	11	24
58278	PHATALE MANSI ARVIND	163	12	14	13	20
58279	PIMPLE BHOOMI RAJESH	164	14	12	13	25
58280	POONAM BHARAMANNA CHOUGULE	166	9	9	9	21
58281	POONAM KIRAN AGAWANE	167	14	15	13	20
58282	SHINDE PRATHAM ASHOK	205	13	15	12	18
58283	PRATIK ANIL JAGTAP	170	12	12	11	20



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Seat no.	Student Name	Roll No.	Internal marks			
			CS1 (CS 111) out of 15	CS2 (CS112) out of 15	CSP CS 113 out of 15	CSP CS113 out of 35
58284	RAIPALLE AAKANKSHA TUKARAM	171	14	14	14	27
58285	MONTUSINGH RATANSINGH RATHOD	133	9	14	10	14
58286	RAUT SHIVAJI SUBRAV	172	12	11	11	9
58287	RAUT VAISHNAVI SHRIDHAR	173	12	11	11	6
58288	AVISHAKAR ANIL RAVALEKAR	14	11	15	11	34
58289	SUTAR RAVIRAJ RACHAPPA	227	12	12	11	21
58290	TUPE ROHAN SAHEBRAO	236	10	14	10	6
58291	SABALE ABHISHEK ANIL	176	6	11	9	14
58292	SADAFULE SAMRUDDHI POPATLAL	177	14	14	12	29
58293	MEDHAL ANAND SAHASRABUDHE	130	15	14	11	34
58294	SAHIL ANIL SAKA	178	13	15	14	28
58295	SURYAWANSHI SAKSHI PANDHARI	226	12	13	12	14
58296	SALUNKE AVISHKAR HEMANT	181	10	13	10	14
58297	SALUNKE VRUSHALI RAJAY	182	8	7	7	1
58298	SALVI SOHAM VINOD	183	11	12	10	15
58299	GAIKWAD SANKET ATMMARAM	52	6	12	11	14
58300	BATHE SANSKRUTI MAHESH	20	13	14	12	23
58301	SARKALE PRASAD SATISH	189	6	14	11	17
58302	SARPALE YASH SURESH	190	8	15	11	22
58303	SATKAR MANISH VITTHAL	191	12	15	11	14
58304	OM SUNIL SATKAR	146	10	15	10	30
58305	SAMRUDDHI GANESH SAWANT	184	13	12	11	16
58306	SANSKRUTI GANESH SAWANT	188	13	14	10	22
58307	SAYYAD SHAUKAT SHABBIR	192	8	13	11	25
58308	SHAIKH JUBER CHAND	194	10	14	10	14
58309	SHELAR ANUSHKA DHANANJAY	195	11	12	10	5
58310	SHELKE GAURAV PANJABRAO	196	12	13	11	16
58311	SHELKE OM SAMADHAN	197	8	12	11	14
58312	SHENDKAR PURVA KISAN	198	11	14	13	28
58313	SHERIKAR NEHA BALAJI	199	14	14	13	33
58314	SHETH SAE SHEKHAR	200	11	14	11	22
58315	SHETTY SPARSHA RAVINDRA	201	6	14	13	29
58316	SHILIMKAR AARYA SANTOSH	202	11	13	10	21
58317	AARYA JAYWANT SHINDE	3	12	14	14	34
58318	ATHARV PRALHAD SHINDE	12	15	15	12	21
58319	DAVID AJAY SHINDE	37	10	14	9	5
58320	SHINDE PRASAD KIRAN	204	13	15	12	34
58321	SHINDE RITESH SHINDE	206	10	10	9	0
58322	SHINDE SANTOSHI ARJUN	207	12	15	12	24
58323	SHINDE TEJAS MUKESH	209	6	10	7	0
58324	SHINGARE SHLOK GANESH	210	6	13	7	2
58325	SHINGATE MAYUR MOHAN	211	8	13	11	27
58326	SHIROLE SHRUSHTI VINAYAK	212	12	14	14	26
58327	PAIGUDE SHRAVANI DEEPAK	147	12	15	13	20
58328	GUPTA SHRAVANI PRITESH	63	12	15	11	



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S.Y.M.Sc (CA) 2023-24
CA 612 MJ: Software Testing

Course Outcome:

- CO1:** Distinguish between white box and black box testing
- CO2:** Define Software testing life cycle
- CO3:** Design test cases

Program Outcome:

- PO 1:** Demonstrate understanding of fundamental and advance concepts in emerging areas
- PO 2:** Design and develop innovative computer applications.
- PO 3:** Analyze existing research reported in the literature
- PO 4:** Propose alternate solutions by undertaking research work.
- PO 5:** Create efficient, reliable, readable and maintainable code.
- PO 6:** Demonstrate a deeper understanding of the chosen domain.
- PO 7:** Select appropriate method to solve the given problem
- PO 8:** Explain complex technical concepts clearly and effectively, both in written and oral forms.
- PO 9:** Demonstrate ability to collaborate effectively with team members, understand different perspectives, and contribute productively to become successful professional.
- PO 10:** Demonstrate ability to work with integrity and a sense of social responsibility.
- PO 11:** Demonstrate self and life-long learning skills
- PO 12:** Solve computational problems innovatively
- PO 13:** Apply knowledge gained and critical thinking to develop real-world applications.



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AssignmentNo.1

1. Explain Testing Principals in detail?(CO1,CO2,PO7,PO8,PO11,PO12,PO13)
2. Explain Software Testing Life Cycle?
(CO1,CO2,PO7,PO8,PO11,PO12,PO13)
3. Explain Types of Software Testing? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
4. What is the difference between White box and Black Box Testing?
(CO1,CO2,PO7,PO8,PO11,PO12,PO13)
5. Explain V-Model with Diagram? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
6. What is Entry criteria and Exit criteria in Software Testing?(CO1,CO2,PO7,PO8,PO11,PO12,PO13)
7. What is Test plan? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)



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ASSIGNMENT-1

1. Explain what manual testing is and discuss its importance in the software development lifecycle. (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
2. Describe at least three different manual testing techniques and provide examples of when each technique would be appropriately used. (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
3. What are the key components of an effective test case? Create and present a sample test case for a login functionality. (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
4. Discuss the process of defect reporting and tracking in manual testing. What tools can be used for this purpose? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
5. Outline the essential elements of a test plan in manual testing. How does a test plan contribute to the overall testing process? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)



A handwritten signature in purple ink, appearing to be "P.V.G.", written over a horizontal line.

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ASSIGNMENT-1

1. What are the different levels of software testing, and how do they differ in terms of scope and objectives? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
2. Explain the difference between manual testing and automated testing. What are the advantages and disadvantages of each approach? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
3. Define the term "test case" and describe the essential components that should be included in a well-structured test case. (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
4. What is the role of regression testing in software development, and why is it important after introducing new features or fixes? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)
5. Discuss the significance of performance testing in software applications. What key metrics are typically evaluated during this process? (CO1,CO2,PO7,PO8,PO11,PO12,PO13)



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T.Y.B.Sc (C.S) 2024-25
CS - 366: Compiler Construction

Course Outcome:

1. **CO1:** To understand the Finite Automata, Pushdown Automata and Turing Machine.
2. **CO2:** To understand the Regular Language, Context Free Language, Context Sensitive Language and Unrestricted Language.
3. **CO3:** To understand the relation between Automaton and Language

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs.

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: Inculcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In use ethical, human and professional values and responsibilities to make their contribution to the society.



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ASSIGNMENT-1

1. Define cross compiler? (CO2, CO3, PO1, PO2)
2. Differentiate between Compiler and Interpreter? (CO2, CO3, PO1, PO2)
3. What is Compiler? Explain the phases of Compiler in detail? (CO2, CO3, PO1, PO2)
4. Explain Front-end of compiler? (CO2, CO3, PO1, PO2)
5. Explain Back-end of compiler? (CO2, CO3, PO1, PO2)
6. Define- (CO2, CO3, PO1, PO2)
7. Token
8. Lexeme
9. Pattern
10. Sentinel
11. Explain Input buffering with diagram, also write code to advance forward pointer? (CO2, CO3, PO1, PO2)
12. What is the need of lexical Analysis? (CO2, CO3, PO1, PO2)
13. Explain the role of lexical analyser? (CO2, CO3, PO1, PO2)
14. What is the use of installid() and gettoken() ? (CO2, CO3, PO1, PO2)
15. Explain the process of lexical analysis? (CO2, CO3, PO1, PO2)
16. Write a LEX code to find area of Rectangle? (CO2, CO3, PO1, PO2)
17. Write a LEX program to find factorial of number N? (CO2, CO3, PO1, PO2)



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ASSIGNMENT-1

1. Discuss intermediate code generation in compilers. What is its role, and what are the advantages of using intermediate representations? **(CO2, CO3, PO1, PO2)**
2. What are syntax-directed translations (SDT)? Explain how they are implemented using attribute grammars, and provide an example. **(CO2, CO3, PO1, PO2)**
3. Describe the role of the symbol table in a compiler. What information is stored in a symbol table, and how is it used throughout the compilation process? **(CO2, CO3, PO1, PO2)**
4. What is target code generation in a compiler, and what are the challenges involved in this phase? Discuss common strategies for code generation. **(CO2, CO3, PO1, PO2)**
5. Explain the concept of compiler optimization levels. What are the trade-offs between different levels. **(CO2, CO3, PO1, PO2)**

T.Y.B.Sc (C.S) 2022-23

CS - 366: Compiler Construction

Course Outcome:

1. **CO1:** To understand the Finite Automata, Pushdown Automata and Turing Machine.
2. **CO2:** To understand the Regular Language, Context Free Language, Context Sensitive Language and Unrestricted Language.
3. **CO3:** To understand the relation between Automaton and Language

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective

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solution to cater the industrial needs.

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: Inculcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In use ethical, human and professional values and responsibilities to make their contribution to the society.

ASSIGNMENT-1

1. What is the role of the lexer (lexical analyzer) in a compiler? Explain how it processes the input code and generates tokens. (CO2, CO3, PO1, PO2)
2. Define the concept of error handling in compilers. What are the different types of errors that can be detected during compilation, and how can they be reported? (CO2, CO3, PO1, PO2)
3. Explain the difference between static and dynamic type checking. Discuss the advantages and disadvantages of each approach. (CO2, CO3, PO1, PO2)
4. What is a code generator, and what are the key tasks performed by this component in a compiler? Discuss the importance of instruction selection. (CO2, CO3, PO1, PO2)
5. Describe the concept of data flow analysis in compiler optimization. How does it help in code optimization? (CO2, CO3, PO1, PO2)



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Best of two sheet MARCH-2024

T.Y.B.Sc(Computer Science)

Sub. Name: T.C.S.

Name of Faculty: Ashwini J-Shinde

Roll No	Name of Student	Internal Marks	Assign.	Best of two	Sign
1	AGATKAR SWAPNIL SUNIL	08	15	15	AS
2	ANANDE SNEHA SATISH	08	15	15	Sneha
3	ANAWALIKAR NILAJA ANANDRAJ	09	15	15	Nilaja
4	BADHE RACHANA YASHWANT	08	15	15	Rachana
5	BANGALE HARSHAD SUNIL	08	10	10	Harshad
6	BANSOD AKSHATA ANAND	08	15	15	Akshata
7	BARGE ABHISHEK MILIND	11	10	11	Abhishek
8	BET ADITYA VINOD	11	10	11	Aditya
9	BET ADITYA VINOD		10	10	Aditya
10	BHADIRGE RUTUJA RAJENDRA	11	15	15	Rutuja
11	BHARGUDE NIKITA PARBATI	AB	10	10	Nikita
12	BHISE VIVEK YASHWANT	09	10	10	Vivek
13	BHOJ ADITYA GANESH	11	15	15	Aditya
14	BHORDE KOMAL CHANDRAKANT	12	15	15	Komal
15	BONGALE PURVA DHANVAKUMAR	10	15	15	Purva
16	BORA RONAK SACHIN	11	10	11	Ronak
17	CHAVAN SHREYA PRITHVIRAJ	11	15	15	Shreya
18	CHAVAN SUBODH SANJAY	11	15	15	Subodh
19	CHAVAN VISHWADEEPTI AJAY	11	15	15	Vishwa
20	CHAVARE SOUMITRA SAMEER	10	10	10	Soumitra
21	CHOUDHARI MRUNAL VITTHAL	09	10	10	Mrunal
22	DATIR DEVANG GOPINATH	11	10	11	Devang
23	DEO NIKHIL GIRISH	11	10	11	Nikhil
24	DEO SWARADA SUHAS	10	10	10	Swarada
25	DESHMUKH ATHARVA MANGESH	10	10	10	Atharva
26	DESHMUKH SRUSHTI VINAYAK	13	15	15	Srushti
27	DESHPANDE ATHARVA MORESHWAR	10	10	10	Atharva
28	DESHPANDE DHURV MANOJ	11	10	11	Dhurv
29	DEWALE SNEHAL MANOHAR	07	15	15	Snehal
30	DHAMAL VEDANT SANTOSH	10	10	10	Vedant
31	DHANDE NARAYAN RAJABHAU	11	10	11	Narayan
32	DHAHADE SUDIKSHA DEEPAK	10	15	15	Sudiksha
33	DHEBE SAMEER SITARAM	05	15	15	Sameer
34	DHINDALE CHETANA SACHIN	07	10	10	Chetana
35	DHIWAR MUGDHA SUNIL	08	15	15	Mugdha
36	DHOTRE SAKSHI SANTOSH	04	10	10	Sakshi
37	DUDHAL ISHITA KISHOR	07	15	15	Ishita
38	GADEKAR PRATIKSHA ANIL	04	15	15	Pratiksha
39	GAIKWAD NAMRATA NITIN	08	15	15	Namrata
40	GAIKWAD OMKAR MILIND	12	15	15	Omkar



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41	GAVAND SHRAVANI ANIL	12	15	15	Gavand
42	GAVHANE ATHARVA PANDURANG	10	15	15	Gavhane
43	GHALME SUJIT VIJAY	13	10	13	Ghalme
44	GHODEKAR OM BALASAHEB	07	10	10	Ghodekar
45	GHOGARE ANKITA ANKUSH	14	10	14	Ghogare
46	GHULE VINAYAK SANJAY	12	10	12	Ghule
47	GOTAD ATHARVA NILESH	AB	10	10	Gotad
48	HOLKAR SHRAVANI SANTOSH	14	15	15	Holkar
49	HOMKAR PRATIK MAHADEV	14	10	14	Homkar
50	HONRAO RUDRESH LALIT	13	15	15	Honrao
51	INGOLE PRATHMESH RAJU	10	10	10	Ingoale
52	JADHAV PRATHAMESH GANESH	10	10	10	Jadhav
53	JADHAV RUTUJA AJIT	13	15	15	Jadhav
54	JAGTAP NANDINI DEEPAK	13	10	13	Jagtap
55	JAGTAP SNIKA SUNIL	13	10	13	Jagtap
56	JANGAM SIDDHI SANDIP	12	15	15	Jangam
57	JARANDE TESAJ SURYAKANT	11	10	11	Jarande
58	JEENA LOKESH GOPALSINGH	09	10	10	Jeena
59	JOSHI JANHAVI PRADIP	11	15	15	Joshi
60	JOSHI KARAN JHUMBERLAL	10	10	10	Joshi
61	JOSHI PUSHKAR PURUSHOTTAM	10	10	10	Joshi
62	JOSHI SHRAVANI BHASKAR	AB	10	10	Joshi
63	KADAM AVDHOOT SHRIKANT	03	10	10	Kadam
64	KADAM KAJAL KISHOR	04	15	15	Kadam
65	KADAM KARAN JALINDAR	05	15	15	Kadam
66	KALBHOR RADHIKA SACHIN	07	15	15	Kalbor
67	KALE ATHARV AVINASH	09	10	10	Kale
68	KAMBLE TANUJA RAJU	08	15	15	Kamble
69	KARANDE PRATIK BABURAO	10	10	10	Karande
70	KARPE ATHARVA DEEPAK	11	15	15	Karpe
71	KATE YOGESH MAHADEO	10	10	10	Kate
72	KAWADE SAHIL SUNIL	10	10	10	Kawade
73	KEDARI SAKSHI SANTOSH	05	15	15	Kedari
74	KET SOHAM MAHESH	11	10	10	Ket
75	KHADE TANUJA SATISH	08	15	15	Khade
76	KHADKE SAKSHI PRAKASH	05	15	15	Khadke
77	KHANEKAR DEVDAS GORAKSHNATH	06	10	10	Khanekar
78	KHAROTE SAHIL RAJESH	06	10	10	Kharote
79	KHEDEKAR PRATHAMESH SHASHIKANT	09	10	10	Khedekar
80	KHOPADE ANIKET SHANTARAM	11	10	10	Khopade
81	KHOPADE OMKAR DNYANESHWAR	13	10	10	Khopade
82	KHOSE AKANKSHA CHANDRAKANT	06	15	15	Khose
83	KOLAGE SUPRIYA HANUMANT	07	10	10	Kolage
84	KONDHALKAR SAEED MADHUKAR	07	15	15	Kondhalkar
85	KUDALE YASH DATTATRAY	10	10	10	Kudale
86	KULKARNI DEVEN MAHESH	06	15	15	Kulkarni
87	KULKARNI MEGHANA ANIL	11	15	15	Kulkarni



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88	KUMBHAR DIKSHA KISHOR	12	15	15	<i>diksha</i>
89	KUSUMALE SHRIKANT BHARAT	06	10	10	<i>Kusumale</i>
90	KUTE AADITYA MANOJ	07	10	10	<i>Aaditya</i>
91	LANGHI LOUKIK DATTATRAY	06	10	10	<i>L.O.L</i>
92	LOLE SOHAM PRAKASH	08	10	10	<i>Soham</i>
93	MAHTO ABHILASHA ARJUN	10	10x	10	<i>Abhilasha</i>
94	MANDEKAR SIDDHI SAMEER	10	15	15	<i>Siddhi</i>
95	MANE AISHWARYA ANIL	11	10	10	<i>Aishwarya</i>
96	MANE VIDHI SUNIL	10	15	15	<i>Mane</i>
97	MATE VAISHNAVI BALASAHEB	10	15	15	<i>Vaishnavi</i>
98	NAGTILAK GANESH KALIDAS	08	15	15	<i>Ganesh</i>
99	NAIK ADITI MILIND	04	15	15	<i>Aditi</i>
100	NAIR ABHINAV ACHUTHAN	11	15	15	<i>Abhinav</i>
101	NALAWADE ARNAV GOPI	07	15	15	<i>Arnav</i>
102	NALAWADE SHRAVAN RAMESH	10	10	10	<i>Shravan</i>
103	NALAWADE TANMAY TATYASO	12	10	12	<i>Tanmay</i>
104	NANAWARE SURAJ DIPAK	11	10	11	<i>Suraj</i>
105	NIBANDHE PRATHAMESH PRADIP	10	15	15	<i>Prathamesh</i>
106	NIKAM SAKSHI VASUDEO	09	15	15	<i>Sakshi</i>
107	NIMBALKAR OMKAR VIJAY	11	15	15	<i>Omkar</i>
108	PADHYE SHRIMAY HARISH	05	10	10	<i>Shrimay</i>
109	PAIGUDE NEEL MILIND	04	10	10	<i>Neel</i>
110	PANCHAL RUTUJA DATTATRAY	12	15	15	<i>Rutuja</i>
111	PANGARE VISHWAJA VIJAY	09	10	10	<i>Vishwa</i>
112	PANGUL ABHIJEET DATTATRAY	11	10	11	<i>Abhijeet</i>
113	PANSARE AMIR HARUN	13	15	15	<i>Amir</i>
114	PARDESHI TANISHA KAMLESH	11	15	15	<i>Tanisha</i>
115	PATASKAR ANISH NILESH	14	10	14	<i>Anish</i>
116	PATIL PRANALI RAVINDRA	13	10	13	<i>Pranali</i>
117	PATIL YASH SACHIN	13	15	15	<i>Yash</i>
118	PAWAR ADESH SOMNATH	13	10	13	<i>Aadesh</i>
119	PAWAR APURVA RAJENDRA	11	10	11	<i>Apurva</i>
120	PAWAR SAKSHI JAYWANT	11	10	11	<i>Sakshi</i>
121	PAWAR SANGHARSHA BHAJANDAS	09	10	10	<i>Sangharsha</i>
122	PAYGUDE SARTHAK SOMNATH	09	15	15	<i>Sarthak</i>
123	PHALKE NAYAN DHANANJAY	10	10	10	<i>Nayan</i>
124	PISAL PRANAV MHASKU	10	10	10	<i>Pranav</i>
125	PISE AAKASH PRAVIN	10	10	10	<i>Aakash</i>
126	SAHANI HARSHVARDHAN DURGESHKUMAR	11	10	11	<i>Harshvardhan</i>
127	SAKPAL SNEHA ANIL	09	15	15	<i>Sneha</i>
128	SALUNKE SWARAJ SURYAKANT	05	10	10	<i>Swaraj</i>
129	SAMAL ISHWAR AMAR	11	10	11	<i>Ishwar</i>
130	SATVILKAR DASIM MURAD	10	10	12	<i>Dasim</i>
131	SAWANT ADITYA ANAND	11	10	11	<i>Aditya</i>
132	SAWANT SAHIL NITIN	10	10	10	<i>Sahil</i>
133	SAWANT TEJAS SATISH	08	15	15	<i>Tejas</i>
134	SAYYAD SARFARAZ SALIM	07	10	10	<i>Sarfraz</i>

A.J. Shinde



(Ashwini J. Shinde)

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PVG's College of Science & Commerce, Pune-09

Class-FY MSC CA (Sem-I)

Internal Exam Marksheet(2024-25)

Subject Code & Name: Java programming

Sr.No	Student Name	Assignment Marks (15)	Internal Exam Marks (15)	Average Marks (Out of 15)
1	BORADE YASH NILESH	15	11	13
2	AINAPURE ARYA HEMANT	15	9	12
3	CHAKOLE MADHURA AMBAJI	15	9	12
4	DHAWARE ADITYA NAIDU	15	11	13
5	SAPKAL KETAN GANESH	15	7	11
6	KUDAL GAYATRI ASHOK	15	12	13.5
7	TIPUGADE SNEHA SAMBHAJI	15	9	12
8	GAVADE NIKITA SURESH	15	10	12.5
9	KARALE ARYA KAILAS	15	11	13
10	GOSAVI RUPESH GAJENDRA	15	10	12.5
11	KOLHAPURE ASHISH SHRIDHAR	15	5	10
12	KASBE PRATIKSHA AVINASH	15	9	12
13	UBHE ONKAR BALKRUSHNA	15	6	10.5
14	FALKE KAUSHAL SANTOSH	10	11	10.5
15	KARANDE SUSHANT SANJAY	15	11	13

Sign

Yashade
Arya
Madhura
Dhaware
Ketan
Gayatri
Aditya
Nikita
Arya
Rupesh
Ashish
Pratiksha
Onkar
Kaushal
Sushant

Faculty Name and Sign: Ashwini J. Shinde

A.J. Shinde



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PVG's College of Science & Commerce, Pune-09
Class-SY MSC CA (Sem-III)

Internal Exam Marksheet(2024-25)

Subject Code & Name: Software Testing

Sr.No	Student Name	Assignment Marks (15)	Internal Exam Marks (15)	Average Marks (Out of 15)
1	THEURKAR ROHIT SATISH	15	12	13.5
2	SURYAVANSHI ROHIT VASANT	15	13	14
3	PATIL VIRAJ SANDESH	15	13	14
4	PALAVAKAR SHAILESH RAJENDRA	15	13	14
5	PATHAN WAHID MUNNA	15	13	14
6	TIVAREKAR JANHAVI PRAVIN	15	11	13
7	SAWANT SHUBHAM SHANKAR	15	13	14
8	JAGTAP VISHWAJIT RAJKUMAR	15	13	14
9	MUTHA KHUSHI ATUL	15	13	14
10	GHADAGE AMRUTA SANTOSH	15	9	12
11	DHUMAL KOMAL RAMCHANDRA	15	9	12
12	NAVALE BHAGYASHRI RAJU	15	9	12
13	POL SAKSHI RAJU	15	8	11.5
14	MAHURKAR VAIBHAVI DEEPAK	15	6	10.5

Sign

[Handwritten signatures and initials next to the table rows]

Faculty Name and Sign: Ashwini J. Shinde

A.J. Shinde



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PVG's College of Science & Commerce, Pune-09

Class-FY BSC CYS (Sem-I)

Internal Exam Marksheet(2024-25)

Subject Code & Name: C programming

Sr.No	Student Name	Assignment Marks (15)	Internal Exam Marks (15)	Average Marks (Out of 15)
1	AADITYA NAGESH SHINDE	15	9	12
2	SHIVAMKUMAR SUBHASH CHOUDHARI	15	5	10
3	AKARSHAN DATTARAY PATIL	15	13	14
4	VIRAJ ANAND PARDESHI	15	13	14
6	MEGHA SACHIN MORE	15	11	13
7	POONAM LAKAPPA BIRAJDAR	15	5	10
8	DEVYANI YOGESH BIBAVE	15	11	13
9	ROHAN SANJAY DHAWARE	10	7	8.5
10	KHUSHI YASHWANT JADHAV	15	10	12.5
11	KAUSTUBH RAMESH MANE	15	11	13
12	ASHWESH SWAPNIL BHIKULE	10	AB	10
13	ATHARVA RAMESH KHADE	15	6	10.5
14	ATHARVA BHUSHAN KULKARNI	15	13	14
15	RADHIKA RAVINDRA PANAT	15	10	12.5

Sign.

Shinde
Sub
Vijay
Mufi
Poonam
Devyani
Rohan
Khushi
Mane
Khade
AB
Kulkarni
Panat

Faculty Name and Sign: Ashwini J. Shinde
A.J. Shinde





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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

S.Y.B.Sc (CS) 2023-24 SEM-III

MTC 231: Numerical Techniques II

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

CO4: A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: In culcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In fuse ethical, human and professional values and responsibilities to make their contribution to the society.



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MTC 231: Numerical Techniques II

- 1 Define relative error.(CO1,CO2,PO2,PO3)
- 2 If approximate value of 2.013 is 2. Find the percentage error. .(CO1,CO2,PO2,PO3)
- 3 Find the relative error of the number $1/3$ whose approximate value is 0.3333. (CO1,CO2,PO2,PO3)
- 4 Round off 0.745250 correct to four significant figure and find out absolute and relative, Percentage error. .(CO1,CO2,PO2,PO3)
- 5 Round off 0.859378 correct to four significant figure. .(CO1,CO2,PO2,PO3)
- 6 Write the formula for regular-falsi method. .(CO1,CO2,PO2,PO3)
- 7 Using false position method, find the real root of the equation $X^2 - X - 2 = 0$ (perform 1 iteration). .(CO1,CO2,PO2,PO3)
- 8 Find the real root of the equation $\log X - \cos X = 0$ correct to three decimal places using Newton -Raphson method (take $X_0 = 1.3$). .(CO1,CO2,PO2,PO3)
- 9 Find a real root of the equation $X \sin X + \cos X = 0$ correct to three decimal places using Newton -Raphson method. (CO1,CO2,PO2,PO3)
- 10 Use Regular -Falsi method to find approximate root of equation $X^3 - 4X - 2 = 0$ in the Interval (2,3) correct upto 2 decimal places. (CO1,CO2,PO2,PO3)
- 11 Find 4th root of 74 using Newton-Raphson method correct upto 4 decimal places.(CO3,PO1,PO4)
- 12 Obtain Newton-Raphson formula to find square root of a given number say p.(CO4,PO3,PO4)
- 13 Write comparison between False position method and Newton-Raphson method.(CO1,CO2)
- 14 Find the square root of 12 using Newton -Raphson method.(CO1,PO2)
- 15 Find a real root of, $X^3 - 2X - 5 = 0$ correct up to a decimal places.(CO2,PO3,PO4)
- 16 Prepare forward differences tables for the following data.(CO2,CO3,PO4)

x	0	2	4	6	8	10	12
y	12	7	6	7	13	32	77

- 17 State and prove Newton-Gregory formula for forward interpolation.(CO1,CO2,PO3)
- 18 Find y_{48} if the data is(CO1,CO2,PO2,PO3)

x	45	50	55	60	65
y	2.871	2.404	2.083	1.862	1.712

- 19 In an examination, number of students scoring certain marks is given below.
Find number of candidates scoring less than 30 marks. (CO1,CO2,PO2,PO3)



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Marks less than	0-19	20-39	40-49	60-79	80-99
No. of candidates	41	62	65	50	17

20 From the following table of yearly premium for policies maturing at coming ages,

Estimate the premiums for policies maturing at the age of 46 years.
(CO1,CO2,PO2,PO3)

AGE x :	45	50	55	60	65
PREMIUM y :	2.871	2.404	2.083	1.862	1.712

21 Find the y at x=1.5 by using Newton -Gregory forward interpolation formula from the following data (CO1,CO2,PO2,PO3)

x	1	2	3	4	5
Y	2	4	8	16	32

22 From the following data, find y when x = 1.45(CO1,CO2,PO2,PO3)

x	1	1.2	1.4	1.6	1.8	2
y	0.0	-0.112	-0.016	0.336	0.992	2

23 From the following data, find the value of f(0.665). (CO1,CO2,PO2,PO3)

x	0.61	0.62	0.63	0.64	0.65	0.66	0.67
y	1.840431	1.858928	1.877610	1.896481	1.915541	1.934792	1.954237

24 Prepare a backward difference table and hence calculate y(2,2) for the following set of

Data(CO1,CO2,PO2,PO3)

x	-2	-1	0	1	2	3
y	8	-3	0	-3	8	45

25 Derive Lagrange's interpolation formula. (CO1,CO2, PO2,PO3)

26 Find f(5) using the following data (CO1,CO2,PO2,PO3)

x	1	2	3	4	5
F(x)	0	1	48	180	900

27 Find first divided difference for the data (CO1,CO2,PO2,PO3)

x	0	1	2	3
y	5	8	10	12

28 From the following data find F(0) by Newton's divided difference formula (CO1,CO2,PO2,PO3)

x	3	5	11	27	34
f(x)	-13	23	899	17315	35606

29 Given a set of x and y.by Newton's divided difference formula, find y at x = 1

x	0	1.5	2	3	3.5
y	1	-1.625	-1	7	15.875



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- 30 Given $f(3) = 24$, $f(5) = 120$, $f(8) = 504$, $f(9) = 720$ and $f(12) = 1716$. Find $f(7)$ by Using Newton's divided difference interpolation formula. (CO1,CO2,PO2,PO3)
- 31 Derive Quadrature formula for numerical integration. (CO1,CO2,PO2,PO3)
- 32 Evaluate the following integral by using trapezoidal rule. Also find the error introduced.
 $\int_{4.0}^{5.2} \log_e x \, dx$ with $h = 0.1$ (CO1,CO2,PO2,PO3)
- 33 Evaluate $\int_0^{\pi/2} e^{\sin x} \, dx$ by dividing the interval into 10 equal parts.
 (CO1,CO2,PO2,PO3)
- 34 State and derive Simpson's (1/3)rd rule for numerical integration (CO1,CO2,PO2,PO3)
- 35 Evaluate $\int_0^{\pi/2} \sqrt{\cos \theta} \, d\theta$ by dividing the interval into 10 equal parts.
 (CO1,CO2,PO2,PO3)
- 36 Evaluate $\int_1^3 dx/x$ using Simpson's (1/3)rd rule. (CO1,CO2,PO2,PO3)
- 37 State and derive Simpson's 3/8th rule for numerical integration. (CO1,CO2,PO2,PO3)
- 38 Evaluate $\int_{2t^2}^1 \sin t \, dt$ with $h = 0.1$ (CO1,CO2,PO2,PO3)
- 39 Evaluate $\int_0^6 y \, dx$ by using Simpson's ($\frac{3}{8}$)th rule from the data given below.
- | | | | | | | | |
|---|---|-----|-----|-----|--------|--------|-------|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| y | 1 | 0.5 | 0.2 | 0.1 | 0.0588 | 0.0385 | 0.027 |
- 40 Evaluate $\int_0^6 \frac{dx}{(1+x)^2}$ by using Simpson's ($\frac{3}{8}$)th rule. (take $h = 1$)
- 41 Evaluate $\int_4^{5.2} \log_e x \, dx$ by Simpson's ($\frac{3}{8}$)th rule (take $h = 0.2$)
- 42 If $f(0) = 1$, $f(0.6) = 0.625$, $f(1.2) = 0.4545$. find $\int_0^{1.2} f(x) \, dx$ using Simpson's ($\frac{1}{3}$)rd rule. (CO1,CO2,PO2,PO3)
- 43 Evaluate $\int_1^3 \frac{dx}{x}$ using Simpson's ($\frac{1}{3}$)rd rule (CO1,CO2,PO2,PO3)
- 44 Use Trapezoidal rule to evaluate $\int_0^1 x^3 \, dx$ consider 5 subintervals
- 45 Evaluate $\int_0^3 \frac{dx}{1+x}$ using Simpson's ($\frac{3}{8}$)th rule (CO1,CO2,PO2,PO3)
- 46 Given $\frac{dy}{dx} = x^2 + y$; $y(0) = 1$. Find $y(0.1)$, using Euler's method
 (CO1,CO2,PO2,PO3)
- 47 Given $\frac{dy}{dx} = x^2 - y$; $y(0) = 1$. Find $y(0.02)$, using Euler's method
 (CO1,CO2,PO2,PO3)



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- 48 Solve $\frac{dy}{dx} = -2y$; $y(0) = 1$. Using Euler's method, find $y(0.1)$ (CO1, CO2, PO2, PO3)
- 49 Find $y(0.2)$, $\frac{dy}{dx} = -y$; $y(0) = 1$, using Euler's method
- 50 Determine the value of $y(0.1)$ upto 4 decimal places by using Euler's modified Method (CO1, CO2, PO2, PO3)
- Given $y(0) = 1$, $\frac{dy}{dx} = x + y$ ($h = 0.05$)
- 51 Write the formula for Runge-kutta method of second order (CO1, CO2, PO2, PO3)
- 52 Solve $\frac{dy}{dx} = x + y$; $y(0) = 1$, using Runge-Kutta second order formula, find $y(0)$ And $y(0.2)$ (CO1, CO2, PO1, PO3)
- 53 Determine the value of y when $x=0.1$ by Euler's modified method $y(0) = 1$, $y(1) = x^2 + y$ (CO1, CO3, PO1, PO3)
- 54 Solve $\frac{dy}{dx} = y - \frac{2x}{y}$ using Euler's modified method. Determine the value of y correct Upto 3 decimal places when $x = 0.1$ Given that $y(0) = 1$ (CO1, CO3, PO1, PO3)
- 55 Use the Runge-Kutta fourth order formula to find the value of y when $x = 1$. Given that $y(0) = 1$, $\frac{dy}{dx} = \frac{y-x}{y+x}$ (CO1, CO2, PO2, PO3)
- 56 Using Runge-Kutta second order method find approximate value of $y(0.2)$ Given that $\frac{dy}{dx} = 1 + y^2$, $y(0) = 0$, $h = 0.2$ (CO1, CO2, PO2, PO3)
- 57 Determine the value of y when $x = 0.1$ by Euler's modified method Given that $\frac{dy}{dx} = x^2 + y$, with $y(0) = 0.94$ (CO1, CO2, PO2, PO3)
- 58 Solve $\frac{dy}{dx} = 1 - y$; $y(0) = 0$ Find $y(0.1)$, $y(0.2)$, $y(0.3)$ using Euler's method (CO1, CO2, PO2, PO3)
- 59 Solve $\frac{dy}{dx} = 1 + y^2$, $y(0) = 0$, find $y(0.1)$, $y(0.2)$, $y(0.3)$ using Euler's method (CO1, CO2, PO2, PO3)



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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

F.Y.B.Sc.(CS) 2023-24 SEM-I

MTC 112: Discrete Mathematics

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: In culcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In fuse ethical, human and professional values and responsibilities to make their contribution to the society.



A handwritten signature in purple ink, appearing to be 'Anand'.

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F.Y.B.Sc(CS) Mathematics II Discrete Mathematics

1. Define Cardinality of set. (CO1, CO2, PO1, PO3, PO4)
2. Explain Principle of Inclusion and Exclusion. (CO1, CO2, PO1, PO3, PO4)
3. Define predicate, Universal quantifier. (CO1, CO2, PO1, PO3, PO4)
4. State and prove De Morgan's law of Boolean Algebra. (CO1, CO2, PO1, PO3, PO4)
5. Define Homogeneous recurrence relations with example. (CO1, CO2, PO1, PO3, PO4)
6. Define the Pigeon-Hole Principle. Show that if there are 30 students in a class then at least two have their last names beginning with the same letter. (CO1, CO2, PO1, PO3, PO4)

7. Show that at a party of 20 persons, there are two persons who have same number of friends. (CO1, CO2, PO1, PO3, PO4)
8. Prove validity of following argument by using method of indirect proof. (CO1, CO2, PO1, PO3, PO4)

"If Meena marries Rohit, she will be in Nashik.

If Meena marries Tanmay, she will be in Baramati.

If she is either in Nashik or Baramati,

She will definitely be settled in life.

She is not settled in life.

Thus she did not marry Rohit or Tanmay.

9. Using method of indirect proof. Prove that "If n is integer & n^2 is odd then n is odd".

10. 11. Solve the following homogeneous recurrence relation. (CO1, CO2, PO1, PO2, PO4)

$$a_n = 3a_{n-1} + 4a_{n-2} \text{ for } n \geq 2, a_0 = 3, a_{10} = 5. \text{ find } a_7 \text{ and } a_{12}. \text{ (CO1, CO2, PO1, PO2, PO4)}$$

11. Express the following statements in symbolic form using quantifiers. Also write their negations. (CO1, CO2, PO1, PO2, PO4)

No rabbit knows calculus.

All Bollywood movies are serious.

12. Find the first six terms of the sequence defined by the following recurrence relation.

$$a_n = a_{n-1} + 3a_{n-2}, \text{ where } a_0 = 1, a_1 = 2 \text{ (CO1, CO2, PO1, PO2, PO4)}$$

13. Give an indirect proof of the following
 $r \rightarrow c, s \rightarrow \sim w, r \vee s, w \vdash c$ (CO1, CO2, PO1, PO2, PO4)

14. Suppose that a function is given by a Boolean expression such that $f(x_1, x_2, x_3) = (x_1 \vee x_2) \wedge x_3$. Find the disjunctive normal form of f . (CO1, CO2, PO1, PO2, PO4)

15. Define the principal of Inclusion-Exclusion for three sets and hence solve the following example : (CO1, CO2, PO1, PO2, PO4)

A survey of 100 students produced the following information: 30 speak English, 45 speak Hindi & 60 speak Marathi. It is also found that 10 speak both English & Hindi, 20 speak both Hindi & Marathi & 15 speak both English & Marathi & 5 speak all the three languages.

How many of these students speak none of the 3 languages.

How many of these students speak exactly two languages.

16. Draw the Hasse diagram of the poset D_{48} , the set of all divisors of 48 with respect to partial order relation "divides". (CO1, CO2, PO1, PO2, PO4)

17. Let $A = \{1, 2, 3\}$ and $B = \{a, b\}$ How many different functions are there from A into B and what are they? (CO1, CO2, PO1, PO2, PO4)

18. Solve recurrence relation : $a_r - 9a_{r-1} + 20a_{r-2} = 2r$. (CO1, CO2, PO1, PO2, PO4)



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19. Solve recurrence relation $a_r - 8a_{r-1} + 16a_{r-2} = 0$ with initial condition $a_2=16, a_3=48$.
(CO1,CO2,PO1,PO2,PO4)
20. State & prove Commutativity, Associativity, Absorption property of join & meet.
(CO1,CO2,PO1,PO2,PO4)
21. Find the number of integers between 1 to 1000 that are divisible by 2 or 3 or 7.
(CO1,CO2,PO1,PO2,PO4)
22. Test for tautology $[(p \wedge q) \rightarrow r] \rightarrow [p \rightarrow (q \rightarrow r)]$. (CO1,CO2,PO1,PO2,PO4)
23. Solve the following homogeneous recurrence relation (CO1,CO2,PO1,PO2,PO4)
 $a_n - 7a_{n-1} + 10a_{n-2} = 0$; $a_0 = 4, a_1 = 17$.
24. Let $A = \{a, b\}$ be a set. Show that $(P(A), \subseteq)$ is a Boolean algebra. Also find atoms in $P(A)$.
25. Prove that in a complemented distributive lattice, a complement of an element is unique.
26. Solve the recurrence relation (CO1,CO2,PO1,PO2,PO4)
 $a_n - 2a_{n-1} - 3a_{n-2} = n+1$, where $a_0=0, a_1=2$.
27. How many numbers are there between 100 & 1000 in which all the digits are distinct.
28. Find the number of permutations for the word 'VISITING', MISSISSIPPI, MAHARASHTRA.
29. How many ways are there to pick 2 different cards from a standard 52-cards such that 1) the first card is an ace and the second card is not a queen? (CO1,CO2,CO3,PO1,PO2,PO4)
30. In how many ways a cricket eleven can choose a captain and vice-captain from amongst themselves. (CO1,CO2,CO3,PO1,PO2,PO4)
31. Write the disjunctive normal form of each of the following:
1) $F(x_1, x_2) = x_1 \vee x_2$, here x_2 is bar.
2) $F(x_1, x_2) = x_1 \vee x_2$.
32. How many integers are there between 100 and 999 inclusive that are divisible by 3 but not by 4?
(CO1,CO2,CO3,PO1,PO2,PO4)
33. D_{12} = set of positive divisors of 12. Draw the Hasse diagram with divides relation. Determine whether it is a Boolean Algebra. (CO1,CO2,CO3,PO1,PO2,PO4)
34. Define valid argument. Write the following argument in symbolic form.
"Either I shall read a book or watch a movie. I shall not read a book. Hence I shall watch a movie."
(CO1,CO2,CO3,PO1,PO2,PO4)
35. How many friends must you have to guarantee that at least 10 of them will have birthday in the same month? (CO1,CO2,CO3,PO1,PO2,PO4)
36. List all possible functions from the set $A = \{a, b, c\}$ to the set $B = \{x, y\}$ (CO1,CO2,CO3,PO1,PO2,PO4)
37. Define tautology and give one example. (CO1,CO2,CO3,PO1,PO2,PO4)
38. Obtain the negation of each of the following (CO1,CO2,CO3,PO1,PO2,PO4)
a) $\forall x \in \mathbb{R}, x^2 - 10 \leq 8$
b) $\forall x \in \mathbb{R}, \forall y \in \mathbb{R}, x^2 + 3y > 4$
39. Define non homogeneous recurrence relation With example (CO1,CO2,CO3,PO1,PO2,PO4)
40. Show that $p \rightarrow q \equiv (\sim q) \rightarrow (\sim p)$ (CO1,CO2,CO3,PO1,PO2,PO4)



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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

S.Y.B.Sc (CS) 2023-24 SEM-III

MTC 231: Group & Coding Theory

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

CO4: A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: Inculcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: Infuse ethical, human and professional values and responsibilities to make their contribution to the society.



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S. Y.B.Sc.(CS) M-1 Groups & Coding Theory - 1

1. Define Division Algorithm.(CO1,CO2,PO2,PO3)
2. State Theorem of GCD.(CO1,CO2,PO2,PO3)
3. Let a, b, c integers. If $a|b$ and $a|c$ then $a|bx+cy$, for any integers x & y . (CO1,CO2,PO2,PO3)
4. Find GCD of numbers 4999 & also 1109 also express as $4999x+1109y$, where x & $y \in \mathbb{Z}$. (CO1,CO2,PO2,PO3)
5. Find GCD of numbers 3997 & 2947. (CO1,CO2,PO2,PO3)
6. Let a & b be integers, not both zero. Then a & b are relatively prime if & only if there exists integers x & y such that $1 = ax + by$. (CO1,CO2,PO2,PO3)
7. Show that congruence relation on set of integers is an equivalence relation. (CO1,CO2,PO2,PO3)
8. i) Find all congruence classes of \mathbb{Z} modulo 6 ii) Find all congruence classes of \mathbb{Z} modulo 4
9. If a, b, c, d is in \mathbb{Z} and n is in \mathbb{N} and $a \equiv b \pmod{n}$, $c \equiv d \pmod{n}$ then
i) $a+c \equiv b+d \pmod{n}$ ii) $a-c \equiv b-d \pmod{n}$ iii) $ac \equiv bd \pmod{n}$. (CO1,CO2,PO2,PO3)
10. Show that similarity of two triangles is an equivalence relation on the set of all triangles.
11. Define Group. (CO1,CO2,PO2,PO3)
12. Let $W = \{1, -1, i, -i\}$ be a subset of complex numbers. Show that W is a group under complex multiplication. (CO1,CO2,PO2,PO3)
13. Let $\mathbb{Z}_4 = \{0, 1, 2, 3\}$ be a set of all residue classes modulo 4. Show that $(\mathbb{Z}_4, +_4)$ is a group
14. Show that the set $\mathbb{R}^n = \{(a_1, a_2, \dots, a_n) / a_1, a_2, \dots, a_n \in \mathbb{R}\}$ is a group under componentwise addition. (CO1,CO2,PO2,PO3)
15. We define $U(n)$ as the set of all positive integers less than n & relatively prime to n . Show that $U(10)$ forms a group under multiplication modulo 10. (CO2,CO3,PO1,PO4)
16. State & prove Cancellation Laws. (CO2,CO3,PO1,PO4)
17. State & prove socks - shoes Property. (CO2,CO3,PO1,PO4)
18. Show that the equation $a*x=b$ has a unique solution for any $a, b \in G$. (CO1,CO2,PO2,PO3)
19. If in a group G , The square of every element is the identity element then prove that G is abelian. (CO2,CO3,PO1,PO4)
20. Prove that a group G is abelian if and only if $(a*b)^{-1} = a^{-1}*b^{-1}$ for all $a, b \in G$. (CO2,CO3,PO1,PO4)
21. Define Order of Group, Order of Elements
22. Find the order of each element of a group $(\mathbb{Z}_{10}, +_{10})$. (CO2,CO3,PO1,PO4)
23. Prove that the order of an element of a group is the same as that of its inverse a^{-1} .
24. State & Prove One - Step Subgroup Test. (CO2,CO3,PO1,PO4)
25. Find all subgroups of \mathbb{Z}_{12} . (CO2,CO3,PO1,PO4)
26. Is $U(10)$, a multiplicative group modulo 10 is a cyclic group? (CO2,CO3,PO1,PO4)
27. Subgroup of a cyclic group is cyclic. (CO2,CO3,PO1,PO4)
28. Define: Permutation of Group, Degree of Permutation, Identity Permutations, Inverse Permutations. (CO2,CO3,PO1,PO4)
29. Let G be a group of order 12. Find all possible orders of subgroups of G . (CO2,CO3,PO1,PO4)
30. Let $G = \mathbb{Z}_4$ & $H = \{0, 2\}$ be its subgroup under addition modulo 4. Find all cosets of H in G . (CO2,CO3,PO1,PO4)
31. Define encoding function $e: B^3 \rightarrow B^4$ as follows $e(b) = b_1b_2b_3b_4$ where $b_4 = b_1$ for $m = 3$ write code words. (CO1, CO2,CO3,PO1, PO3,PO4)



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32. For $e: B^3 \rightarrow B^6$, (3, 6) encoding function, find the minimum distance.
 $e(000)=00000, e(001)=001001, e(010)=010010, e(011)=011011, e(100)=100100, e(101)=10101, e(110)=110110, e(111)=111111$.(CO1, CO2, CO3, PO1, PO3, PO4)

33. Define Parity Check Matrix .(CO1, CO2, CO3, PO1, PO3, PO4)

34. Consider the (3, 5) encoding function $e: B^3 \rightarrow B^5$ defined as:
 $e(000) = 00000, e(100)=10011, e(001)=00110, e(101)=10101, e(010)=01001, e(110)=11010$
 $e(011)=01111, e(111)=11100$.(CO1, CO2, CO3, PO1, PO3, PO4)

Decode the following words using maximum likelihood decoding function.
11001 b)01010 c) 00111. .(CO1, CO2, CO3, PO1, PO3, PO4)

35. Let $p=11$, $q=5$ and $e=7$. Using RSA method encode the message 'GOOD'. .(CO1, CO2, CO3, PO1, PO3, PO4)

36. Encode the word **MATHS** using RSA method. Let $p=3, q=11$ & $e=3$. .(CO1, CO2, CO3, PO1, PO3, PO4)

37. Decode the message **MACNY** using RSA method where, public key is 3 & $p=3, q=11$. .(CO1, CO2, CO3, PO1, PO3, PO4)

38. Determine the public key s, n if $p=79, q=89$ & $t=119$. .(CO1, CO2, CO3, PO1, PO3, PO4)

39. Define Message & word. .(CO1, CO2, CO3, PO1, PO3, PO4)

40. Define Code word & Weight of a code or Hamming Weight. .(CO1, CO2, CO3, PO1, PO3, PO4)



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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

F.Y.B.Sc(CS) 2023-24 SEM-I

MTC 111: Matrix Algebra

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: In culcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In fuse ethical, human and professional values and responsibilities to make their contribution to the society.



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Assignment No.1 Introduction to Matrix Algebra

1. Let $A = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ Find $A(BA)$. (CO1,PO1)
2. Let $A = \begin{bmatrix} 4 & 1 \\ -7 & 6 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 3 \\ 4 & 5 \end{bmatrix}$ Find $A+AB-3I_2$. (CO2,PO1,PO3)
3. If $X = \begin{bmatrix} 6 & 2 \\ 1 & -2 \end{bmatrix}$, $Y = \begin{bmatrix} 3 & 0 \\ 6 & 2 \end{bmatrix}$ Whether it is commutative or not.
(CO1,PO1,PO4)
4. Find the inverses of the following matrix $\begin{bmatrix} 8 & 6 \\ 5 & 4 \end{bmatrix}$. (CO3,PO2,PO4)
5. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 1 & 1 \\ 3 & 2 & 4 \end{bmatrix}$, if it exists. (CO1,PO2,PO3)
6. Let $A = \begin{bmatrix} 5 & 1 \\ 3 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 \\ 4 & 3 \end{bmatrix}$. Show that $AB \neq BA$. (CO3,PO2)
7. Find the inverses of the following matrix $\begin{bmatrix} 3 & 2 \\ 7 & 4 \end{bmatrix}$. (CO1,PO3)
8. Find the inverses of the following matrix $\begin{bmatrix} 3 & -2 \\ 7 & 4 \end{bmatrix}$. (CO2,PO3,PO4)
9. Let $A = \begin{bmatrix} x & -1 & 2 \\ 3 & 4 & 5 \\ -1 & 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 \\ y \\ 4 \end{bmatrix}$. If $AB = \begin{bmatrix} 16 \\ -3 \\ -5 \end{bmatrix}$, find x and y. (CO3,PO1,PO4)
10. Let $A = \begin{bmatrix} 3 & -6 \\ -1 & 2 \end{bmatrix}$ construct a 2×2 matrix B such that AB is a zero matrix.
(CO2,PO2,PO3)



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Assignment No.2 Linear Equations in Linear Algebra-I

1. Determine if the following system is consistent:

$$x_2 + 4x_3 = -5$$

$$x_1 + 3x_2 + 5x_3 = -2$$

$$3x_1 + 7x_2 + 7x_3 = 6. \text{ (CO3, PO2)}$$

2. Determine, if the following system has unique solution.

$$x_1 - 3x_3 = 8$$

$$2x_1 + 2x_2 + 9x_3 = 7$$

$$x_2 + 5x_3 = -2. \text{ (CO1, PO3)}$$

3. Compute

$$(i) \begin{bmatrix} 1 & 2 & -1 \\ 0 & -5 & 3 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \\ 4 \end{bmatrix}$$

$$(ii) \begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix}. \text{ (CO2, PO3, PO4)}$$

4. Let $A = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 3 & 1 \\ -1 & -2 & 1 \end{bmatrix}$ then compute $5I_3 - A$. (CO3, PO1, PO4)

5. Solve the system of linear equation,

$$x + 2y + 3z = 1$$

$$4x + 5y + 6z = 3$$

$$7x + 8y + 9z = 3. \text{ (CO2, PO2, PO3)}$$

6. Use invertible matrix theorem to decide if A is invertible, where,

$$A = \begin{bmatrix} 1 & 0 & -2 \\ 3 & 1 & -2 \\ -5 & -1 & 9 \end{bmatrix}. \text{ (CO1, PO1)}$$



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Assignment No.3 Linear Equations in Linear Algebra-II

1. Find LU factorization of following matrix $\begin{bmatrix} 2 & 5 \\ -3 & -4 \end{bmatrix}$. (CO2,PO1)

2. Find LU factorization of following matrix $\begin{bmatrix} 3 & -1 & 2 \\ -3 & -2 & 10 \\ 9 & -5 & 6 \end{bmatrix}$. (CO1,PO2,PO3)

3. Let $A = \begin{bmatrix} 2 & 3 \\ 0 & -1 \\ 1 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ -2 & 1 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 4 & 1 \\ -1 & 0 & 3 \end{bmatrix}$, $D = \begin{bmatrix} 0 & -1 & 1 \\ 5 & 2 & 1 \\ 2 & 3 & 4 \end{bmatrix}$,

$E = \begin{bmatrix} 1 & 1 & 1 \\ 3 & 2 & 3 \\ 6 & -1 & 4 \end{bmatrix}$, compute the following if the operations are feasible.

(i) $-3(D+2E)$, (ii) $2B-C$, (iii) AB , (iv) BA , (v) $(3E)(D)$,

(vi) $(AB)C$. (CO1,PO2,PO3)

4. Convert the matrix $A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}$ into LU factorization and use to solve

$Ax=b$ where $b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix}$. (CO3,PO2,PO4)

5. Describe all solution of $AX = b$, where;

$A = \begin{bmatrix} 3 & 5 & -4 \\ -3 & -2 & 4 \\ 6 & 1 & -8 \end{bmatrix}$, $b = \begin{bmatrix} 7 \\ -1 \\ -4 \end{bmatrix}$. (CO1,PO2,PO3)

6. Row reduce the matrix A below to echelon form, and locate the pivot

columns of A $A = \begin{bmatrix} 0 & -3 & -6 & 4 & 9 \\ -1 & -2 & -1 & 3 & 1 \\ -2 & -3 & 0 & 3 & -1 \\ 1 & 4 & 5 & -9 & -7 \end{bmatrix}$

(CO2,PO2)



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Assignment No.4 Determinants

1. Use a cofactor expansion across the third row to compute $\det A$, where, $A =$

$$\begin{bmatrix} 1 & 5 & 0 \\ 2 & 4 & -1 \\ 0 & -2 & 0 \end{bmatrix}. \text{ (CO1, PO1, PO3)}$$

2. Compute $\det A$, where, $A = \begin{bmatrix} 3 & -7 & 8 & 9 & -6 \\ 0 & 2 & -5 & 7 & 3 \\ 0 & 0 & 1 & 5 & 0 \\ 0 & 0 & 2 & 4 & -1 \\ 0 & 0 & 0 & -2 & 0 \end{bmatrix}. \text{ (CO1, PO2)}$

3. Find determinant of the matrix.

$$A = \begin{bmatrix} 2 & 4 & 5 & 6 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & -1 & 5 & 6 & 9 \\ 0 & 0 & 0 & 2 & 5 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & \frac{3}{2} \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \end{bmatrix}. \text{ (CO1, PO1)}$$


4. Compute the determinants of a matrix A by cofactor expansions. At each step choose a row and column that involves the least amount of computation.

$$A = \begin{bmatrix} 6 & 0 & 0 & 5 \\ 1 & 7 & 2 & -5 \\ 2 & 0 & 0 & 0 \\ 8 & 3 & 1 & 8 \end{bmatrix}. \text{ (CO3, PO1, PO3)}$$

5. Find determinant of the matrix,

$$A = \begin{bmatrix} 4 & 0 & 0 & 0 \\ 7 & -1 & 0 & 0 \\ 2 & 6 & 3 & 0 \\ 5 & -8 & 4 & -3 \end{bmatrix}. \text{ (CO2, PO3)}$$




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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

S.Y.B.Sc(CS) 2023-24 SEM-IV

MTC 242: Operations Research

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: In culcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In fuse ethical, human and professional values and responsibilities to make their contribution to the society.



A handwritten signature in purple ink, appearing to be "D. P. M." with a stylized flourish.

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Assignment No.1 Linear Programming Problem

Define Operation Research (CO1,PO1,PO4)

Explain Scope of Operation Research(CO1,CO3,PO2)

Applications & Limitations Of OR(CO2,CO3,PO3)

Mathematical Model of LPP (CO1,CO2,PO2,PO3)

Draw a Feasible region for the following constraints.

(CO1,CO2,PO2,PO3)

$$x+2y \geq 10$$

$$x+y=6 \quad x,y \geq 0$$

Find feasible region for the following LPP: (CO1,CO2,PO2,PO3)

Maximize $Z = x+y$

Subject to, $2x+3y=5$

$$2x+3y=3 \quad x,y \geq 0$$

A Production manager wants to determine the quantity to be produced per month of products A & B manufactured by his firm. The raw materials required per unit of product A is 60 Kg. & that for per unit of product B is 20 Kg. The availability of the raw material is 12,00 Kg. Machine hours required per piece of product A & B is 8 & 5 respectively. The assembly of products A & B per piece required 3 man hours & 4 man hours respectively. The machine hours & man hours available to maximum of 600 & 500 respectively. The profit per unit of A is Rs.30 & B is Rs.40. Formulate the LPP & solve it by graphical method. ((CO1,CO2,PO2,PO3)

A firm manufactures headache pills in two sizes A & B. Size A contains 2 grains of aspirin, 5 grains of bicarbonate & 1 gram of codeine. Size B contains 1 grain of aspirin, 8 grains of bicarbonate & 6 grains of codeine. It is found by users that it requires at least 12 grains of aspirin, 74 grains of bicarbonate & 24 grains of codeine for providing immediate effect. It is required to determine the least number of pills a patient should take to get immediate relief. Formulate the problem as a LPP & solve it by graphically. (CO1,CO2,PO2,PO3)

Solve following LPP by graphically & find optimum solution (CO1,CO2,CO3,PO2,PO3)

a) $\text{Max } Z = 24x + 8y$

b) $\text{Min } Z = 3x + 4y$

Subject to, $2x + 3y \leq 40$

Subject to, $2x + 3y \geq 36$

$$(CO1,CO2,PO2,PO3) 4x + y \leq 20$$

$$2x + 2y \geq 28$$

$$10x + 8y \leq 60 \quad x, y \geq 0$$

$$8x + 2y \geq 32, x, y \geq 0$$

c) $\text{Max } Z = 80x + 120y$

d) $\text{Min } Z = 40x + 100y$

Subject to, $x + y \leq 9$

Subject to, $12x + 6y \leq 3000$

$$x \geq 2, \quad y \geq 3,$$

$$4x + 10y \leq 900$$

$$6x + 5y \leq 60 \quad x, y \geq 0$$

$$2x + 3y \leq 900 \quad x, y \geq 0$$



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Assignment No.1

Que.1) Find the initial basic feasible solution of the following transportation problem by North West Corner Method. Is this solution optimal? If not find an optimal solution. (CO1, PO1, PO2)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	7	3	8	6	60
O ₂	4	2	5	10	100
O ₃	2	6	5	1	40
Demand	20	50	50	80	

Que .2) Find the initial basic feasible solution of the following transportation problem by North West Corner Method. Is this solution optimal? If not find an optimal solution. (CO1, CO2, PO2, PO3)

	I	II	III	Supply
A	16	20	12	200
B	14	8	18	160
C	26	24	16	90
Demand	180	120	150	

Que.3) Find the IBFS for the following transportation problem by matrix minima Method. (CO2, CO3, PO2, PO3, PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	2	4	1	3	200
O ₂	2	2	1	4	250
Demand	150	75	200	100	

Ques.4) Find the IBFS for the following transportation problem by matrix minima Method. (CO2, CO3, PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	1	2	1	4	30
O ₂	3	3	2	1	50
O ₃	4	2	5	9	20
Demand	20	40	30	10	

Que.5) Find IBFS for the following T.P. using VAM. Also find the optimal solution by MODI Method. (CO2, CO3, PO4)

Origin	D ₁	D ₂	D ₃	Supply
O ₁	40	70	90	300
O ₂	12	80	30	400
O ₃	60	90	45	200
Demand	300	300	300	



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Que.6) Find IBFS for the following T.P. using VAM. Also find the optimal solution by MODI Method. .(CO2,CO3,PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	5	3	6	4	30
O ₂	3	4	7	8	15
O ₃	9	6	5	8	15
Demand	10	25	18	7	

Que.7) Solve the following T.P. by VAM to maximize the profit. (CO2,CO3,PO3,PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	90	90	100	100	200
O ₂	50	70	130	85	100
Demand	75	100	100	30	

Que.8) Solve the following T.P. by VAM to maximize the profit. (CO2,CO3,PO3,PO4)

Origin	D ₁	D ₂	Supply
O ₁	19	17	20
O ₂	8	1	30
O ₃	12	5	40
Demand	35	30	

Que.9) Explain mathematical Formulation of T.P. .(CO2,CO3,PO3,PO4)

Que.10) Explain degeneracy in the T.P. How it can be resolved. .(CO2,CO3,PO3,PO4)



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Assignment No.3

Que.1 Solve the following assignment problems to maximize the profit

(CO1,CO2,CO3,PO1,PO2)

1)

	A	B	C	D	E
I	30	37	40	28	40
II	40	24	27	21	36
III	40	32	33	30	35
IV	25	38	40	36	36
V	29	32	41	34	39

2)

	M ₁	M ₂	M ₃	M ₄
J ₁	5	7	11	6
J ₂	8	5	9	6
J ₃	4	7	10	7
J ₄	10	4	8	3

3)

	1	2	3	4
I	30	37	40	28
II	40	24	27	21
III	40	32	33	30
IV	25	38	40	36
V	29	32	41	34

4)

	A	B	C	D	E
1	62	78	50	101	82
2	71	84	61	73	59
3	87	92	111	71	81
4	48	64	87	77	80

Que.2) Solve the assignment problems for minimum costs. (CO3,PO2,PO3,PO4)

1)

	M ₁	M ₂	M ₃	M ₄
J ₁	10	10	-	7
J ₂	12	9	7	8
J ₃	14	8	10	-
J ₄	12	7	11	12

2)

	I	II	III	IV	V
A	3	4	10	15	8
B	4	7	15	18	8
C	8	12	20	20	12
D	5	5	8	10	6
E	10	10	15	25	10

3)

	A	B	C
J ₁	470	580	410
J ₂	385	920	740
J ₃	880	550	430

4) Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows. Determine the optimum assignment schedule.(CO1,CO3,PO3,PO4)



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		Job				
		1	2	3	4	5
Person	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

5) Solve the following assignment problem.(CO1,CO2,CO3,PO3,PO4)

		Men		
		1	2	3
Task	P	9	26	15
	Q	13	27	6
	R	35	20	15
	S	18	30	20

6) Mathematical representation of Assignment problem.(CO1,PO1,PO4)

7) Explain Hungarian Method to solve Assignment problem. (CO1,PO1,PO4)

MCQ QUESTIONS: (CO1,PO1,PO4)

1. If the number of rows and columns in an assignment problem are not equal than it is called problem. (a) Prohibited (b) infeasible (c) unbounded (d) unbalanced

2. The method of solution of assignment problems is called method.

(a) NWCR (b) VAM (c) LCM (d) Hungarian

3. When a maximization assignment problem is converted in minimization problem, the resulting matrix is called (a) Cost matrix (b) Profit matrix (c) Regret matrix (d) Dummy matrix

4. The extra row or column which is added to balance an assignment problem is called

(a) Regret (b) epsilon (c) dummy (d) extra

5. When a particular assignment in the given problem is not possible or restricted as a condition, it is called a problem.

(a) Infeasible (b) degenerate (c) unbalanced (d) prohibited

6. If in an assignment problem, number of rows is not equal to number of columns then

(a) Problem is degenerate (b) Problem is unbalanced (c) It is a maximization problem (d) Optimal solution is not possible



[Signature]

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P.V.G's College of Science and Commerce, Pune-09

Internal Exam Seat number List MARCH-2024

S.Y.BSc.(CS)

Subject Name: Operational Research

Subject Teacher Name: Asst. Prof. Mohini Pardeshi

Exam Seat No.	Student Name	Internal Marks	Assignment	Best of two	Sign
2204	PANGUL ABHIJEET DATTATRAYA	9	10	10	Abhijeet
2205	ANAWALIKAR NILAJA ANANDRAJ	11	12	12	Nilaja
2206	ANISH NILESH PATASKAR	6	10	10	Anish
2207	KALE ATHARV AVINASH	9	10	10	Atharv
2208	BADHE RACHANA YASHWANT	10	11	11	Rachana
2209	BADODKAR GAYATRI SACHIN	7	12	12	Gayatri
2210	HARSHAD SUNIL BANGALE	10	11	11	Harshad
2211	BARGE ABHISHEK MILIND	9	11	11	Abhishek
2212	ADITYA GANESH BHOJ	10	11	11	Aditya
2213	BHORDE KOMAL CHANDRAKANT	9	12	12	Komal
2214	BORA RONAK SACHIN	12	12	12	Ronak
2215	CHAVAN SUBODH SANJAY	12	12	12	Subodh
2216	CHAVARE SOUMITRA SAMEER	12	13	13	Soumitra
2217	DEVANG GOPINATH DATIR	8	11	11	Devang
2218	DEO SWARADA SUHAS	12	13	13	Swarada
2219	DHRUV MANOJ DESHPANDE	10	12	12	Dhruv
2220	DEVDAAS GORAKSHNATH KHANEKA	10	12	12	Devdaas
2221	DEVEN MAHESH KULKARNI	11	12	12	Deven
2222	DHAMAL VEDANT SANTOSH	12	13	13	Vedant
2223	DHEBE SAMEER SITARAM	10	11	11	Dhebe
2224	CHETANA SACHIN DHINDALE	10	12	12	Chetana
2225	GAIKWAD NAMRATA NITIN	11	12	12	Namrata
2226	GAIKWAD OMKAR MILIND	12	13	13	Omkar
2227	GANESH KALIDAS NAGTILAK	11	13	13	Ganesh
2228	GAVAND SHRAVANI ANIL	8	11	11	Shravani
2229	GHALME SUJIT VIJAY	4	8	8	Sujit
2230	ANKITA ANKUSH GHOGARE	9	11	11	Ankita
2231	GHULE VINAYAK SANJAY	11	12	12	Vinayak
2232	ATHARV NILESH GOTAD	2	8	8	Atharv
2233	HOMKAR PRATIK MAHADEV	9	12	12	Pratik
2234	JADHAV PRATHAMESH GANESH	7	10	10	Prathamesh
2235	JADHAV RUTUJA AJIT	13	15	15	Rutuja
2236	JAGTAP NANDINI DEEPAK	11	12	12	Nandini
2237	SANIKA JAGTAP	8	10	10	Sanika
2238	JARANDE TEJAS SURYAKANT	8	11	11	Tejas
2239	JANHAVI PRADIP JOSHI	10	12	12	Janhavi
2240	JOSHI KARAN JHUMBERLALI	7	10	10	Karan
2241	JOSHI OMKAR ANIRUDDHA	AB	6	6	Omkar
2242	JOSHI SUSHRUT SACHIN	4	8	8	Sushrut
2243	KADAM AVDHOOT SHRIKANT	8	10	10	Avdhoot
2244	KADAM KAJAL KISHOR	10	11	11	Kajal
2245	KADAM KARAN JALINDAR	8	12	12	Kadam
2246	KADAM SOURAV SACHIN	7	11	11	Sourav
2247	KALBHOR RADHIKA SACHIN	7	11	11	Radhika
2248	KAMBLE TANUJA RAJU	8	10	10	Tanuja



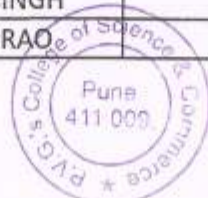
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Vidyanagari, S. No. 44, Pravat, Pune - 411 009.

Subject Name: Operational Research

Subject Teacher Name: Asst. Prof. Mohini Pardeshi

Exam Seat No.	Student Name	Internal Marks	Assignment	Best of two	Sign
2297	SHINDE ADITYA DHANAJI	10	12	12	Shinde
2298	SHINDE PRANAV DHANAJI	8	11	11	PS
2299	SHRAVAN RAMESH NALAWADE	9	10	10	Shrawan
2300	DAYAL SHRAVANI NARENDRA	7	10	10	
2301	SHRIMAY HARISH PADHYE	10	12	12	Spadhye
2302	SOHAM MAHESH KET	11	11	11	Soham
2303	SONAWANE RIYA PANDHARINATH	9	11	11	Sonawane
2304	ARYA RAHUL SUBHAGADE	7	11	11	Arya
2305	SUMIT PAVAN SUPEKAR	10	12	12	Sumit
2306	SOHAM MANOJ TAGADE	10	12	12	Soham
2307	AKSHAT NISHANT TASKAR	10	11	11	Akshat
2308	UGHADE ADITYA NITIN	8	11	11	
2309	VAIDYA SIDDHESH SHASHANK	8	10	10	Vaidya
2310	VAISHNAVI BALASAHEB MATE	11	13	13	Vaishnavi
2311	SANSKRUTI VINDO VEYWHARE	7	11	11	Sanskriti
2312	VHARKAT BHAVANA MAHESH	8	12	12	Vharkat
2313	VIBHUTE ASHUTOSH SANJAY	10	11	11	Vibhute
2314	YEDE VISHAL ANKUSH	10	11	11	Yede
2315	YADAV NITISH RAMSAGAR	9	11	11	Yadav
2316	HARSHAVARDHAN TATYASO ZAM	11	12	12	Harshavardhan
2317	HRISHIKESH VIJAY ZUNGARE	8	11	11	Hrishikesh
2318	AGATKAR SWAPNIL SUNIL	11	13	13	Agatkar
2319	ANANDE SNEHA SATISH	9	11	11	Anande
2320	BANSOD AKSHATA ANAND	9	13	13	Bansod
2321	ADITYA VINOD BET	9	10	10	Aditya
2322	RUTUJA RAJENDRA BHADIRGE	11	13	13	Rutuja
2323	BHISE VIVEK YASHWANT	11	12	12	Bhise
2324	BONGALE PURVA DHANVAKUMAR	6	11	11	Bongale
2325	SHREYA PRITHVIRAJ CHAVAN	7	10	10	Shreya
2326	CHAVAN VISHWADEEPTI AJAY	10	13	13	Chavan
2327	CHOUDHARI MRUNAL VITTHAL	10	12	12	Choudhari
2328	DEO NIKHIL GIRISH	12	13	13	Deo
2329	DESHMUKH ATHARVA MANGESH	11	12	12	Deshmukh
2330	DESHMUKH SRUSHTI VINAYAK	9	11	11	Deshmukh
2331	DEWALE SNEHAL MANOHAR	9	12	12	Dewale
2332	DHANDE NARAYAN RAJABHAU	10	12	12	Dhande
2333	DHADE SUDIKSHA DEEPAK	10	12	12	Dhade
2334	DHIWAR MUGDHA SUNIL	8	12	12	Dhiwar
2335	DHOTRE SAKSHI SANTOSH	8	12	12	Dhotre
2336	DUDHAL ISHITA KISHOR	13	13	13	Dudhal
2337	GADEKAR PRATIKSHA ANIL	11	13	13	Gadekar
2338	GAVHANE ATHARVA PANDURANG	8	10	10	Gavhane
2339	GHODEKAR OM BALASAHEB	11	12	12	Ghodekar
2340	HOLKAR SHRAVANI SANTOSH	12	13	13	Holkar
2341	HONRAO RUDRESH LALIT	10	13	13	Honrao
2342	JANGAM SIDDHI SANDIP	9	12	12	Jangam
2343	JEENA LOKESH GOPAL SINGH	11	12	12	Jeena
2344	KARANDE PRATIK BABURAO	7	10	10	Karande



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Pune - 411 009.

Pune Vidyarthi Griha's College of Science & Commerce,Pune-09

2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

**F.Y.M.Sc(CA)2023-24SEM-II CA
562B MJ: C# and .NET**

Course Outcomes:

CO1: Understand the VB.NET, C# and ASP

CO2: Design and develop window based and web based.NET applications.

CO3: Design and Implement database connectivity using ADO.NET.

Program Outcome:

PO1: Demonstrate understanding of fundamental and advance concepts in emerging areas

PO 2: Design and develop innovative computer applications.

PO3: Analyze existing research reported in the literature

PO 4: Propose alternate solutions by undertaking research work.

PO 5: Create efficient, reliable, readable and maintainable code.

PO6: Demonstrate a deeper understanding of the chosen domain.

PO 7: Select appropriate method to solve the given problem

PO8: Explain complex technical concepts clearly andeffectively, both in written and oral forms.

PO9: Demonstrate ability to collaborate effectively with team members, understand different perspectives, and contribute productively to become successful professional.

PO10: Demonstrate ability to work with integrity and a sense of social responsibility.

PO 11: Demonstrate self and life-long learning skills

PO12: Solve computational problems innovatively

PO13: Apply knowledge gained and critical thinking to develop real-world applications.

Practical Assignments

1. Write a program to check whether the number is even or odd and print an appropriate message to the user. (CO1, PO1, PO5, PO7)

2. Write a program which will find all such numbers which are divisible by 5. (CO1, PO1, PO5, PO7)

3. Write a program which can compute the factorial of a given number. (CO1,PO1,PO5, PO12)

4. Write a program that prints out all the elements of the list that are less than10. (CO1,PO1, PO7)

5. Write a program to determine whether the number is prime or not.(CO1,PO1,PO5,PO12)

6. Write a program to check whether a number is palindrome or not (using recursion and without recursion). (CO1, PO1, PO5, PO12)

7. Write a C# program that reads a number from the user and calculates its squareroot. Handle the exception if the number is negative. (CO1, PO1, PO5, PO6)

8. Write a C# program that prompts the user to input two numbers and divides them.Handle exceptions when the user enters non-numeric values. (CO1, PO1, PO5, PO8)

9. Write a C# program that takes three letters and displays the min reverse order. (CO1,PO1, PO5)

10. Write a C# program to check if a character is a vowel, a digit, or any other symbol. (CO1, PO1, PO5)

11. Write a C# program to accept a person's height in centimeters and categorize them according to their height. (CO1, PO1, PO5)

12. Write a C# program to read roll no, name, and marks of three subjects and calculate the total, percentage, and division. (CO1, CO3, PO1, PO5, PO13)

13. Write a menu-driven program in C# for simple calculations.(CO1, PO5, PO7)



14. Write a program to input a string and count the number of spaces in it.(CO1, PO5,PO7)
15. Write a program to calculate the sum of elements in an array.(CO1,PO5,PO7)
16. Write a recursive function to find the factorial of a number.(CO1,PO1,PO5, PO12)
17. How to interact with the user using the Request. Query String command.
(CO1,PO8, PO13)
18. Write a program to inter act with the user using the Request. Form command.
(CO1,PO8, PO13)
19. Write a program to inter act with the user through radio but to ns using the Request.
Form command. (CO1, PO8, PO13)
20. Write a program to create an open connection to a dates our ce using the ADOC
connection object to access and manipulate a database. (CO3, PO5, PO6, PO13)



P.V.G.'s College of Science & Commerce, Pune
Marklist

Internal Exam - April 2024

Class: F.Y.M.Sc.(CA)
Sem II

Subject Code: CS-562B MJ

Subject Name: C#.NET

Sr No.	Internal Exam Seat Number	Name of Candidate	Internal Evaluation mode and marks			
			Assignment Marks (15M)	Int. Test Score (15M)	Best out of 2 evaluation (15M)	Sign
1	1	RISHABH MAHADEV GAWADE	15	7	15	R. Gade
2	2	KAUSTUBH SURESH PALLOD	15	7	15	K. Pallo
3	3	BANGALE VAISHNAVI ASHOK	14	7	14	B. Bangale
4	4	LAVANYA SUNIL CHAUDHARY	10	AB	10	L. Chaudhary
5	5	MUTHA KHUSHI ATUL	9	10	10	M. Mutha
6	6	ROHIT SATISH THEURKAR	10	7	10	R. Theurkar
7	7	KOMAL RAMCHANDRA DHUMAL	8	10	10	K. Dhumal
8	8	PALAVAKAR SHAIKESH RAJENDRA	8	11	11	P. Rajendra
9	9	PATIL VIRAJ SANDESH	8	11	11	P. Viraj
10	10	PATHAN WAHID MUNNA	8	11	11	P. Wahid
11	11	POTEKAR YASH ANKUR	15	10	15	P. Yash
12	12	JADHAV NIKHIL SAMEER	10	7	10	N. Nikhil
13	13	POL SAKSHI RAJU	10	10	10	P. Sakshi
14	14	BARGE AYUSH ABHIJEET	8	10	10	B. Ayush
15	15	GANI SHAHFAISAL IJAJNABI	13	7	13	G. Shah
16	16	BORKAR RUTUJA RAJENDRA	10	10	10	B. Rutuja
17	17	UPARE YOGESH MADHUKAR	15	7	15	Y. Upare
18	18	SAWANT SHUBHAM SHANKAR	10	7	10	S. Shubham
19	19	SURYAWANSHI ROHIT VASANT	10	7	10	S. Rohit
20	20	KHIRSAGAR TANVI PRASAD	12	8	12	K. Tanvi
21	21	GAVALI CHINMAYEE CHETAN	12	6	12	G. Chetan
22	22	WADKAR RUTHVIK SURESH	10	7	10	W. Ruthvik
23	23	AKSHADA RAMDAS KAHADANE	15	9	15	A. Akshada
24	24	TIVAREKAR JANHAVI PRAVEEN	8	12	12	T. Janhavi
25	25	GHADAGE AMRUTA SANTOSH	8	11	11	G. Amruta
26	26	CHAVAN PRAJVAL UMESH	AB			
27	27	BHOME ATHARV VISHNU	14	7	14	B. Atharv
28	28	NAVALE BHAGYASHIRI RAJU	10	6	10	N. Bhagya
29	29	JADHAV SAYALI DINESH	15	11	15	J. Sayali
30	30	JAGTAP VISHWAJIT RAJKUMAR	10	7	10	J. Vishwa
31	31	KELKAR ATHARVA ABHIJIT	15	8	15	K. Atharva
32	32	GOSAVI CHETAN GAJENDRA	10	8	10	G. Chetan
33	33	DNYANESH SANDIP AGARKAR	15	8	15	D. Sandip
34	34	DHOLE RAJ SHIVAJI	AB			



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Sr. No.	Internal Exam Seat Number	Name of Candidate	Internal Evaluation mode and marks			
			Assignment Marks (15M)	Int. Test Score (15M)	Best out of 2 evaluation (15M)	Sign
35	35	AWALE SEJAL SANJAY	8	10	10	<u>Awale</u>
36	36	YADAV GAURI KIRAN	8	10	10	<u>Yadav</u>
37	37	MAHURKAR VAIBHAVI DEEPAK	14	10	14	<u>Mahurkar</u>
38	38	GUJARATHI YASH PRASANNA	8	10	10	<u>Gujarathi</u>
39	39	KUTWAD ADITYA RAHUL	10	10	10	<u>Kutwad</u>
40	40	ADHAV PALAVI MANOHAR	13	10	10	<u>Adhav</u>
41	41	CHAVAN PREM NARAYAN	14	8	14	<u>Chavan</u>

Name & Sign of Subject Teacher:

Roshani Atae

Roshani Atae



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Pune - 411 009

P.V.G.'s College of Science & Commerce, Pune
Marklist

Internal Exam - April 2024

Class: F.Y.M.Sc.(Cs)

Sem: II

Subject Code: CS-564 MJ

Subject Name: ASP.NET Programming

Sr. No.	Internal Exam Seat Number	Name of Candidate	Assignment Marks (15M)	Int. Test Score (15M)	Best out of 2 evaluation (15M)	Sign
1	1	JADHAV ROSHAN MILIND	8	15	15	<i>Atkar</i>
2	2	YADAV ATHARV KISHOR	8	14	14	<i>Sayadav</i>
3	3	PRAJWAL PRAVIN PAWAR	8	13	13	<i>Burde</i>
4	4	ATHARVA MAHAVIR SALVE	AB			
5	5	DEVGHARKAR PRANAV MAHESH	8	12	12	<i>Devgharkar</i>
6	6	RUSHIKESH SANDIP BHAGAT	8	12	12	<i>Rushikesh</i>
7	7	SANCHIT VIKAS BHOSALE	8	11	11	<i>Sanchit</i>
8	8	KAKADE PRADNYA PRAKASH	AB			
9	9	CHAVAN ADITI SHRIRAM	15	11	15	<i>Chavan</i>
10	10	ASHTEKAR HARSH KISHOR	8	10	10	<i>Ashtekar</i>
11	11	NIRAVANE ANISH PRADEEP	15	10	15	<i>Niravane</i>
12	12	MARATHE SHLOK DHANANJAY	10	13	13	<i>Marathe</i>
13	13	KOKARE SAMRUDDHI BALKRISHNA	14	10	14	<i>Kokare</i>
14	14	KHOPADE SAMRUDDHI SACHIN	10	10	10	<i>Khopade</i>
15	15	TARU KOMLIKA KAILAS	12	11	12	<i>Taru</i>
16	16	RANE SHREYA SANJAY	11	11	11	<i>Rane</i>
17	17	SHINDE PARTH SANJAY	10	11	11	<i>Shinde</i>
18	18	SATPUTE NIKHIL NANDKISHOR	10	15	15	<i>Satpute</i>
19	19	PHAPALE SAI RAJESH	AB			
20	20	THOMBRE PRANAV PRASHANT	15	12	15	<i>Thombre</i>
21	21	NIMBALKAR SIDDHANT NITIN	10	13	13	<i>Nimbalkar</i>
22	22	LADKAT ESHITA SUJIT	AB			
23	23	MHAMANE VAIBHAV NAGESH	12	13	13	<i>Mhamane</i>
24	24	WAGHMARE SHRUSHTI SANTOSH	15	14	15	<i>Waghmare</i>
25	25	ATHARVA SACHIN SAMINDRE	10	13	13	<i>Atharva</i>
26	26	PRATHMESH VAJJINATH RAUT	11	10	11	<i>Prathmesh</i>
27	27	BHALSING AKANKSHA RAJENDRA	10	5	10	<i>Bhalsing</i>
28	28	MALI OMKAR SIDRAM	14	11	14	<i>Mali</i>
29	29	NAIK MANDAR RAJESH	12	12	12	<i>Naik</i>
30	30	VARTAK UDAYAN KAUSTUBH	15	12	15	<i>Vartak</i>
31	31	SHIRKE DIPALI SANDEEP	14	13	14	<i>Shirke</i>
32	32	SIDDHI SANJAY SHIVILKAR	AB			
33	33	TAVNOJI ADITYA ARJUN	AB			
34	34	KUL SAKSHI RAMBHAU	10	8	10	<i>Kul</i>
35	35	PORE MRUDULA JITENDRA	14	12	14	<i>Pore</i>
36	36	SALUNKHE RUSHIKESH GAJANAN	10	11	11	<i>Salunkhe</i>



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PVG College of science & commerce
FY. B.Sc. Animation AY 2023-2024
Subject - ANM101 FOUNDATION OF ART
SEM - I

Course Outcomes:-

Student will be able to:-

1. **CO1:** Could you please summarize the fundamental principles of drawing and handling
2. **CO2:** Materials, emphasizing the significance of design elements? Additionally, could you
3. **CO3:** Provide an example of how to apply one to two-point perspective in drawing.
4. **CO4:** Discuss the principles of colour theory and colour harmony in drawing and sketching.
5. **CO5:** Demonstrate rendering techniques with suitable styles and proportions.

Program Outcomes:-

- 1 **PO1:** Product Development: Analyse, design and develop novel products and Solutions for emerging new media opportunities.
- 2 **PO2:** Skill Competency: Demonstrate globally accepted competent skills in passive and interactive content space.
- 3 **PO3:** Problem Analysis: Identify, formulate and solve complex media design challenges using fundamental principles involved in technology, design and storytelling.
- 4 **PO4:** Modern Tool / Techniques usage: Select, adapt, and apply appropriate tools, techniques, resources to various activities, with an understanding of their boundaries...
- 5 **PO5:** Professional Ethics: Understand and commit to professional ethics and IP regulations, responsibilities, and norms of professional publishing practices based on Criteria.

Sketching (15 hrs.):

1. Assignment for Drawing Basic Shapes (Two and Three Dimensional)- **CO3, PO3**
2. Drawing and Developing five objects using Basic shapes. - **CO3, PO1, PO4**
3. (E.g. Car, Cup and Saucer)- **CO1, PO4**
4. Practicing Technique of Pencil Shading. – **CO4, PO4**
5. Making 10 point Grayscale using two of the Shading techniques. - **CO4, PO4**
6. Types of Colours (Primary, Secondary, Tertiary), demonstration and assignment- **CO4, PO4**
7. Sketching Eyes, Ear, Nose and lips. - **CO1, PO1, PO3**
8. Sketching Hand and Feet. – **CO1, PO1, PO3**
9. Sketching Human Face.- **CO1, PO1, PO3**
10. Foreshortening of hand and legs. - **CO2, CO3, PO3, PO4**
11. Assignment for Muscle Drawing. - **CO1, PO3**
12. Drawing Basic Human figure (Male, Female, and Child) - **CO1, PO1,**

Flipbook

1. Drawing different mannequin poses. - **CO3, PO1**
2. Sequential drawing for figures (E.g. - Walking, Running, Jumping) – **CO1, PO2**
3. Sequential drawing for objects (E.g. - Grain Sack, Cube with tail.) – **CO3, PO3**
4. Making a Flipbook for a "Ball with Tail" and colouring it - **CO3, PO3**
5. Making a Flipbook for "Growing Flower" or any other subject (of your choice) and colouring it - **CO4, PO4**

PVG College of science & commerce
FY. B.Sc. Animation AY 2023-2024
Subject – ANM102 BASICS OF ANIMATION
SEM - I

Course Outcomes:-

1. **CO1:** Identify and apply the 12 Animation Principles through Digital Animation.
2. **CO2:** Understand timing and motion through key-frames, holds and in-betweens
3. **CO3:** Demonstrate skills in the use of industry standard tools

Program Outcomes:-

1. **PO1:** Product Development: Analyse, design and develop novel products and
2. Solutions for emerging new media opportunities.
3. **PO2:** Skill Competency: Demonstrate globally accepted competent skills in passive and interactive content space.
4. **PO3:** Problem Analysis: Identify, formulate and solve complex media design challenges using fundamental principles involved in technology, design and storytelling.
5. **PO4:** Modern Tool / Techniques usage: Select, adapt, and apply appropriate tools, techniques, resources to various activities, with an understanding of their boundaries...
6. **PO5:** Professional Ethics: Understand and commit to professional ethics and IP regulations, responsibilities, and norms of professional publishing practices based on Criteria.

Assignment:-

- 1) Bouncing ball - **CO1, PO2**
- 2) Bouncing ball with different type of ball – **CO1, CO2, PO3**
- 3) Single Pendulum – **CO1, CO2, PO3**
- 4) Double Pendulum – **CO1 CO2, CO3,**
- 5) Cartoon Character - **CO1 CO2, CO3, PO4**
- 6) Character jump -**CO1, CO2, CO3,**
- 7) Arc - **CO1, CO2, CO3,**
- 8) Walk cycle – male - **CO1, CO2, CO3, PO3**
- 9) Walk cycle – female - **CO1, CO2, CO3, PO3**
- 10) Run cycle – male - **CO1, CO2, CO3, PO3**
- 11) Run cycle – female - **CO1, CO2, CO3, PO3**
- 12) Character acting with dialog – **CO1, CO2, PO1, PO3**
- 13) Masking - - **CO1, CO2, PO3**
- 14) Character Expression – **CO1, PO3**
- 15) Character animation with 12 principles - **CO1, CO2, CO3, PO3**

P.V.G's College of Science & Commerce, Pune 9

Class : F.Y.B.Sc. (Animation) Sem:I

Academic Year: 2023-24

Subject: ANM 101 Foundation of Art

Internal Evaluation Record

Roll No.	Student Name	Internal Marks (out of 30)	
		Int. Test Score (30)	Sign
FY.Ani 01	BAND YASH HEMANTKUMAR	✓ 19	
FY.Ani 02	BANDAL RUSHIKESH PANDURANG	✓ 18	
FY.Ani 03	BARAVKAR SHITAL RAJENDRA	✓ 17	
FY.Ani 04	BHALERAO SUJAL VIVEK	✓ 19	
FY.Ani 05	BHARATI SARIKA YADUNATH	✓ 16	
FY.Ani 06	BHOSALE YOGITA ANNASAHEB	✓ 18	
FY.Ani 07	BINIWALE NOOPUR SUSHIL	✓ 22	
FY.Ani 08	BOTRE CHAITANYA KHANDU	✓ 16	
FY.Ani 09	CHAUDHARI ATHARVA ANIL	✓ 16	
FY.Ani 10	DANAWALE HARSHAL MANOJ	✓ 13	
FY.Ani 11	DATIR MALHAR AMAR	✓ 16	
FY.Ani 12	GAIKWAD NIRJALA NITIN	✓ 15	
FY.Ani 13	GANGNE SNEHA DILIP	✓ 22	
FY.Ani 14	GUDDETI SHASHANK AMOL	✓ 12	
FY.Ani 15	GUJARATHI POORVA VIVEK	✓ 24	
FY.Ani 16	GUPTA ANURAG RAMPRAKASH	✓ 15	
FY.Ani 17	INGLE CHETAN ANANT	✓ 19	
FY.Ani 18	JADHAV PRAJWAL RAJENDRA	✓ 20	
FY.Ani 19	JAGTAP MALHAR DEEPAK	✓ 15	
FY.Ani 20	JAGTAP SAURABH UMESH	✓ 25	
FY.Ani 21	JAGTAP TANVI ANIL	✓ 24	
FY.Ani 22	JOSHI TANVI KIRAN	✓ 25	
FY.Ani 23	KADAM SAKSHI SACHIN	✓ 19	
FY.Ani 24	KALAP AKANKSHA ASHOK	✓ 19	
FY.Ani 25	KALE DIGVIJAY MADHUKAR	✓ 20	
FY.Ani 26	KALOKHE ATHARVA GANESH	✓ 23	
FY.Ani 27	KAMBLE ADITYA RAJARAM	✓ 23	
FY.Ani 28	KAMBLE AKANKSHA VILAS	✓ 20	
FY.Ani 29	KAMBLE SHWETA BASAVRAJ	✓ 22	
FY.Ani 30	KAMTHE SNEHA MOHAN	✓ 19	

P.V.G's College of Science & Commerce, Pune 9

Class : F.Y.B.Sc. (Animation) Sem:I

Academic Year: 2023-24

Subject: ANM 101 Foundation of Art

Internal Evaluation Record

Roll No.	Student Name	Internal Marks (out of 30)	
		Int.Test Score (30)	Sign
FY.Ani 31	KHANDAGALE SAKSHI ANIL	17	Sakshi
FY.Ani 32	KHOPADE OM GANESH	24	Khopade
FY.Ani 33	KHUNTE SAMRUDDHI YOGESH	24	Samruddhi
FY.Ani 34	KONDHALKAR SAHIL SUHAS	22	Sahil
FY.Ani 35	KULKARNI TANMAY CHINTAMANI	22	Tanmay
FY.Ani 36	KUSHWAHA ANSHUSINGH	21	Anshu
FY.Ani 37	MANDEKAR SIDDHI GANESH	19	Siddhi
FY.Ani 38	MANE RUPESH MANOJ	21	Rupesh
FY.Ani 39	MORE ADITYA SACHIN	17	Aditya
FY.Ani 40	MULAY VEDASTU DINESH	25	Vedastu
FY.Ani 41	MULE YUVRAJ NARAYAN	21	Yuvraj
FY.Ani 42	MUNOT RIYA ANAND	15	Riya
FY.Ani 43	NANGUDE SAMRUDDHI VIJAY	16	Samruddhi
FY.Ani 44	PAWAR ADITYA YOGESH	21	Aditya
FY.Ani 45	POL KARAN YOGESH	AB	
FY.Ani 46	RANAWARE NEERAJ GANESH	18	N.R
FY.Ani 47	RASANE SUJAL MANOJ	18	Sujal
FY.Ani 48	RASKAR SANISA SACHIN	21	Sanisa
FY.Ani 49	RATHOUR SACHIN DHARMBEER	16	Sachin
FY.Ani 50	ROKADE DHANASHRI RAVINDRA	24	Dhanashri
FY.Ani 51	SHARMA SUMAN RAMESH	24	Suman
FY.Ani 52	SHINDE ADITYA RAJU	18	Aditya
FY.Ani 53	SHINDE APOORVA ARUN	18	Apoorva
FY.Ani 54	SHINGATE SHREYAS SHESHERAO	18	Shreyas
FY.Ani 55	SINGIRAL RAHUL DEVENDRA	20	Rahul
FY.Ani 56	SONAWANE TANVI ANIL	16	Tanvi
FY.Ani 57	SURYAWANSHI ASHISH LIMBRAJ	20	Ashish
FY.Ani 58	TALEKAR SIDDHI PREMKUMAR	23	Siddhi
FY.Ani 59	VEER PRATIKSHA PRASAD	24	Pratiksha
FY.Ani 60	WAGH SHANTANU VISHNU	21	Shantanu

P.V.G's College of Science & Commerce, Pune 9

Class : F.Y.B.Sc. (Animation) Sem:I

Academic Year: 2023-24

Subject: ANM 102 Basic of Animation

Internal Evaluation Record

Roll No.	Student Name	Internal Marks (out of 30)	
		Int. Test Score (30)	Sign
FY.Ani 01	BAND YASH HEMANTKUMAR	30	<i>Yash B. Band</i>
FY.Ani 02	BANDAL RUSHIKESH PANDURANG	30	<i>Bandal</i>
FY.Ani 03	BARAVKAR SHITAL RAJENDRA	29	<i>Shital</i>
FY.Ani 04	BHALERAO SUJAL VIVEK	18	<i>Sujal</i>
FY.Ani 05	BHARATI SARIKA YADUNATH	28	<i>Sarika</i>
FY.Ani 06	BHOSALE YOGITA ANNASAHEB	29	<i>Y. Bhosale</i>
FY.Ani 07	BINIWALE NOOPUR SUSHIL	27	<i>SB</i>
FY.Ani 08	BOTRE CHAITANYA KHANDU	30	<i>Chaitanya</i>
FY.Ani 09	CHAUDHARI ATHARVA ANIL	28	<i>A. Chaudh</i>
FY.Ani 10	DANAWALE HARSHAL MANOJ	28	<i>Harshal</i>
FY.Ani 11	DATIR MALHAR AMAR	27	<i>Malhar</i>
FY.Ani 12	GAIKWAD NIRJALA NITIN	26	<i>Nirjala</i>
FY.Ani 13	GANGNE SNEHA DILIP	26	<i>Sneha</i>
FY.Ani 14	GUDDETI SHASHANK AMOL	24	<i>Shuddeti</i>
FY.Ani 15	GUJARATHI POORVA VIVEK	27	<i>Poorva</i>
FY.Ani 16	GUPTA ANURAG RAMPRAKASH	16	<i>Anurag</i>
FY.Ani 17	INGLE CHETAN ANANT	11	<i>Chetan</i>
FY.Ani 18	JADHAV PRAJWAL RAJENDRA	28	<i>Praj</i>
FY.Ani 19	JAGTAP MALHAR DEEPAK	19	<i>Malhar</i>
FY.Ani 20	JAGTAP SAURABH UMESH	29	<i>Saurabh</i>
FY.Ani 21	JAGTAP TANVI ANIL	28	<i>Tanvi</i>
FY.Ani 22	JOSHI TANVI KIRAN	29	<i>Tanvi</i>
FY.Ani 23	KADAM SAKSHI SACHIN	30	<i>Sakshi</i>
FY.Ani 24	KALAP AKANKSHA ASHOK	29	<i>Akalap</i>
FY.Ani 25	KALE DIGVIJAY MADHUKAR	27	<i>Digvijay</i>
FY.Ani 26	KALOKHE ATHARVA GANESH	25	<i>Atharva</i>
FY.Ani 27	KAMBLE ADITYA RAJARAM	28	<i>Aditya</i>
FY.Ani 28	KAMBLE AKANKSHA VILAS	27	<i>Kamble</i>
FY.Ani 29	KAMBLE SHWETA BASAVRAJ	26	<i>Shweta</i>
FY.Ani 30	KAMTHE SNEHA MOHAN	27	<i>Sneha</i>

P.V.G's College of Science & Commerce, Pune 9

Class : F.Y.B.Sc. (Animation) Sem:I

Academic Year: 2023-24

Subject: ANM 102 Basic of Animation

Internal Evaluation Record

Roll No.	Student Name	Internal Marks (out of 30)	
		Int.Test Score (30)	Sign
FY.Ani 31	KHANDAGALE SAKSHI ANIL	27	Sakshi
FY.Ani 32	KHOPEDE OM GANESH	30	Om
FY.Ani 33	KHUNTE SAMRUDDHI YOGESH	30	Samruddhi
FY.Ani 34	KONDHALKAR SAHIL SUHAS	11	Sahil
FY.Ani 35	KULKARNI TANMAY CHINTAMANI	28	Tanmay
FY.Ani 36	KUSHWAHA ANSHUSINGH	28	Anshu
FY.Ani 37	MANDEKAR SIDDHI GANESH	27	Siddhi
FY.Ani 38	MANE RUPESH MANOJ	21	Rupesh
FY.Ani 39	MORE ADITYA SACHIN	17	Aditya
FY.Ani 40	MULAY VEDASTU DINESH	28	Vedastu
FY.Ani 41	MULE YUVRAJ NARAYAN	29	Yuvraj
FY.Ani 42	MUNOT RIYA ANAND	26	Riya
FY.Ani 43	NANGUDE SAMRUDDHI VIJAY	22	Samruddhi
FY.Ani 44	PAWAR ADITYA YOGESH	28	Aditya
FY.Ani 45	POL KARAN YOGESH	AB	
FY.Ani 46	RANAWARE NEERAJ GANESH	27	Neeraj
FY.Ani 47	RASANE SUJAL MANOJ	13	Sujal
FY.Ani 48	RASKAR SANISA SACHIN	28	Sanisa
FY.Ani 49	RATHOUR SACHIN DHARMBEER	11	Sachin
FY.Ani 50	ROKADE DHANASHRI RAVINDRA	26	Dhanashri
FY.Ani 51	SHARMA SUMAN RAMESH	30	Suman
FY.Ani 52	SHINDE ADITYA RAJU	11	Aditya
FY.Ani 53	SHINDE APOORVA ARUN	29	Apoorva
FY.Ani 54	SHINGATE SHREYAS SHESHERAO	26	Shreyas
FY.Ani 55	SINGIRAL RAHUL DEVENDRA	26	Rahul
FY.Ani 56	SONAWANE TANVI ANIL	26	Tanvi
FY.Ani 57	SURYAWANSHI ASHISH LIMBRAJ	24	Ashish
FY.Ani 58	TALEKAR SIDDHI PREMKUMAR	25	Siddhi
FY.Ani 59	VEER PRATIKSHA PRASAD	25	Pratiksha
FY.Ani 60	WAGH SHANTANU VISHNU	25	Shantanu

2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

F.Y.B.Sc(CS) 2022-23

CS-112-DATABASE MANAGEMENT SYSTEM

Course Outcomes

1. Solve real world problems using appropriate set, function, and relational models.
2. Design E-R Model for given requirements and convert the same into database tables.
3. Use SQL.
4. Programme Objectives:
5. To develop problem solving abilities using a computer.

Programme Outcomes

1. To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
2. To train students in professional skills related to Software Industry.
3. To prepare necessary knowledge base for research and development in Computer Science.
4. To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.

1. TYPES OF ENTITY SETS(CO1,PO1)
2. Difference between strong and weak entity set(CO1,PO2)
3. Strong Entity Set (CO1PO2)
4. Weak Entity Set (CO1,PO1)
5. CASE STUDIES ON E-R MODEL(CO1,PO1,PO2)
6. SYMBOLS USED IN E-R DIAGRAM(CO1,CO2,PO3,PO4)



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Vidyanagari, S. No. 44, Pravati,
Pune - 411 009.

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Class : F.Y.B.Sc. (Computer Science)	Semester:	Academic Year: 2022-23
Subject: DBMS	I	Internal Evaluation Record

Sr. No.	Roll No.	Name	Internal Evaluation					
			Assignme nt submitted	Assignme nt (15)	Internal Test attendanc e	Int.Test Score (15)	Best of Two	Sign of Student
1	IEBF1	AAKASH PRAVIN PISE		12		12	12	
2	IEBF2	ABHIJEET TUKARAM PANGUL	<i>Abhi</i>	12	<i>Abhi</i>	13	13	<i>Abhi</i>
3	IEBF3	ABHILASHA ARJUN MAHTO	<i>A</i>	12	<i>A</i>	12	12	<i>A</i>
4	IEBF4	ABHINAV ACHUTHAN NAIR	<i>Abhinav</i>	12	<i>Abhinav</i>	13	13	<i>Abhinav</i>
5	IEBF5	ABHISHEK MILIND BARGE		12		11	12	
6	IEBF6	ADESH SOMNATH PAWAR	<i>A.P</i>	12	<i>A.P</i>	11	12	<i>A.P</i>
7	IEBF7	ADITI MILIND NAIK	<i>A.M.Naik</i>	12	<i>A.M.Naik</i>	11	12	<i>A.M.Naik</i>
8	IEBF8	ADITYA ANAND SAWANT		12		15	15	
9	IEBF9	ADITYA DHANAJI SHINDE		12		14	14	
10	IEBF10	ADITYA EKNATH DAPHALE		12		15	15	
11	IEBF11	ADITYA GANESH BHOJ		12		15	15	
12	IEBF12	ADITYA MANOJ KUTE	<i>Aditya</i>	12	<i>Aditya</i>	15	15	<i>Aditya</i>
13	IEBF13	ADITYA NITIN UGHADE		12		15	15	
14	IEBF14	ADITYA RAJENDRA POTDAT		12		15	15	
15	IEBF15	ADITYA SURESH UJGAONKAR	<i>Aditya</i>	12	<i>Aditya</i>	14	14	<i>Aditya</i>
16	IEBF16	ADITYA VINOD BET		12		13	13	
17	IEBF17	AISHWARYA ANIL MANE		12		12	12	
18	IEBF18	AKANKSHA CHANDRAKANT KHOSÉ		12		13	13	
19	IEBF19	AKSHAT NISHANT TASKAR	<i>Akshat</i>	12	<i>Akshat</i>	13	13	<i>Akshat</i>
20	IEBF20	AKSHATA ANAND BANSOD		12		13	13	
21	IEBF21	AMIR HARUN PANSARE	<i>Amir</i>	12	<i>Amir</i>	12	12	<i>Amir</i>
22	IEBF22	ANISH NILESH PATASKAR	<i>Anish</i>	12	<i>Anish</i>	12	12	<i>Anish</i>
23	IEBF23	ANKITA ANKUSH GHOGARE	<i>Ankita</i>	12	<i>Ankita</i>	13	13	<i>Ankita</i>
24	IEBF24	ANUJ SANTOSH KHATPE	<i>Anuj</i>	12	<i>Anuj</i>	08	12	<i>Anuj</i>
25	IEBF25	APURVA RAJENDRA PAWAR	<i>Apurva</i>	12	<i>Apurva</i>	15	15	<i>Apurva</i>
26	IEBF26	ARNAV GOPI NALAWADE	<i>Arnav</i>	12	<i>Arnav</i>	13	13	<i>Arnav</i>
27	IEBF27	ARYAN HARSHAL VATTURKAR	<i>Aryan</i>	12	<i>Aryan</i>	15	15	<i>Aryan</i>
28	IEBF28	ARYAN SANTOSH MANE		12		15	15	
29	IEBF29	ASHUTOSH SANJAY VIBHUTE		12		14	12	
30	IEBF30	ATHARVA AVINASH KALE	<i>Atharva</i>	12	<i>Atharva</i>	15	15	<i>Atharva</i>
31	IEBF31	ATHARVA DEEPAK KARPE	<i>Atharva</i>	12	<i>Atharva</i>	15	15	<i>Atharva</i>
32	IEBF32	ATHARVA MANGESH DESHMUKH	<i>Atharva</i>	12	<i>Atharva</i>	14	14	<i>Atharva</i>
33	IEBF33	ATHARVA NILESH GOTAD	<i>Atharva</i>	12	<i>Atharva</i>	13	13	<i>Atharva</i>
34	IEBF34	BHAKTI KIRAN MAPRAKAR		12		14	14	



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Pune - 411 009.

35	IEBF35	BHAVANA MAHESH VHARKAT	EV	12	EV	15	15	EV
36	IEBF36	DASIM MURAD SATVILKAR		12		13	13	
37	IEBF37	DEVDA GORAKSHNATH KHANEKAR	Rangesh	12	Rangesh	12	12	Rangesh
38	IEBF38	DEVEN MAHESH KULKARNI		12	DK	14	14	DK
39	IEBF39	DHANUSH PADMANABHA	Dhanush	12	Dhanush	13	13	Dhanush
40	IEBF40	DHRUV MANOJ DESHPANDE		12	Dhruv	11	12	Dhruv
41	IEBF41	DIKSHA KISHOR KUMBHAR	Diksha	12	Diksha	14	14	Diksha
42	IEBF42	GANESH KALIDAS NAGTILAK		12		14	14	
43	IEBF43	GAYATRI SACHIN BADODKAR		12	GSB	11	12	GSB
44	IEBF44	HARSHADA SHIVAJI YELWANDE	Harshada	12	Harshada	14	14	Harshada
45	IEBF45	HARSHVARDHAN DURGESHKUMAR SAHANI		12	Harshani	13	13	Harshani
46	IEBF46	HARSHVARDHAN TATYASO ZAMBRE		12	Harsh	14	14	Harsh
47	IEBF47	INDRAJEET RATARAM CHOUDHARY		12	Indrajeet	14	14	Indrajeet
48	IEBF48	ISHITA KISHOR DUDHAL	Shitadudha	12	Shitadudha	14	14	Shitadudha
49	IEBF49	JANHAVI PRADIP JOSHI	Janhavi	12	Janhavi	13	13	Janhavi
50	IEBF50	KAJAL KISHOR KADAM	Kajal	12	Kajal	14	14	Kajal
51	IEBF51	KARAN JALINDAR KADAM		12	Kadams	14	14	Kadams
52	IEBF52	KARAN JHUMBERLAL JOSHI	Karan	12	Karan	14	14	Karan
53	IEBF53	KAUSHIK KONDIBA (SHITURE) SHITURE	Kaushik	12	Kaushik	14	14	Kaushik
54	IEBF54	KHUSHI KAMAL PAREEK	Khushi	12	Khushi	12	12	Khushi
55	IEBF55	KOMAL CHANDRAKANT BHORDE		12		13	13	Kabhorde
56	IEBF56	LOUKIK DATTATRAYA LANGHI		12		13	13	L.D. Langhi
57	IEBF57	MANSI RAJESH TIWARI	Mansi	12	Mansi	15	15	Mansi
58	IEBF58	MEGHANA ANIL KULKARNI	Meghana	12	Meghana	12	12	Meghana
59	IEBF59	MIHIR PRAKASH RAJGURU	Mihir	12	Mihir	13	13	Mihir
60	IEBF60	MRUNAL VITTHAL CHOUDHARY	Mrunal	12	Mrunal	15	15	Mrunal
61	IEBF61	MUGDHA SUNIL DHIWAR	Mugdha	12	Mugdha	14	14	Mugdha
62	IEBF62	NAMRATA NITIN GAIKWAD	Namrata	12	Namrata	14	14	Namrata
63	IEBF63	NANDINI DEEPAK JAGTAP	Nandini	12	Nandini	13	13	Nandini
64	IEBF64	NARAYAN RAJABHAU DHANDE	Narayan	12	Narayan	14	14	Narayan
65	IEBF65	NAYAN DHANANJAY PHALKE	Nayan	12	Nayan	15	15	Nayan
66	IEBF66	NEEL MILIND PAIGUDE	Neel	12	Neel	15	15	Neel
67	IEBF67	NEHA SHANKAR WAGHMARE	Neel	12	Neel	13	13	Neel
68	IEBF68	NEHA SUHAS REPALE		12		13	13	Neel
69	IEBF69	NIKHIL GIRISH DEO	Nikhil	12	Nikhil	15	15	Nikhil
70	IEBF70	NILAJA ANANDRAJ ANAWALIKAR	Nilaja	12	Nilaja	15	15	Nilaja
71	IEBF71	NOORJAHAN NOORMOHAMMAD SHAIKH		12	Noorjahan	15	15	Noorjahan
72	IEBF72	OM BALASAHEB GHODEKAR		12	Om	15	15	Om
73	IEBF73	OMKAR ANIRUDHA JOSHI		12		15	12	
74	IEBF74	OMKAR DNYANESHWAR KHOPADE		12		13	13	
75	IEBF75	OMKAR MILIND GAIKWAD	Om	12	Om	15	15	Om
76	IEBF76	OMKAR VIJAY NIMBALKAR		12		15	15	
77	IEBF77	PARTHIV VINAYAK KARBHARI		12		13	13	
78	IEBF78	PIYUSH PANJABRAO MALI	Piyush	12	Piyush	15	15	Piyush



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79	IEBF79	PRADYUMNA ASHUTOSH DEO	<u>P.D.</u>	12	<u>P.D.</u>	14	14	<u>P.D.</u>
80	IEBF80	PRAGATI MANOJ SHINDE	<u>P.Shinde</u>	12	<u>P.Shinde</u>	15	15	<u>P.Shinde</u>
81	IEBF81	PRANALI RAVINDRA PATIL	<u>P.patil</u>	12	<u>P.patil</u>	14	14	<u>P.patil</u>
82	IEBF82	PRANAV DHANAJI SHINDE	*	—		15	15	
83	IEBF83	PRANAV MHASKU PISAL	<u>P.P</u>	12	<u>P.P</u>	15	15	<u>P.P</u>
84	IEBF84	PRATHAM RAJESH DAVE		12		<u>Ab</u>	12	
85	IEBF85	PRATHAMESH PRADIP NIBANDHE	<u>Pradip</u>	12	<u>Pradip</u>	15	15	<u>Pradip</u>
86	IEBF86	PRATHMESH RAJU INGOLE		12		12	12	
87	IEBF87	PRATIK BABURAO KARANDE	<u>Prakarande</u>	12	<u>Prakarande</u>	13	13	<u>Prakarande</u>
88	IEBF88	PRATIK MAHADEV HOMKAR	<u>Pranjan</u>	12	<u>Pranjan</u>	14	14	<u>Pranjan</u>
89	IEBF89	PRATIKSHA ANIL GADEKAR	<u>Pradiksha</u>	12	<u>Pradiksha</u>	15	15	<u>Pradiksha</u>
90	IEBF90	PRATIKSHA SAGAR VEER		12		<u>Ab</u>	12	
91	IEBF91	PRITAM PRABHAKAR SURYAWANSHI		12		14	14	
92	IEBF92	PURVA DHANVAKUMAR BONGALE	<u>P.Bongale</u>	12	<u>P.Bongale</u>	14	14	<u>P.Bongale</u>
93	IEBF93	PUSHKAR PURUSHOTTAM JOSHI	*			13	13	
94	IEBF94	RACHANA YASHWANT BADHE	<u>RB</u>	12	<u>RB</u>	14	14	<u>RB</u>
95	IEBF95	RADHIKA SACHIN KALBHOR		12	<u>Rakalbhore</u>	14	14	<u>Rakalbhore</u>
96	IEBF96	RIYA MANOJ SHINDE	<u>Riya</u>	12	<u>Riya</u>	15	15	<u>Riya</u>
97	IEBF97	RIYA PANDHARINATH SONAWANE	<u>Risawane</u>	12	<u>Risawane</u>	14	14	<u>Risawane</u>
98	IEBF98	ROHAN SANDIP WABLE		12	<u>Rwale</u>	10	12	<u>Rwale</u>
99	IEBF99	RONAK SACHIN BORA		12		14	14	
100	IEBF100	RUDRESH LALIT HONRAO	<u>Rudresh</u>	12	<u>Rudresh</u>	15	15	<u>Rudresh</u>
101	IEBF101	RUSHIKESH RAMCHANDRA WAGH		12		<u>Ab</u>	12	
102	IEBF102	RUTUJA RAJENDRA BHADIRGE	<u>Rutuja</u>	12	<u>Rutuja</u>	14	14	<u>Rutuja</u>
103	IEBF103	RUTUJA AJIT JADHAV		12		13	13	
104	IEBF104	RUTUJA DATTATRAY PANCHAL		12		14	14	
105	IEBF105	RUTVIK PARSHURAM VEER	<u>Rutvik</u>	12	<u>Rutvik</u>	13	13	<u>Rutvik</u>
106	IEBF106	SAAE GANESH KHIRSAGAR		12		15	15	
107	IEBF107	SAAE MADHUKAR KONDHALKAR	<u>Kondhalakar</u>	12	<u>Kondhalakar</u>	15	15	<u>Kondhalakar</u>
108	IEBF108	SAHIL NITIN SAWANT		12		15	15	
109	IEBF109	SAHIL RAJESH KHAROTE		12		12	12	
110	IEBF110	SAHIL SUNIL KAWADE	<u>S.Kawade</u>	12	<u>S.Kawade</u>	12	12	<u>S.Kawade</u>
111	IEBF111	SAKSHI JAYWANT PAWAR	<u>Sakshi</u>	12	<u>Sakshi</u>	15	15	<u>Sakshi</u>
112	IEBF112	SAKSHI PRAKASH KHADKE	<u>S</u>	12	<u>S</u>	15	15	<u>S</u>
113	IEBF113	SAKSHI SANTOSH DHOTRE	<u>Sakshi</u>	12	<u>Sakshi</u>	15	15	<u>Sakshi</u>
114	IEBF114	SAKSHI SANTOSH KEDARI	<u>Sakshi</u>	12	<u>Sakshi</u>	13	13	<u>Sakshi</u>
115	IEBF115	SAKSHI VASUDEO NIKAM	<u>Sakshi</u>	12	<u>Sakshi</u>	15	15	<u>Sakshi</u>
116	IEBF116	SAMEER SITARAM DHEBE	*	12		15	15	<u>Dhebe</u>
117	IEBF117	SANGHARSHA BHAJANDAS PAWAR	<u>S.Pawar</u>	12		15	15	
118	IEBF118	SANIKA SANJAY THOPATE	<u>Thopate</u>	12	<u>Thopate</u>	15	15	<u>Thopate</u>
119	IEBF119	SANIKA SUNIL JAGTAP		12		15	15	
120	IEBF120	SANSKRUTI VINOD VEYWHARE		12		13	13	
121	IEBF121	SARFARAZ SALIM SAYYAD	<u>S</u>	12	<u>S</u>	12	12	<u>S</u>
122	IEBF122	SARTHAK SHIVAJI SHETE	*	—		15	15	<u>Shete</u>



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123	IEBF123	SARTHAK SOMNATH PAYGUDE		12		15	15	
124	IEBF124	SHLOK DNYANESHWAR YADAV		12		11	12	
125	IEBF125	SHRAVAN RAMESH NALAWADE	Shrawade	12	Shrawade	12	12	Shrawade
126	IEBF126	SHRAVANI ANIL GAVAND	Shrawand	12	Shrawand	13	13	Shrawand
127	IEBF127	SHRAVANI NARENDRA DAYAL		12		13	13	
128	IEBF128	SHRAVANI SANTOSH HOLKAR	Shrawani	12	Shrawani	15	15	Shrawani
129	IEBF129	SHREYA PRITHVIRAJ CHAVAN	Shrawan	12	Shrawan	13	13	Shrawan
130	IEBF130	SHREYAS SACHIN WALAMBE	Shraw	12	Shraw	15	15	Shraw
131	IEBF131	SHRIKANT BHARAT KUSUMALE	Shraw	12	Shraw	12	12	Shraw
132	IEBF132	SHRIMAY HARISH PADHYE		12		14	14	
133	IEBF133	SIDDHESH SHASHANK VAIDYA		12		13	13	
134	IEBF134	SIDDHI SAMEER MANDEKAR	idhar	12	idhar	14	14	idhar
135	IEBF135	SIDDHI SANDEEP JANGAM		12		11	12	
136	IEBF136	SMIT BHUPENDRA MESHRAM	Smit	12	Smit	15	15	Smit
137	IEBF137	SNEHA ANIL SAKPAL	Sneha	12	Sneha	15	15	Sneha
138	IEBF138	SNEHA SATISH ANANDE	Sneha	12	Sneha	15	15	Sneha
139	IEBF139	SNEHAL MANOHAR DEWALE		12		15	15	
140	IEBF140	SOHAM MANGESH SONAWANE	So	12	So	10	12	So
141	IEBF141	SOHAM MANOJ TAGADE		12		13	13	
142	IEBF142	SOHAM PRAKASH LOLE		12		15	15	
143	IEBF143	SOUMITRA SAMEET CHAVARE		12		11	12	
144	IEBF144	SOURAV SACHIN KADAM	Sourav	12	Sourav	11	12	Sourav
145	IEBF145	SRUSHTI VINAYAK DESHMUKH	Srushti	12	Srushti	11	12	Srushti
146	IEBF146	SUDIKSHA DEEPAK DHAVADE	Sudiksha	12	Sudiksha	15	15	Sudiksha
147	IEBF147	SUJAL SHAILESH SHELAR	Shelar	12	Shelar	15	15	Shelar
148	IEBF148	SUJIT VIJAY GHALME	Sujit	12	Sujit	11	12	Sujit
149	IEBF149	SUMIT PAVAN SUPEKAR	Sumit	12	Sumit	15	15	Sumit
150	IEBF150	SUPRIYA HANUMANT KOLAGE	Supriya	12	Supriya	15	15	Supriya
151	IEBF151	SURAJ DIPAK NANAWARE		12		15	15	
152	IEBF152	SWAPNIL SUNIL AGATKAR	SA	12	SA	15	15	SA
153	IEBF153	SWARADA SUHAS DEO	SSDEO	12	SSDEO	14	14	SSDEO
154	IEBF154	SWARAJ SURYAKANT SALUNKE		12		12	12	
155	IEBF155	SWATI AJAY BARGE		12		13	13	
156	IEBF156	TANISHA KAMLESH PARDESHI	Tanisha	12	Tanisha	13	13	Tanisha
157	IEBF157	TANMAY TATYASO NALAWADE	Tanmay	12	Tanmay	15	15	Tanmay
158	IEBF158	TANUJA RAJU KAMBLE	TANUJA	12	TANUJA	15	15	TANUJA
159	IEBF159	TANUJA SATISH KHADE		12		14	14	
160	IEBF160	TEJAS SATISH SAWANT	Tejas	12	Tejas	14	14	Tejas
161	IEBF161	TEJAS SURYAKANT JARANDE	T.J	12	T.J	13	13	T.J
162	IEBF162	VAISHNAVI BALASAHEB MATE	V-Mate	12	V-Mate	14	14	V-Mate
163	IEBF163	VANSH SHARAD JOSHI		12		14	14	
164	IEBF164	VEDANT SANTOSH DHAMAL	Vedant	12	Vedant	13	13	Vedant
165	IEBF165	VEDKUMAR PRASHANT PATIL		12		14	14	
166	IEBF166	VIDHI SUNIL MANE	Vidhi	12	Vidhi	15	15	Vidhi



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167	IEBF167	VINAYAK SANJAY GHULE	<i>Vinayak</i>	12	<i>Vinayak</i>	14	14	<i>Vinayak</i>
168	IEBF168	VISHAL ANKUSH YEDE		12		14	14	
169	IEBF169	VISHWADEEPTI AJAY CHAVAN		12		14	14	
170	IEBF170	VISHWAJA VIJAY PANGARE	<i>Vijay</i>	12	<i>Vijay</i>	15	15	<i>Vijay</i>
171	IEBF171	VISHWAS MARUTI KAMBLE	<i>Maruti</i>	12	<i>Maruti</i>	14	14	<i>Maruti</i>
172	IEBF172	VIVEK DATTATRAY PATIL		12		15	15	
173	IEBF173	VIVEK YASHWANT BHISE	<i>Yashw</i>	12	<i>Yashw</i>	15	15	<i>Yashw</i>
174	IEBF174	YASH DATTATRAY KUDALE	<i>Yash</i>	12	<i>Yash</i>	15	15	<i>Yash</i>
175	IEBF175	YASH SACHIN PATIL	<i>Yash</i>	12	<i>Yash</i>	15	15	<i>Yash</i>
176	IEBF176	YOGESH MAHADEO KATE	<i>Kate</i>	12	<i>Kate</i>	15	15	<i>Kate</i>
	IEBF177	Devang Patil	<i>Patil</i>	08	<i>Patil</i>	15	15	<i>Patil</i>
Iyoti Patil			<i>Iyoti Patil</i>					
Name of Subject Teacher			Signature of Subject Teacher					



[Signature]
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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

F.Y.B.Sc(CS) 2022-23 CS-112-DATABASE MANAGEMENT SYSTEM

Course Outcomes

1. Solve real world problems using appropriate set, function, and relational models.
2. Design E-R Model for given requirements and convert the same into database tables.
3. Use SQL.
4. Programme Objectives:
5. To develop problem solving abilities using a computer.

Programme Outcomes

1. To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
2. To train students in professional skills related to Software Industry.
3. To prepare necessary knowledge base for research and development in Computer Science.
4. To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.

1. TYPES OF ENTITY SETS(CO1,PO1)
2. Difference between strong and weak entity set(CO1,PO2)
3. Strong Entity Set (CO1PO2)
4. Weak Entity Set (CO1,PO1)
5. CASE STUDIES ON E-R MODEL(CO1,PO1,PO2)
6. SYMBOLS USED IN E-R DIAGRAM(CO1,CO2,PO3,PO4)



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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

M.Sc(CA) 2022-23

Sem-III

CA-CCTP-8 : Internet Of Things


Course Outcomes:

- CO1. EXPLAIN the Applications/Devices, Protocols and Communication Models of IoT
- CO2. DEMONSTRATE small Mechanical Engineering IoT oriented applications using Sensors, Actuators, Microcontrollers and Cloud
- CO3. SELECT commonly used IoT Simulation Hardware platforms
- CO4. APPLICATION of Interfacing and Communication Technologies for IoT

Programme Outcomes:

- PO 1: The Programme seeks to instill in students a deep and comprehensive knowledge of core computer science disciplines, advanced computer science concepts, theories, and principles, including algorithms, data structures, programming languages, artificial intelligence, machine learning, cloud computing, advanced databases, full stack development, software project management, and design patterns.
- PO 2: Graduates should be equipped with the ability to analyze complex problems in computer science, design innovative solutions, and implement them effectively
- PO 3: The program aims to develop students' research skills, enabling them to evaluate existing research, contribute to knowledge in the field, and apply critical thinking to solve computational problems.
- PO 4: The program aims to cultivate a passion for research, encouraging students to engage in original research projects that contribute to the advancement of computer science knowledge and address real-world problems.
- PO 5: Students are expected to gain proficiency in multiple programming languages and develop the ability to write efficient, reliable, and maintainable code.
- PO 6: Depending on the chosen track or concentration, students may develop expertise in areas.
- PO 7: Through hands-on projects, practical assignments, and exposure to state-of-the-art tools and technologies, we aim to develop the technical proficiency and problem-solving skills necessary for success in the professional world.
- PO 8: Graduates should be adept at presenting complex technical concepts clearly and effectively, both in written and oral forms, to various audiences.
- PO 9: Computer science professionals often work in multidisciplinary teams. Students should learn to collaborate effectively with team members, understand different perspectives, and contribute productively to achieve common goals.
- PO 10: The program places a strong emphasis on ethical considerations, responsible use of technology, and awareness of the societal impact of computing solutions. We aim to produce graduates who approach their work with integrity and a sense of social responsibility.
- PO 11: Acknowledging the dynamic nature of computer science, we aim to instill in our students a desire for




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continuous learning and professional development, empowering them to adapt and thrive in the face of technological advancements; prepared them to adapt to new technologies and methodologies throughout their careers.


PO 12: Students will be encouraged to think creatively and innovatively, exploring new ideas and approaches to solve computational problems and advance the state of the art in the field.

PO 13: The program include On Job Training, internships, research work, research article and papers writing or a thesis that provides students with practical experience, applying their knowledge to real-world challenges.

IOT Assignment

- 1 Explain communication models in IOT(CO1,PO1)
- 2 Explain Push-pull model and Exclusive pair.(CO2,PO2)
- 3 3 Explain three layer IOT architecture.(CO1,PO7)

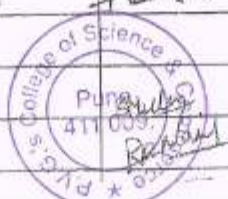



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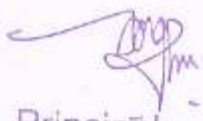
Class : S.Y.M.Sc.(CA)	Semester: I	Academic Year : 2022-23
Subject: <u>IOT</u>	Internal Evaluation Record	

Sr. No.	Roll no.	Student Name / Date	Assignment Submitted	Assignment (30)	Internal Test attendance	Internal Test Score (30)	Total (Out of 30) (Best of 2)	Sign of Student
1	SMCA01	BACCHUBHAI SOHEL M SHARIF	HT	28	HT	24	28	HT
2	SMCA02	BHAVSAR RUCHITA CHANDRAKANT	P Bhosale	28	P Bhosale	21	28	P Bhosale
3	SMCA03	BHOITE AMEY RAJENDRA	P Bhosale	28	P Bhosale	21	28	P Bhosale
4	SMCA04	BHORADE SONALI VITTHAL		28		21	28	
5	SMCA05	BHOSALE POOJA ANKUSH	Pooja	29	Pooja	24	29	Pooja
6	SMCA06	BIDWE NEHA RAJENDRA	Bidwe	29	Bidwe	24	29	Bidwe
7	SMCA07	BIRADAR ABHISHEK AMAR	Abhishek	28	Abhishek	23	28	Abhishek
8	SMCA08	BODHE VIPUL VIVEK		28		23	28	
9	SMCA09	BUDDHADEV SANKET KIRTI				22		
10	SMCA10	CHAVAN SOURABH SHARAD				22		
11	SMCA11	DEVKAR NISHA SANJAY	Nisha	28	Nisha	22	28	Nisha
12	SMCA12	DUGAD SIDDHI SHANTILAL	Siddhi	28	Siddhi	22	28	Siddhi
13	SMCA13	FALAKE KRUSHNARAO RAJENDRA	KR Falake	28	KR Falake	21	28	KR Falake
14	SMCA14	GAIKWAD ASHA NITIN		28		22	28	
15	SMCA15	GAIKWAD GAURAV VINAYAK	Gaurav	28	Gaurav	22	28	Gaurav
16	SMCA16	GAIKWAD MANASI SANJAY	Manasi	28	Manasi	22	28	Manasi
17	SMCA17	GAIKWAD SANDHYA SANJAY						
18	SMCA18	GAIKWAD SANKET LAXMAN						
19	SMCA19	GALINDE PRATHMESH PRAVIN	Prade	29	Prade	24	29	Prade
20	SMCA20	GANDHI HARSHAL SANJAY	Harshi	28	Harshi	22	28	Harshi
21	SMCA21	GUJAR PRACHI SACHIN		28		22	28	
22	SMCA22	JADHAV ABHISHEK VIJAY	Abhishek	29	Abhishek	24	29	Abhishek
23	SMCA23	JADHAV PRANIL ANIL		29		24	29	
24	SMCA24	JADHAV RITIKA GANESH	Ritika	29	Ritika	24	29	Ritika
25	SMCA25	KADAM MAYURI VIJAY	Mayuri	29	Mayuri	24	29	Mayuri
26	SMCA26	KADLAG RUSHIKESH BALASAHEB	Rushikesh	28	Rushikesh	22	28	Rushikesh
27	SMCA27	KARALE MRUNAL SIDHHESHWAR	Mrunal	29	Mrunal	24	29	Mrunal
28	SMCA28	KONKAR NIHAR SANJEEV	Nihar	29	Nihar	24	29	Nihar
29	SMCA29	KUMATKAR MAYA BABASAHEB				24		
30	SMCA30	KUMBHAR PRASAD BALASAHEL	P. Kumbhar	29	P. Kumbhar		29	P. Kumbhar
31	SMCA31	LAD GAJANAND ASHOK		28		22	28	
32	SMCA32	MALVI ANIRUDDHA NILKANTH	Aniruddha	28	Aniruddha	21	28	Aniruddha
33	SMCA33	MULAY PRACHITI SUNIL		28		22	28	
34	SMCA34	MULEY SHIVANI SHIVARAJ	Shivani	29	Shivani	22	29	Shivani
35	SMCA35	NAIR ROHIT RAVINDRA	Rohit	29	Rohit	23	29	Rohit



43	SMCA43	PATIL SOURABH SURESH	<i>Stil</i>	29	<i>Stil</i>	23	29	<i>Stil</i>
44	SMCA44	PAVANASKAR ANIRUDHA ABHAY						
45	SMCA45	PAWAR AKANKSHA PRAMOD	<i>Pawar</i>	28	<i>Pawar</i>	22	28	<i>Pawar</i>
46	SMCA46	PAWAR NITIN SANTOSH	<i>N.S. Pawar</i>		<i>N.S. Pawar</i>			<i>N.S. Pawar</i>
47	SMCA47	PAWAR SAYALI RAJARAM	<i>Pawar</i>	29	<i>Pawar</i>	21	29	<i>Pawar</i>
48	SMCA48	PIMPALE VYANKATESH PRASHANTRAO	<i>Wankar</i>	29	<i>Wankar</i>	23	29	<i>Wankar</i>
49	SMCA49	RANANAWARE KUNAL YOGESH	<i>R.R.</i>	29	<i>R.R.</i>	23	29	<i>R.R.</i>
50	SMCA50	RATNAPURE SHWETA SATISH	<i>Ratna</i>	29	<i>Ratna</i>	23	29	<i>Ratna</i>
51	SMCA51	SELUKAR AKSHAY SANJAY	<i>Seh</i>	28	<i>Seh</i>	22	28	<i>Seh</i>
52	SMCA52	SHINDE KIRTI NILU	<i>Shinde</i>	28	<i>Shinde</i>	22	28	<i>Shinde</i>
53	SMCA53	SHINDE ROHIT CHANDRAKANT	<i>Shinde</i>	29	<i>Shinde</i>	22	29	<i>Shinde</i>
54	SMCA54	SHIROLE SIDDHI SHRIKANT	<i>Shirole</i>	29	<i>Shirole</i>	23	29	<i>Shirole</i>
55	SMCA55	SONAWANE ANAND SUBHASH	<i>Stil</i>	29	<i>Stil</i>	23	29	<i>Stil</i>
56	SMCA56	SONAWANE SHRUTI NITIN	<i>Stil</i>	29	<i>Stil</i>	21	29	<i>Stil</i>
57	SMCA57	SONNIS RUTUJA DEVENDRA	<i>S</i>	22	<i>S</i>	23	27	<i>S</i>
58	SMCA58	TALLE SHIVRAJ GANGADHAR						
59	SMCA59	WAGH CHINMAY MADHAV	<i>W</i>	28	<i>W</i>	22	28	<i>W</i>
Name of the Subject teacher				Signature of Subject Teacher				




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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

F.Y.B.Sc(CS) 2022-23 SEM-I

MTC 111: Matrix Algebra

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

Program Outcome:


PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: Inculcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: Infuse ethical, human and professional values and responsibilities to make their contribution to the society.




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Assignment No.1 Introduction to Matrix Algebra

1. Let $A = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ Find $A(BA)$. (CO1,PO1)
2. Let $A = \begin{bmatrix} 4 & 1 \\ -7 & 6 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 3 \\ 4 & 5 \end{bmatrix}$ Find $A+AB-3I_2$. (CO2,PO1,PO3)
3. If $X = \begin{bmatrix} 6 & 2 \\ 1 & -2 \end{bmatrix}$, $Y = \begin{bmatrix} 3 & 0 \\ 6 & 2 \end{bmatrix}$ Whether it is commutative or not.
(CO1,PO1,PO4)
4. Find the inverses of the following matrix $\begin{bmatrix} 8 & 6 \\ 5 & 4 \end{bmatrix}$. (CO3,PO2,PO4)
5. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 1 & 1 \\ 3 & 2 & 4 \end{bmatrix}$, if it exists. (CO1,PO2,PO3)
6. Let $A = \begin{bmatrix} 5 & 1 \\ 3 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 \\ 4 & 3 \end{bmatrix}$. Show that $AB \neq BA$. (CO3,PO2)
7. Find the inverses of the following matrix $\begin{bmatrix} 3 & 2 \\ 7 & 4 \end{bmatrix}$. (CO1,PO3)
8. Find the inverses of the following matrix $\begin{bmatrix} 3 & -2 \\ 7 & 4 \end{bmatrix}$. (CO2,PO3,PO4)
9. Let $A = \begin{bmatrix} x & -1 & 2 \\ 3 & 4 & 5 \\ -1 & 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 \\ y \\ 4 \end{bmatrix}$. If $AB = \begin{bmatrix} 16 \\ -3 \\ -5 \end{bmatrix}$, find x and y. (CO3,PO1,PO4)
10. Let $A = \begin{bmatrix} 3 & -6 \\ -1 & 2 \end{bmatrix}$ construct a 2x2 matrix B such that AB is a zero matrix.
(CO2,PO2,PO3)




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Assignment No.2 Linear Equations in Linear Algebra-I

1. Determine if the following system is consistent:

$$x_2 + 4x_3 = -5$$

$$x_1 + 3x_2 + 5x_3 = -2$$

$$3x_1 + 7x_2 + 7x_3 = 6. \text{ (CO3, PO2)}$$

2. Determine, if the following system has unique solution.

$$x_1 - 3x_3 = 8$$

$$2x_1 + 2x_2 + 9x_3 = 7$$

$$x_2 + 5x_3 = -2. \text{ (CO1, PO3)}$$

3. Compute

$$(i) \begin{bmatrix} 1 & 2 & -1 \\ 0 & -5 & 3 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \\ 4 \end{bmatrix}$$

$$(ii) \begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix}. \text{ (CO2, PO3, PO4)}$$

4. Let $A = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 3 & 1 \\ -1 & -2 & 1 \end{bmatrix}$ then compute $5I_3 - A$. (CO3, PO1, PO4)

5. Solve the system of linear equation,

$$x + 2y + 3z = 1$$

$$4x + 5y + 6z = 3$$

$$7x + 8y + 9z = 3. \text{ (CO2, PO2, PO3)}$$

6. Use invertible matrix theorem to decide if A is invertible, where,

$$A = \begin{bmatrix} 1 & 0 & -2 \\ 3 & 1 & -2 \\ -5 & -1 & 9 \end{bmatrix}. \text{ (CO1, PO1)}$$



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Assignment No.3 Linear Equations in Linear Algebra-II

1. Find LU factorization of following matrix $\begin{bmatrix} 2 & 5 \\ -3 & -4 \end{bmatrix}$. (CO2,PO1)

2. Find LU factorization of following matrix $\begin{bmatrix} 3 & -1 & 2 \\ -3 & -2 & 10 \\ 9 & -5 & 6 \end{bmatrix}$. (CO1,PO2,PO3)

3. Let $A = \begin{bmatrix} 2 & 3 \\ 0 & -1 \\ 1 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ -2 & 1 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 4 & 1 \\ -1 & 0 & 3 \end{bmatrix}$, $D = \begin{bmatrix} 0 & -1 & 1 \\ 5 & 2 & 1 \\ 2 & 3 & 4 \end{bmatrix}$,

$E = \begin{bmatrix} 1 & 1 & 1 \\ 3 & 2 & 3 \\ 6 & -1 & 4 \end{bmatrix}$, compute the following if the operations are feasible.

(i) $-3(D+2E)$, (ii) $2B-C$, (iii) AB , (iv) BA , (v) $(3E)(D)$,

(vi) $(AB)C$. (CO1,PO2,PO3)

4. Convert the matrix $A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}$ into LU factorization and use to solve

$Ax=b$ where $b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix}$. (CO3,PO2,PO4)

5. Describe all solution of $AX = b$, where;


$A = \begin{bmatrix} 3 & 5 & -4 \\ -3 & -2 & 4 \\ 6 & 1 & -8 \end{bmatrix}$, $b = \begin{bmatrix} 7 \\ -1 \\ -4 \end{bmatrix}$. (CO1,PO2,PO3)

6. Row reduce the matrix A below to echelon form, and locate the pivot

columns of A $A = \begin{bmatrix} 0 & -3 & -6 & 4 & 9 \\ -1 & -2 & -1 & 3 & 1 \\ -2 & -3 & 0 & 3 & -1 \\ 1 & 4 & 5 & -9 & -7 \end{bmatrix}$

(CO2,PO2)




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Assignment No.4 Determinants

1. Use a cofactor expansion across the third row to compute $\det A$, where, $A =$

$$\begin{bmatrix} 1 & 5 & 0 \\ 2 & 4 & -1 \\ 0 & -2 & 0 \end{bmatrix}. \text{ (CO1, PO1, PO3)}$$

2. Compute $\det A$, where, $A = \begin{bmatrix} 3 & -7 & 8 & 9 & -6 \\ 0 & 2 & -5 & 7 & 3 \\ 0 & 0 & 1 & 5 & 0 \\ 0 & 0 & 2 & 4 & -1 \\ 0 & 0 & 0 & -2 & 0 \end{bmatrix}. \text{ (CO1, PO2)}$

3. Find determinant of the matrix.

$$A = \begin{bmatrix} 2 & 4 & 5 & 6 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & -1 & 5 & 6 & 9 \\ 0 & 0 & 0 & 2 & 5 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & \frac{3}{2} \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \end{bmatrix}. \text{ (CO1, PO1)}$$

4. Compute the determinants of a matrix A by cofactor expansions. At each step choose a row and column that involves the least amount of computation.

$$A = \begin{bmatrix} 6 & 0 & 0 & 5 \\ 1 & 7 & 2 & -5 \\ 2 & 0 & 0 & 0 \\ 8 & 3 & 1 & 8 \end{bmatrix}. \text{ (CO3, PO1, PO3)}$$

5. Find determinant of the matrix,

$$A = \begin{bmatrix} 4 & 0 & 0 & 0 \\ 7 & -1 & 0 & 0 \\ 2 & 6 & 3 & 0 \\ 5 & -8 & 4 & -3 \end{bmatrix}. \text{ (CO2, PO3)}$$



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Class : F.Y.B.Sc. (Computer Science)	Semester: I	Academic Year: 2022-23
Subject: <u>Matrix Algebra</u>	Internal Evaluation Record	

Sr. No.	Roll No.	Name	Internal Evaluation					
			Assignment submitted	Assignment (15)	Internal Test attendance	Int. Test Score (15)	Best of Two	Sign of Student
1	IEBF1	AAKASH PRAVIN PISE	<u>A.Pise</u>	14	<u>A.Pise</u>	11	14	<u>A.Pise</u>
2	IEBF2	ABHIJEET TUKARAM PANGUL	<u>Abhijeet</u>	14	<u>Abhijeet</u>	12	14	<u>Abhijeet</u>
3	IEBF3	ABHILASHA ARJUN MAHTO	<u>A</u>	12	<u>A</u>	11	12	<u>A</u>
4	IEBF4	ABHINAV ACHUTHAN NAIR	<u>Abhinav</u>	13	<u>Abhinav</u>	11	13	<u>Abhinav</u>
5	IEBF5	ABHISHEK MILIND BARGE	<u>Abhishek</u>	11	<u>Abhishek</u>	08	11	<u>Abhishek</u>
6	IEBF6	ADESH SOMNATH PAWAR	<u>Adesh</u>	12	<u>Adesh</u>	11	12	<u>Adesh</u>
7	IEBF7	ADITI MILIND NAIK	<u>A.M.Naik</u>	12	<u>A.M.Naik</u>	10	12	<u>A.M.Naik</u>
8	IEBF8	ADITYA ANAND SAWANT	<u>Aditya</u>	10	<u>Aditya</u>	6	10	<u>Aditya</u>
9	IEBF9	ADITYA DHANAJI SHINDE	<u>Aditya</u>	12	<u>Aditya</u>	11	12	<u>Aditya</u>
10	IEBF10	ADITYA EKNATH DAPHALE	<u>Aditya</u>	12	<u>Aditya</u>	11	12	<u>Aditya</u>
11	IEBF11	ADITYA GANESH BHOJ	<u>Aditya</u>	11	<u>Aditya</u>	10	11	<u>Aditya</u>
12	IEBF12	ADITYA MANOJ KUTE	<u>Aditya</u>	11	<u>Aditya</u>	10	11	<u>Aditya</u>
13	IEBF13	ADITYA NITIN UGHADE	<u>Aditya</u>	12	<u>Aditya</u>	11	12	<u>Aditya</u>
14	IEBF14	ADITYA RAJENDRA POTDAR	<u>Aditya</u>	10	<u>Aditya</u>	8	10	<u>Aditya</u>
15	IEBF15	ADITYA SURESH UJGAONKAR	<u>Aditya</u>	11	<u>Aditya</u>	9	11	<u>Aditya</u>
16	IEBF16	ADITYA VINOD BET	<u>Aditya</u>	10	<u>Aditya</u>	8	10	<u>Aditya</u>
17	IEBF17	AISHWARYA ANIL MANE	<u>Aishwarya</u>	11	<u>Aishwarya</u>	8	11	<u>Aishwarya</u>
18	IEBF18	AKANKSHA CHANDRAKANT KHOSE	<u>Akanksha</u>	12	<u>Akanksha</u>	8	12	<u>Akanksha</u>
19	IEBF19	AKSHAT NISHANT TASKAR	<u>Akshat</u>	10	<u>Akshat</u>	9	10	<u>Akshat</u>
20	IEBF20	AKSHATA ANAND BANSOD	<u>Akshata</u>	13	<u>Akshata</u>	11	13	<u>Akshata</u>
1	IEBF21	AMIR HARUN PANSARE	<u>A.H.P</u>	14	<u>A.H.P</u>	11	14	<u>A.H.P</u>
22	IEBF22	ANISH NILESH PATASKAR	<u>Anish</u>	11	<u>Anish</u>	10	11	<u>Anish</u>
23	IEBF23	ANKITA ANKUSH GHOGARE	<u>Ankita</u>	12	<u>Ankita</u>	10	12	<u>Ankita</u>
24	IEBF24	ANUJ SANTOSH KHATPE	<u>Anuj</u>	13	<u>Anuj</u>	11	13	<u>Anuj</u>
25	IEBF25	APURVA RAJENDRA PAWAR	<u>A.P.</u>	15	<u>A.P.</u>	13	15	<u>A.P.</u>
26	IEBF26	ARNAV GOPI NALAWADE	<u>Arnav</u>	11	<u>Arnav</u>	10	11	<u>Arnav</u>
27	IEBF27	ARYAN HARSHAL VATTURKAR	<u>Aryan</u>	10	<u>Aryan</u>	7	10	<u>Aryan</u>
28	IEBF28	ARYAN SANTOSH MANE	<u>Aryan</u>	11	<u>Aryan</u>	9	11	<u>Aryan</u>
29	IEBF29	ASHUTOSH SANJAY VIBHUTE	<u>A.S.Vibhute</u>	11	<u>A.S.Vibhute</u>	10	11	<u>A.S.Vibhute</u>
30	IEBF30	ATHARVA AVINASH KALE	<u>Atharva</u>	12	<u>Atharva</u>	11	12	<u>Atharva</u>
31	IEBF31	ATHARVA DEEPAK KARPE	<u>Atharva</u>	12	<u>Atharva</u>	10	12	<u>Atharva</u>
32	IEBF32	ATHARVA MANGESH DESHMUKH	<u>Atharva</u>	11	<u>Atharva</u>	7	11	<u>Atharva</u>
33	IEBF33	ATHARVA NILESH GOTAD	<u>A</u>	12	<u>A</u>	11	12	<u>A</u>
34	IEBF34	BHAKTI KIRAN MAPRAKAR	<u>Bhakti</u>	11	<u>Bhakti</u>	10	11	<u>Bhakti</u>



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			1	3	6
35	IEBF35	BHAVANA MAHESH VHARKAT	BV	14	BV
36	IEBF36	DASIM MURAD SATVILKAR	DMS	13	DMS
37	IEBF37	DEVDAAS GORAKSHNATH KHANEKAR	Devdaas	12	Devdaas
38	IEBF38	DEVEN MAHESH KULKARNI	DK	15	DK
39	IEBF39	DHANUSH PADMANABHA	Dhanush	12	Dhanush
40	IEBF40	DHRUV MANOJ DESHPANDE	Dhruv	12	Dhruv
41	IEBF41	DIKSHA KISHOR KUMBHAR	Diksha	11	Diksha
42	IEBF42	GANESH KALIDAS NAGTILAK	Ganesh	11	Ganesh
43	IEBF43	GAYATRI SACHIN BADODKAR	GSB	14	GSB
44	IEBF44	HARSHADA SHIVAJI YELWANDE	Harshada	12	Harshada
45	IEBF45	HARSHVARDHAN DURGESHKUMAR SHANAI	HShanai	13	HShanai
46	IEBF46	HARSHVARDHAN TATYASO ZAMBRE	Harsh	9	Harsh
47	IEBF47	INDRAJEET RATARAM CHOUDHARY	Indrajeet	9	Indrajeet
48	IEBF48	ISHITA KISHOR DUDHAL	Shitadudhal	11	Shitadudhal
49	IEBF49	JANHAVI PRADIP JOSHI	Janhavi	11	Janhavi
50	IEBF50	KAJAL KISHOR KADAM	KJ Kadam	13	KJ Kadam
51	IEBF51	KARAN JALINDAR KADAM	Kadam	12	Kadam
52	IEBF52	KARAN JHUMBERLAL JOSHI	Karane	13	Karane
53	IEBF53	KAUSHIK KONDIBA SHITURE	Kaushik	13	Kaushik
54	IEBF54	KHUSHI KAMAL PAREEK	Khushi	11	Khushi
55	IEBF55	KOMAL CHANDRAKANT BHORDE	KBhorde	12	KBhorde
56	IEBF56	LOUKIK DATTATRAYA LANGHI	L.D Langhi	12	L.D Langhi
57	IEBF57	MANSI RAJESH TIWARI	Mansi	14	Mansi
58	IEBF58	MEGHANA ANIL KULKARNI	Meghana	12	Meghana
59	IEBF59	MIHIR PRAKASH RAJGURU	Mihir	11	Mihir
60	IEBF60	MRUNAL VITTHAL CHOUDHARY	Mrunal	12	Mrunal
61	IEBF61	MUGDHA SUNIL DHIWAR	Mugdha	11	Mugdha
62	IEBF62	NAMRATA NITIN GAIKWAD	Namrata	10	Namrata
63	IEBF63	NANDINI DEEPAK JAGTAP	Nandini	11	Nandini
64	IEBF64	NARAYAN RAJABHAU DHANDE	Narayan	10	Narayan
65	IEBF65	NAYAN DHANANJAY PHALKE	Nayan	10	Nayan
66	IEBF66	NEEL MILIND PAIGUDE	Neel	12	Neel
67	IEBF67	NEHA SHANKAR WAGHMARE	Neha	11	Neha
68	IEBF68	NEHA SUHAS REPALÉ	Repale	11	Repale
69	IEBF69	NIKHIL GIRISH DEO	Nikhil	11	Nikhil
70	IEBF70	NILAJA ANANDRAJ ANAWALIKAR	Nilaja	11	Nilaja
71	IEBF71	NOORJAHAN NOORMOHAMMAD SHAIKH	N	11	N
72	IEBF72	OM BALASAHEB GHODEKAR	Om	12	Om
73	IEBF73	OMKAR ANIRUDHA JOSHI		-A.B-	
74	IEBF74	OMKAR DNYANESHWAR KHOPADE	Omkar	10	Omkar
75	IEBF75	OMKAR MILIND GAIKWAD	Omkar	10	Omkar
76	IEBF76	OMKAR VIJAY NIMBALKAR	Omkar	12	Omkar
77	IEBF77	PARTHIV VINAYAK KARBHARI	P.V.K	10	P.V.K
78	IEBF78	PIYUSH PANJABRAO MALI	PPMALI	10	PPMALI



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79	IEBF79	PRADYUMNA ASHUTOSH DEO	¹ <u>P. Deo</u>	10	³ <u>P. Deo</u>	6	10	⁵ <u>P. Deo</u>
80	IEBF80	PRAGATI MANOJ SHINDE	<u>P. Shinde</u>	10	<u>P. Shinde</u>	8	10	<u>P. Shinde</u>
81	IEBF81	PRANALI RAVINDRA PATIL	<u>P. Patil</u>	10	<u>P. Patil</u>	7	10	<u>P. Patil</u>
82	IEBF82	PRANAV DHANAJI SHINDE	<u>P. S</u>	12	<u>P. S</u>	11	12	<u>P. S</u>
83	IEBF83	PRANAV MHASKU PISAL	<u>P. m. Pisal</u>	12	<u>P. m. Pisal</u>	10	12	<u>P. m. Pisal</u>
84	IEBF84	PRATHAM RAJESH DAVE	Cancelled					
85	IEBF85	PRATHAMESH PRADIP NIBANDHE	<u>P. Nibandhe</u>	11	<u>P. Nibandhe</u>	10	11	<u>P. Nibandhe</u>
86	IEBF86	PRATHMESH RAJU INGOLE	<u>P. Ingole</u>	12	<u>P. Ingole</u>	9	12	<u>P. Ingole</u>
87	IEBF87	PRATIK BABURAO KARANDE	<u>P. Karande</u>	11	<u>P. Karande</u>	10	11	<u>P. Karande</u>
88	IEBF88	PRATIK MAHADEV HOMKAR	<u>P. Homkar</u>	10	<u>P. Homkar</u>	9	10	<u>P. Homkar</u>
89	IEBF89	PRATIKSHA ANIL GADEKAR	<u>P. Gadekar</u>	14	<u>P. Gadekar</u>	11	14	<u>P. Gadekar</u>
90	IEBF90	PRATIKSHA SAGAR VEER	<u>P. Veer</u>	8	<u>P. Veer</u>	05	8	<u>P. Veer</u>
91	IEBF91	PRITAM PRABHAKAR SURYAWANSHI	<u>P. Suryawanshi</u>	10	<u>P. Suryawanshi</u>	9	10	<u>P. Suryawanshi</u>
92	IEBF92	PURVA DHANVAKUMAR BONGALE	<u>P. Bongale</u>	11	<u>P. Bongale</u>	9	11	<u>P. Bongale</u>
93	IEBF93	PUSHKAR PURUSHOTTAM JOSHI	<u>P. Joshi</u>	10	<u>P. Joshi</u>	9	10	<u>P. Joshi</u>
94	IEBF94	RACHANA YASHWANT BADHE	<u>R. Badhe</u>	10	<u>R. Badhe</u>	8	10	<u>R. Badhe</u>
95	IEBF95	RADHIKA SACHIN KALBHOR	<u>R. Kalbhore</u>	10	<u>R. Kalbhore</u>	7	10	<u>R. Kalbhore</u>
96	IEBF96	RIYA MANOJ SHINDE	<u>R. Shinde</u>	10	<u>R. Shinde</u>	9	11	<u>R. Shinde</u>
97	IEBF97	RIYA PANDHARINATH SONAWANE	<u>R. Sonawane</u>	9	<u>R. Sonawane</u>	5	9	<u>R. Sonawane</u>
98	IEBF98	ROHAN SANDIP WABLE	<u>R. Wable</u>		<u>R. Wable</u>	5	9	<u>R. Wable</u>
99	IEBF99	RONAK SACHIN BORA	<u>R. Bora</u>	12	<u>R. Bora</u>	10	12	<u>R. Bora</u>
100	IEBF100	RUDRESH LALIT HONRAO	<u>R. Honrao</u>	14	<u>R. Honrao</u>	10	14	<u>R. Honrao</u>
101	IEBF101	RUSHIKESH RAMCHANDRA WAGH			AB			
102	IEBF102	RUTUJA RAJENDRA BHADIRGE	<u>R. Bhadirge</u>	12	<u>R. Bhadirge</u>	10	12	<u>R. Bhadirge</u>
103	IEBF103	RUTUJA AJIT JADHAV	<u>R. Jadhav</u>	12	<u>R. Jadhav</u>	10	12	<u>R. Jadhav</u>
104	IEBF104	RUTUJA DATTATRAY PANCHAL	<u>R. Panchal</u>	12	<u>R. Panchal</u>	8	12	<u>R. Panchal</u>
105	IEBF105	RUTVIK PARSHURAM VEER	<u>R. Veer</u>	10	<u>R. Veer</u>	7	10	<u>R. Veer</u>
106	IEBF106	SAEE GANESH KHIRSAGAR	<u>S. Khirsagar</u>	9	<u>S. Khirsagar</u>	9	9	<u>S. Khirsagar</u>
107	IEBF107	SAEE MADHUKAR KONDHALKAR	<u>S. Kondhalkar</u>	10	<u>S. Kondhalkar</u>	9	10	<u>S. Kondhalkar</u>
108	IEBF108	SAHIL NITIN SAWANT	<u>S. Sawant</u>	10	<u>S. Sawant</u>	8	10	<u>S. Sawant</u>
109	IEBF109	SAHIL RAJESH KHAROTE	<u>S. Kharote</u>		<u>S. Kharote</u>	8	10	<u>S. Kharote</u>
110	IEBF110	SAHIL SUNIL KAWADE	<u>S. Kawade</u>		<u>S. Kawade</u>	9	10	<u>S. Kawade</u>
111	IEBF111	SAKSHI JAYWANT PAWAR	<u>S. Pawar</u>	11	<u>S. Pawar</u>	9	11	<u>S. Pawar</u>
112	IEBF112	SAKSHI PRAKASH KHADKE	<u>S. Khadke</u>	10	<u>S. Khadke</u>	7	10	<u>S. Khadke</u>
113	IEBF113	SAKSHI SANTOSH DHOTRE	<u>S. Dhotre</u>	14	<u>S. Dhotre</u>	12	14	<u>S. Dhotre</u>
114	IEBF114	SAKSHI SANTOSH KEDARI	<u>S. Kedari</u>	12	<u>S. Kedari</u>	10	12	<u>S. Kedari</u>
115	IEBF115	SAKSHI VASUDEO NIKAM	<u>S. Nikam</u>	12	<u>S. Nikam</u>	11	12	<u>S. Nikam</u>
116	IEBF116	SAMEER SITARAM DHEBE	<u>S. Dhebe</u>	11	<u>S. Dhebe</u>	10	11	<u>S. Dhebe</u>
117	IEBF117	SANGHARSHA BHAJANDAS PAWAR	<u>S. Pawar</u>	11	<u>S. Pawar</u>	10	11	<u>S. Pawar</u>
118	IEBF118	SANIKA SANJAY THOPATE	<u>S. Thopate</u>	11	<u>S. Thopate</u>	9	11	<u>S. Thopate</u>
119	IEBF119	SANIKA SUNIL JAGTAP	<u>S. Jagtap</u>	13	<u>S. Jagtap</u>	10	13	<u>S. Jagtap</u>
120	IEBF120	SANSKRUTI VINOD VEYWHARE	<u>S. Veywhare</u>	14	<u>S. Veywhare</u>	11	14	<u>S. Veywhare</u>
121	IEBF121	SARFARAZ SALIM SAYYAD	<u>S. Sayyad</u>	10	<u>S. Sayyad</u>	7	10	<u>S. Sayyad</u>
122	IEBF122	SARTHA SHIVAJI SHETE	<u>S. Shete</u>	11	<u>S. Shete</u>	8	11	<u>S. Shete</u>



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123	IEBF123	SARTHAK SOMNATH PAYGUDE	<u>Sarthak</u>	10	<u>Sarthak</u>	8	10	<u>Sarthak</u>
124	IEBF124	SHLOK DNYANESHWAR YADAV			<u>Shlok</u>	7	10	<u>Shlok</u>
125	IEBF125	SHRAVAN RAMESH NALAWADE		11		8	11	
126	IEBF126	SHRAVANI ANIL GAVAND	<u>Shravani</u>	11	<u>Shravani</u>	9	11	<u>Shravani</u>
127	IEBF127	SHRAVANI NARENDRA DAYAL	<u>Shravani</u>	12	<u>Shravani</u>	9	12	<u>Shravani</u>
128	IEBF128	SHRAVANI SANTOSH HOLKAR	<u>Shravani</u>	13	<u>Shravani</u>	11	13	<u>Shravani</u>
129	IEBF129	SHREYA PRITHVIRAJ CHAVAN	<u>Shreya</u>	12	<u>Shreya</u>	10	12	<u>Shreya</u>
130	IEBF130	SHREYAS SACHIN WALAMBE				9	10	
131	IEBF131	SHRIKANT BHARAT KUSUMALE	<u>Shrikant</u>	10	<u>Shrikant</u>	8	10	<u>Shrikant</u>
132	IEBF132	SHRIMAY HARISH PADHYE	<u>Shrimay</u>	12	<u>Shrimay</u>	10	12	
133	IEBF133	SIDDHESH SHASHANK VAIDYA				11	14	
134	IEBF134	SIDDDHI SAMEER MANDEKAR	<u>Siddhi</u>	12	<u>Siddhi</u>	10	12	<u>Siddhi</u>
135	IEBF135	SIDDDHI SANDEEP JANGAM	<u>Siddhi</u>	11	<u>Siddhi</u>	9	11	<u>Siddhi</u>
136	IEBF136	SMIT BHUPENDRA MESHRAM				11	13	
137	IEBF137	SNEHA ANIL SAKPAL	<u>Sneha</u>	12	<u>Sneha</u>	10	12	<u>Sneha</u>
138	IEBF138	SNEHA SATISH ANANDE	<u>Sneha</u>	12	<u>Sneha</u>	10	12	<u>Sneha</u>
139	IEBF139	SNEHAL MANOHAR DEWALE	<u>Snehal</u>	12	<u>Snehal</u>	10	12	<u>Snehal</u>
140	IEBF140	SOHAM MANGESH SONAWANE	<u>Soham</u>	11	<u>Soham</u>	9	11	<u>Soham</u>
141	IEBF141	SOHAM MANOJ TAGADE	<u>Soham</u>	15	<u>Soham</u>	12	15	<u>Soham</u>
142	IEBF142	SOHAM PRAKASH LOLE	<u>Soham</u>	12	<u>Soham</u>	11	12	<u>Soham</u>
143	IEBF143	SOUMITRA SAMEET CHAVARE				8	10	
144	IEBF144	SOURAV SACHIN KADAM	<u>Sourav</u>	10	<u>Sourav</u>	7	10	<u>Sourav</u>
145	IEBF145	SRUSHTI VINAYAK DESHMUKH	<u>Srushti</u>	11	<u>Srushti</u>	9	11	<u>Srushti</u>
146	IEBF146	SUDIKSHA DEEPAK DHAVADE	<u>Sudiksha</u>	12	<u>Sudiksha</u>	10	12	<u>Sudiksha</u>
147	IEBF147	SUJAL SHAILESH SHELAR	<u>Sujal</u>	12	<u>Sujal</u>	10	12	<u>Sujal</u>
148	IEBF148	SUJIT VIJAY GHALME	<u>Sujit</u>	9	<u>Sujit</u>	6	9	<u>Sujit</u>
149	IEBF149	SUMIT PAVAN SUPEKAR	<u>Sumit</u>	12	<u>Sumit</u>	10	12	<u>Sumit</u>
150	IEBF150	SUPRIYA HANUMANT KOLAGE	<u>Supriya</u>	13	<u>Supriya</u>	11	13	<u>Supriya</u>
151	IEBF151	SURAJ DIPAK NANAWARE	<u>Suraj</u>	12	<u>Suraj</u>	10	12	<u>Suraj</u>
152	IEBF152	SWAPNIL SUNIL AGATKAR	<u>Swapnil</u>	12	<u>Swapnil</u>	10	12	<u>Swapnil</u>
153	IEBF153	SWARADA SUHAS DEO	<u>Swarada</u>	11	<u>Swarada</u>	9	11	<u>Swarada</u>
154	IEBF154	SWARAJ SURYAKANT SALUNKE	<u>Swaraj</u>	12	<u>Swaraj</u>	11	12	<u>Swaraj</u>
155	IEBF155	SWATI AJAY BARGE				10	12	
156	IEBF156	TANISHA KAMLESH PARDESHI	<u>Tanisha</u>	12	<u>Tanisha</u>	10	12	<u>Tanisha</u>
157	IEBF157	TANMAY TATYASO NALAWADE	<u>Tanmay</u>	10	<u>Tanmay</u>	6	10	<u>Tanmay</u>
158	IEBF158	TANUJA RAJU KAMBLE	<u>Tanuja</u>	10	<u>Tanuja</u>	7	10	<u>Tanuja</u>
159	IEBF159	TANUJA SATISH KHADE	<u>Tanuja</u>	10	<u>Tanuja</u>	6	10	<u>Tanuja</u>
160	IEBF160	TEJAS SATISH SAWANT	<u>Tejas</u>	12	<u>Tejas</u>	6	12	<u>Tejas</u>
161	IEBF161	TEJAS SURYAKANT JARANDE	<u>T.J.</u>	10	<u>T.J.</u>	6	10	<u>T.J.</u>
162	IEBF162	VAISHNAVI BALASAHEB MATE	<u>V. B. Mate</u>	10	<u>V. B. Mate</u>	7	10	<u>V. B. Mate</u>
163	IEBF163	VANSH SHARAD JOSHI	<u>V. Joshi</u>	11	<u>V. Joshi</u>	8	11	<u>V. Joshi</u>
164	IEBF164	VEDANT SANTOSH DHAMAL	<u>Vedant</u>	10	<u>Vedant</u>	7	10	<u>Vedant</u>
165	IEBF165	VEDKUMAR PRASHANT PATIL				7	10	
166	IEBF166	VIDHI SUNIL MANE	<u>Vidhi</u>	14	<u>Vidhi</u>	11	14	<u>Vidhi</u>



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167	IEBF167	VINAYAK SANJAY GHULE	<u>11</u>	<u>11</u>	<u>10</u>	<u>11</u>	<u>11</u>
168	IEBF168	VISHAL ANKUSH YEDE	<u>12</u>	<u>12</u>	<u>10</u>	<u>12</u>	<u>12</u>
169	IEBF169	VISHWADEEPTI AJAY CHAVAN	<u>12</u>	<u>12</u>	<u>10</u>	<u>12</u>	<u>12</u>
170	IEBF170	VISHWAJA VIJAY PANGARE	<u>10</u>	<u>10</u>	<u>8</u>	<u>10</u>	<u>10</u>
171	IEBF171	VISHWAS MARUTI KAMBLE	<u>10</u>	<u>10</u>	<u>8</u>	<u>10</u>	<u>10</u>
172	IEBF172	VIVEK DATTATRAY PATIL	<u>9</u>	<u>9</u>	<u>6</u>	<u>9</u>	<u>9</u>
173	IEBF173	VIVEK YASHWANT BHISE	<u>10</u>	<u>10</u>	<u>7</u>	<u>10</u>	<u>10</u>
174	IEBF174	YASH DATTATRAY KUDALE	<u>12</u>	<u>12</u>	<u>10</u>	<u>12</u>	<u>12</u>
175	IEBF175	YASH SACHIN PATIL	<u>12</u>	<u>12</u>	<u>10</u>	<u>12</u>	<u>12</u>
176	IEBF176	YOGESH MAHADEO KATE	<u>13</u>	<u>13</u>	<u>11</u>	<u>13</u>	<u>13</u>
177	IEBF177	Devang Gopinath Datir	<u>11</u>	<u>11</u>	<u>11</u>	<u>11</u>	<u>11</u>
Sonita S. Muley Name of Subject Teacher			 Signature of Subject Teacher				




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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

F.Y.B.Sc.(CS) 2022-23 SEM-I

MTC 112: Discrete Mathematics

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

Program Outcome:


PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: In culcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In fuse ethical, human and professional values and responsibilities to make their contribution to the society.




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F.Y.B.Sc(CS) Mathematics II Discrete Mathematics

1. Define Cardinality of set. (CO1, CO2, PO1, PO3, PO4)
2. Explain Principle of Inclusion and Exclusion. (CO1, CO2, PO1, PO3, PO4)
3. Define predicate, Universal quantifier. (CO1, CO2, PO1, PO3, PO4)
4. State and prove De Morgan's law of Boolean Algebra. (CO1, CO2, PO1, PO3, PO4)
5. Define Homogeneous recurrence relations with example. (CO1, CO2, PO1, PO3, PO4)
6. Define the Pigeon-Hole Principle. Show that if there are 30 students in a class then at least two have their last names beginning with the same letter. (CO1, CO2, PO1, PO3, PO4)
7. Show that at a party of 20 persons, there are two persons who have same number of friends. (CO1, CO2, PO1, PO3, PO4)
8. Prove validity of following argument by using method of indirect proof. (CO1, CO2, PO1, PO3, PO4)

"If Meena marries Rohit, she will be in Nashik.

If Meena marries Tanmay, she will be in Baramati.

If she is either in Nashik or Baramati,

She will definitely be settled in life.

She is not settled in life.

Thus she did not marry Rohit or Tanmay.

9. Using method of indirect proof. Prove that "If n is integer & n^2 is odd then n is odd".

10.11. Solve the following homogeneous recurrence relation. (CO1, CO2, PO1, PO2, PO4)

$a_n = 3a_{n-1} + 4a_{n-2}$ for $n \geq 2$, $a_9 = 3$, $a_{10} = 5$. find a_7 and a_{12} . (CO1, CO2, PO1, PO2, PO4)

11. Express the following statements in symbolic form using quantifiers. Also write their negations. (CO1, CO2, PO1, PO2, PO4)

No rabbit knows calculus.

All Bollywood movies are serious.

12. Find the first six terms of the sequence defined by the following recurrence relation.

$a_n = a_{n-1} + 3a_{n-2}$, where $a_0 = 1$, $a_1 = 2$ (CO1, CO2, PO1, PO2, PO4)

13. Give an indirect proof of the following

$r \rightarrow c, s \rightarrow \neg w, r \vee s, w \vdash c$ (CO1, CO2, PO1, PO2, PO4)

14. Suppose that a function is given by a Boolean expression such that $f(x_1, x_2, x_3) = (x_1 \vee x_2) \wedge x_3$. Find the disjunctive normal form of f . (CO1, CO2, PO1, PO2, PO4)

15. Define the principle of Inclusion-Exclusion for three sets and hence solve the following example : (CO1, CO2, PO1, PO2, PO4)

A survey of 100 students produced the following information: 30 speak English, 45 speak Hindi & 60 speak Marathi. It is also found that 10 speak both English & Hindi, 20 speak both Hindi & Marathi & 15 speak both English & Marathi & 5 speak all the three languages.

How many of these students speak none of the 3 languages.

How many of these students speak exactly two languages.

16. Draw the Hasse diagram of the poset D_{48} , the set of all divisors of 48 with respect to partial order relation "divides". (CO1, CO2, PO1, PO2, PO4)

17. Let $A = \{1, 2, 3\}$ and $B = \{a, b\}$ How many different functions are there from A into B and what are they? (CO1, CO2, PO1, PO2, PO4)


18. Solve recurrence relation: $a_r - 9a_{r-1} + 20a_{r-2} = 2r$. (CO1, CO2, PO1, PO2, PO4)



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19. Solve recurrence relation : $a_r - 8a_{r-1} + 16a_{r-2} = 0$ with initial condition $a_2=16, a_3= 48$.
(CO1,CO2,PO1,PO2,PO4)
20. State & prove Commutativity, Associativity, Absorption property of join & meet.
(CO1,CO2,PO1,PO2,PO4)
21. Find the number of integers between 1 to 1000 that are divisible by 2 or 3 or 7.
(CO1,CO2,PO1,PO2,PO4)
22. Test for tautology $[(p \wedge q) \rightarrow r] \rightarrow [p \rightarrow (q \rightarrow r)]$. (CO1,CO2,PO1,PO2,PO4)
23. Solve the following homogeneous recurrence relation (CO1,CO2,PO1,PO2,PO4)
 $a_n - 7a_{n-1} + 10a_{n-2} = 0$; $a_0 = 4, a_1 = 17$.
24. Let $A = \{a, b\}$ be a set. Show that $(P(A), \subseteq)$ is a Boolean algebra. Also find atoms in $P(A)$.
25. Prove that in a complemented distributive lattice, a complement of an element is unique.
26. Solve the recurrence relation (CO1,CO2,PO1,PO2,PO4)
 $a_n - 2a_{n-1} - 3a_{n-2} = n+1$, where $a_0 = 0, a_1 = 2$.
27. How many numbers are there between 100 & 1000 in which all the digits are distinct.
28. Find the number of permutations for the word 'VISITING', MISSISSIPPI, MAHARASHTRA.
29. How many ways are there to pick 2 different cards from a standard 52 -cards such that 1) the first card is an ace and the second card is not a queen? (CO1,CO2,CO3,PO1,PO2,PO4)
30. In how many ways a cricket eleven can choose a captain and vice-captain from amongst themselves. (CO1,CO2,CO3,PO1,PO2,PO4)
31. Write the disjunctive normal form of each of the following:
1) $F(x_1, x_2) = x_1 \vee x_2$, here x_2 is bar.
2) $F(x_1, x_2) = x_1 \vee x_2$.
32. How many integers are there between 100 and 999 inclusive that are divisible by 3 but not by 4?
(CO1,CO2,CO3,PO1,PO2,PO4)
33. D_{12} = set of positive divisors of 12. Draw the Hasse diagram with divides relation. Determine whether it is a Boolean Algebra. (CO1,CO2,CO3,PO1,PO2,PO4)
34. Define valid argument. Write the following argument in symbolic form.
"Either I shall read a book or watch a movie. I shall not read a book. Hence I shall watch a movie."
(CO1,CO2,CO3,PO1,PO2,PO4)
35. How many friends must you have to guarantee that at least 10 of them will have birthday in the same month? (CO1,CO2,CO3,PO1,PO2,PO4)
36. List all possible functions from the set $A = \{a, b, c\}$ to the set $B = \{x, y\}$ (CO1,CO2,CO3,PO1,PO2,PO4)
37. Define tautology and give one example. (CO1,CO2,CO3,PO1,PO2,PO4)
38. Obtain the negation of each of the following (CO1,CO2,CO3,PO1,PO2,PO4)
a) $\forall x \in \mathbb{R}, x^2 - 10 \leq 8$
b) $\forall x \in \mathbb{R}, \forall y \in \mathbb{R}, x^2 + 3y > 4$
39. Define non homogeneous recurrence relation With example (CO1,CO2,CO3,PO1,PO2,PO4)
40. Show that $p \rightarrow q \equiv (\sim q) \rightarrow (\sim p)$ (CO1,CO2,CO3,PO1,PO2,PO4)




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Class : F.Y.B.Sc. (Computer Science)	Semester:	Academic Year: 2022-23
Subject: Discrete Mathematics		Internal Evaluation Record

Sr. No.	Roll No.	Name	Internal Evaluation					
			Assignme nt submitted	Assignme nt (15)	Internal Test attendanc e	Int.Test Score (15)	Best of Two	Sign of Student
1	IEBF1	AAKASH PRAVIN PISE	<i>edise</i>	12	<i>edise</i>	13	13	<i>edise</i>
2	IEBF2	ABHIJEET TUKARAM PANGUL	<i>Abhijeet</i>	10	<i>Abhijeet</i>	14	14	<i>Abhijeet</i>
3	IEBF3	ABHILASHA ARJUN MAHTO	<i>B</i>	12	<i>B</i>	12	12	<i>B</i>
4	IEBF4	ABHINAV ACHUTHAN NAIR	<i>Abhinav</i>	10	<i>Abhinav</i>	13	13	<i>Abhinav</i>
5	IEBF5	ABHISHEK MILIND BARGE	<i>Abhishek</i>	11	<i>Abhishek</i>	11	11	<i>Abhishek</i>
6	IEBF6	ADESH SOMNATH PAWAR	<i>Adesh</i>	12	<i>Adesh</i>	12	12	<i>Adesh</i>
7	IEBF7	ADITI MILIND NAIK	<i>A.M.Naik</i>	11	<i>A.M.Naik</i>	12	12	<i>A.M.Naik</i>
8	IEBF8	ADITYA ANAND SAWANT	<i>Aditya</i>	12	<i>Aditya</i>	12	12	<i>Aditya</i>
9	IEBF9	ADITYA DHANAJI SHINDE	<i>Aditya</i>	11	<i>Aditya</i>	12	12	<i>Aditya</i>
10	IEBF10	ADITYA EKNATH DAPHALE	<i>Aditya</i>	10	<i>Aditya</i>	12	12	<i>Aditya</i>
11	IEBF11	ADITYA GANESH BHOJ	<i>Aditya</i>	11	<i>Aditya</i>	11	11	<i>Aditya</i>
12	IEBF12	ADITYA MANOJ KUTE	<i>Aditya</i>	11	<i>Aditya</i>	12	12	<i>Aditya</i>
13	IEBF13	ADITYA NITIN UGHAD	<i>Aditya</i>	11	<i>Aditya</i>	11	11	<i>Aditya</i>
14	IEBF14	ADITYA RAJENDRA POTDAR	<i>Aditya</i>	10	<i>Aditya</i>	11	11	<i>Aditya</i>
15	IEBF15	ADITYA SURESH UJGAONKAR	<i>Aditya</i>	10	<i>Aditya</i>	12	12	<i>Aditya</i>
16	IEBF16	ADITYA VINOD BET	<i>Aditya</i>	10	<i>Aditya</i>	12	12	<i>Aditya</i>
17	IEBF17	AISHWARYA ANIL MANE	<i>Aishwarya</i>	10	<i>Aishwarya</i>	13	13	<i>Aishwarya</i>
18	IEBF18	AKANKSHA CHANDRAKANT KHOSE	<i>Akanksha</i>	10	<i>Akanksha</i>	13	13	<i>Akanksha</i>
19	IEBF19	AKSHAT NISHANT TASKAR	<i>Akshat</i>	12	<i>Akshat</i>	12	12	<i>Akshat</i>
20	IEBF20	AKSHATA ANAND BANSOD	<i>Akshata</i>	12	<i>Akshata</i>	12	12	<i>Akshata</i>
21	IEBF21	AMIR HARUN PANSARE	<i>Amir</i>	12	<i>Amir</i>	12	12	<i>Amir</i>
22	IEBF22	ANISH NILESH PATASKAR	<i>Anish</i>	12	<i>Anish</i>	14	14	<i>Anish</i>
23	IEBF23	ANKITA ANKUSH GHOGARE	<i>Ankita</i>	12	<i>Ankita</i>	12	12	<i>Ankita</i>
24	IEBF24	ANUJ SANTOSH KHATPE	<i>Anuj</i>	12	<i>Anuj</i>	13	13	<i>Anuj</i>
25	IEBF25	APURVA RAJENDRA PAWAR	<i>Apurva</i>	12	<i>Apurva</i>	13	13	<i>Apurva</i>
26	IEBF26	ARNAV GOPI NALAWADE	<i>Arnav</i>	10	<i>Arnav</i>	11	11	<i>Arnav</i>
27	IEBF27	ARYAN HARSHAL VATTURKAR	<i>Aryan</i>	10	<i>Aryan</i>	12	12	<i>Aryan</i>
28	IEBF28	ARYAN SANTOSH MANE	<i>Aryan</i>	10	<i>Aryan</i>	11	11	<i>Aryan</i>
29	IEBF29	ASHUTOSH SANJAY VIBHUTE	<i>Ashutosh</i>	10	<i>Ashutosh</i>	11	11	<i>Ashutosh</i>
30	IEBF30	ATHARVA AVINASH KALE	<i>Atharva</i>	10	<i>Atharva</i>	13	13	<i>Atharva</i>
31	IEBF31	ATHARVA DEEPAK KARPE	<i>Atharva</i>	10	<i>Atharva</i>	13	13	<i>Atharva</i>
32	IEBF32	ATHARVA MANGESH DESHMUKH	<i>Atharva</i>	10	<i>Atharva</i>	10	10	<i>Atharva</i>
33	IEBF33	ATHARVA NILESH GOTAD	<i>Atharva</i>	10	<i>Atharva</i>	11	11	<i>Atharva</i>
34	IEBF34	BHAKTI KIRAN MAPRAKAR	<i>Bhakti</i>	10	<i>Bhakti</i>	11	11	<i>Bhakti</i>



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			1		3		6
35	IEBF35	BHAVANA MAHESH VHARKAT	<u>BV</u>	12	<u>BV</u>	12	12 <u>BV</u>
36	IEBF36	DASIM MURAD SATVILKAR	<u>DS</u>	11	<u>DS</u>	11	11 <u>DS</u>
37	IEBF37	DEVDA GORAKSHNATH KHANEKAR	<u>Bhanekar</u>	12	<u>Bhanekar</u>	12	12 <u>Bhanekar</u>
38	IEBF38	DEVEN MAHESH KULKARNI	<u>DK</u>	12	<u>DK</u>	12	12 <u>DK</u>
39	IEBF39	DHANUSH PADMANABHA	<u>Dhanush</u>	12	<u>Dhanush</u>	12	12 <u>Dhanush</u>
40	IEBF40	DHRUV MANOJ DESHPANDE	<u>Dhruv</u>	11	<u>Dhruv</u>	11	11 <u>Dhruv</u>
41	IEBF41	DIKSHA KISHOR KUMBHAR	<u>Diksha</u>	12	<u>Diksha</u>	12	13 <u>Diksha</u>
42	IEBF42	GANESH KALIDAS NAGTILAK	<u>Ganesh</u>	12	<u>Ganesh</u>	12	14 <u>Ganesh</u>
43	IEBF43	GAYATRI SACHIN BADODKAR	<u>GSB</u>	12	<u>GSB</u>	12	14 <u>GSB</u>
44	IEBF44	HARSHADA SHIVAJI YELWANDE	<u>Harshada</u>	10	<u>Harshada</u>	10	11 <u>Harshada</u>
45	IEBF45	HARSHVARDHAN DURGESHKUMAR	<u>Habani</u>	10	<u>Habani</u>	10	10 <u>Habani</u>
46	IEBF46	HARSHVARDHAN TATYASO ZAMBRE	<u>Harsh</u>	10	<u>Harsh</u>	10	10 <u>Harsh</u>
47	IEBF47	INDRAJEET RATARAM CHOUDHARY	<u>Indrajeet</u>	10	<u>Indrajeet</u>	10	10 <u>Indrajeet</u>
48	IEBF48	ISHITA KISHOR DUDHAL	<u>Shitadhal</u>	10	<u>Shitadhal</u>	10	15 <u>Shitadhal</u>
49	IEBF49	JANHVI PRADIP JOSHI	<u>Janhvi</u>	10	<u>Janhvi</u>	10	10 <u>Janhvi</u>
50	IEBF50	KAJAL KISHOR KADAM	<u>KJ Kadam</u>	14	<u>KJ Kadam</u>	14	14 <u>KJ Kadam</u>
51	IEBF51	KARAN JALINDAR KADAM	<u>Kadam</u>	11	<u>Kadam</u>	11	11 <u>Kadam</u>
52	IEBF52	KARAN JHUMBERLAL JOSHI	<u>Karan</u>	12	<u>Karan</u>	12	12 <u>Karan</u>
53	IEBF53	KAUSHIK KONDIBA SHITURE	<u>Kaushik</u>	13	<u>Kaushik</u>	13	13 <u>Kaushik</u>
54	IEBF54	KHUSHI KAMAL PAREEK	<u>Khushi</u>	13	<u>Khushi</u>	13	13 <u>Khushi</u>
55	IEBF55	KOMAL CHANDRAKANT BHORDE	<u>KBhorde</u>	13	<u>KBhorde</u>	13	13 <u>KBhorde</u>
56	IEBF56	LOUKIK DATTATRAYA LANGHI	<u>L.D. Langhi</u>	10	<u>L.D. Langhi</u>	11	11 <u>L.D. Langhi</u>
57	IEBF57	MANSI RAJESH TIWARI	<u>Mansi</u>	12	<u>Mansi</u>	14	14 <u>Mansi</u>
58	IEBF58	MEGHANA ANIL KULKARNI	<u>Meghana</u>	10	<u>Meghana</u>	11	11 <u>Meghana</u>
59	IEBF59	MIHIR PRAKASH RAJGURU	<u>Mihir P</u>	10	<u>Mihir P</u>	11	11 <u>Mihir P</u>
60	IEBF60	MRUNAL VITTHAL CHOUDHARY	<u>Mrunal</u>	10	<u>Mrunal</u>	13	13 <u>Mrunal</u>
61	IEBF61	MUGDHA SUNIL DHIWAR	<u>Mugdha</u>	10	<u>Mugdha</u>	13	13 <u>Mugdha</u>
62	IEBF62	NAMRATA NITIN GAIKWAD	<u>Namrata</u>	10	<u>Namrata</u>	10	10 <u>Namrata</u>
63	IEBF63	NANDINI DEEPAK JAGTAP	<u>Nandini</u>	10	<u>Nandini</u>	15	15 <u>Nandini</u>
64	IEBF64	NARAYAN RAJABHAU DHANDE	<u>Narayan</u>	10	<u>Narayan</u>	13	13 <u>Narayan</u>
65	IEBF65	NAYAN DHANANJAY PHALKE	<u>Nayan</u>	11	<u>Nayan</u>	11	11 <u>Nayan</u>
66	IEBF66	NEEL MILIND PAIGUDE	<u>Neel</u>	12	<u>Neel</u>	14	14 <u>Neel</u>
67	IEBF67	NEHA SHANKAR WAGHMARE	<u>Neha</u>	12	<u>Neha</u>	15	15 <u>Neha</u>
68	IEBF68	NEHA SUHAS REPALE	<u>Repale</u>	12	<u>Repale</u>	15	15 <u>Repale</u>
69	IEBF69	NIKHIL GIRISH DEO	<u>Nikhil</u>	12	<u>Nikhil</u>	14	14 <u>Nikhil</u>
70	IEBF70	NILAJA ANANDRAJ ANAWALIKAR	<u>Nilaja</u>	12	<u>Nilaja</u>	14	14 <u>Nilaja</u>
71	IEBF71	NOORJAHAN NOORMOHAMMAD SHAIKH	<u>Noor</u>	12	<u>Noor</u>	14	14 <u>Noor</u>
72	IEBF72	OM BALASAHEB GHODEKAR	<u>Om</u>	12	<u>Om</u>	13	13 <u>Om</u>
73	IEBF73	OMKAR ANIRUDHA JOSHI	<u>Omkar</u>	06		08	08 <u>Omkar</u>
74	IEBF74	OMKAR DNYANESHWAR KHOPADE	<u>Omkar</u>	13	<u>Omkar</u>	13	13 <u>Omkar</u>
75	IEBF75	OMKAR MILIND GAIKWAD	<u>Omkar</u>	14	<u>Omkar</u>	14	14 <u>Omkar</u>
76	IEBF76	OMKAR VIJAY NIMBALKAR	<u>Omkar</u>	14	<u>Omkar</u>	14	14 <u>Omkar</u>
77	IEBF77	PARTHIV VINAYAK KARBHARI	<u>P.V. K</u>	13	<u>P.V. K</u>	13	13 <u>P.V. K</u>
78	IEBF78	PIYUSH PANJABRAO MALI	<u>Pama</u>	12	<u>Pama</u>	12	12 <u>Pama</u>



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79	IEBF79	PRADYUMNA ASHUTOSH DEO	<u>P. Ash</u>	10	<u>P. Ash</u>	10	10	<u>P. Ash</u>
80	IEBF80	PRAGATI MANOJ SHINDE	<u>P. Shinde</u>	10	<u>P. Shinde</u>	15	15	<u>P. Shinde</u>
81	IEBF81	PRANALI RAVINDRA PATIL	<u>P. Patil</u>	10	<u>P. Patil</u>	15	15	<u>P. Patil</u>
82	IEBF82	PRANAV DHANAJI SHINDE	<u>P.S</u>	10	<u>P.S</u>	11	11	<u>P.S</u>
83	IEBF83	PRANAV MHASKU PISAL	<u>P.m. Pisal</u>	10	<u>P.m. Pisal</u>	10	10	<u>P.m. Pisal</u>
84	IEBF84	PRATHAM RAJESH DAVE	cancelled	10		-		AB
85	IEBF85	PRATHAMESH PRADIP NIBANDHE	<u>P. Nibandhe</u>	10	<u>P. Nibandhe</u>	10	10	<u>P. Nibandhe</u>
86	IEBF86	PRATHMESH RAJU INGOLE	<u>P. Ingole</u>	11	<u>P. Ingole</u>	14	14	<u>P. Ingole</u>
87	IEBF87	PRATIK BABURAO KARANDE	<u>P. Karande</u>	11	<u>P. Karande</u>	14	14	<u>P. Karande</u>
88	IEBF88	PRATIK MAHADEV HOMKAR	<u>P. Homkar</u>	11	<u>P. Homkar</u>	14	14	<u>P. Homkar</u>
89	IEBF89	PRATIKSHA ANIL GADEKAR	<u>P. Gadekar</u>	12	<u>P. Gadekar</u>	13	13	<u>P. Gadekar</u>
90	IEBF90	PRATIKSHA SAGAR VEER	<u>P. Veer</u>	10	<u>P. Veer</u>	10	10	<u>P. Veer</u>
91	IEBF91	PRITAM PRABHAKAR SURYAWANSHI	<u>P. Suryawanshi</u>	11	<u>P. Suryawanshi</u>	14	14	<u>P. Suryawanshi</u>
92	IEBF92	PURVA DHANVAKUMAR BONGALE	<u>P. Bongale</u>	11	<u>P. Bongale</u>	14	14	<u>P. Bongale</u>
93	IEBF93	PUSHKAR PURUSHOTTAM JOSHI	<u>P. Joshi</u>	12	<u>P. Joshi</u>	14	14	<u>P. Joshi</u>
94	IEBF94	RACHANA YASHWANT BADHE	<u>R. Badhe</u>	10	<u>R. Badhe</u>	10	10	<u>R. Badhe</u>
95	IEBF95	RADHIKA SACHIN KALBHOR	<u>R. Kalbhore</u>	11	<u>R. Kalbhore</u>	12	12	<u>R. Kalbhore</u>
96	IEBF96	RIYA MANOJ SHINDE	<u>R. Shinde</u>	11	<u>R. Shinde</u>	14	14	<u>R. Shinde</u>
97	IEBF97	RIYA PANDHARINATH SONAWANE	<u>R. Sonawane</u>	12	<u>R. Sonawane</u>	13	13	<u>R. Sonawane</u>
98	IEBF98	ROHAN SANDIP WABLE	<u>R. Wable</u>	10	<u>R. Wable</u>	10	10	<u>R. Wable</u>
99	IEBF99	RONAK SACHIN BORA	<u>R. Bora</u>	11	<u>R. Bora</u>	15	15	<u>R. Bora</u>
100	IEBF100	RUDRESH LALIT HONRAO	<u>R. Honrao</u>	12	<u>R. Honrao</u>	14	14	<u>R. Honrao</u>
101	IEBF101	RUSHIKESH RAMCHANDRA WAGH		11		-		AB
102	IEBF102	RUTUJA RAJENDRA BHADIRGE	<u>R. Bhadirge</u>	12	<u>R. Bhadirge</u>	13	13	<u>R. Bhadirge</u>
103	IEBF103	RUTUJA AJIT JADHAV	<u>R. Jadhav</u>	12	<u>R. Jadhav</u>	13	13	<u>R. Jadhav</u>
104	IEBF104	RUTUJA DATTATRAY PANCHAL		12		14	14	
105	IEBF105	RUTVIK PARSHURAM VEER	<u>R. Veer</u>	10	<u>R. Veer</u>	10	10	<u>R. Veer</u>
106	IEBF106	SALE GANESH KHIRSAGAR	<u>S. Khirsagar</u>	09	<u>S. Khirsagar</u>	09	9	<u>S. Khirsagar</u>
107	IEBF107	SAEE MADHUKAR KONDHALKAR	<u>S. Kondhalkar</u>		<u>S. Kondhalkar</u>	12	12	<u>S. Kondhalkar</u>
108	IEBF108	SAHIL NITIN SAWANT	<u>S. Sawant</u>	10	<u>S. Sawant</u>	10	10	<u>S. Sawant</u>
109	IEBF109	SAHIL RAJESH KHAROTE		12	<u>S. Kharote</u>	12	12	<u>S. Kharote</u>
110	IEBF110	SAHIL SUNIL KAWADE		13	<u>S. Kawade</u>	13	13	<u>S. Kawade</u>
111	IEBF111	SAKSHI JAYWANT PAWAR	<u>S. Pawar</u>	14	<u>S. Pawar</u>	14	14	<u>S. Pawar</u>
112	IEBF112	SAKSHI PRAKASH KHADKE	<u>S. Khadke</u>	11	<u>S. Khadke</u>	11	11	<u>S. Khadke</u>
113	IEBF113	SAKSHI SANTOSH DHOTRE	<u>S. Dhotre</u>	12	<u>S. Dhotre</u>	13	13	<u>S. Dhotre</u>
114	IEBF114	SAKSHI SANTOSH KEDARI	<u>S. Kedari</u>	12	<u>S. Kedari</u>	13	13	<u>S. Kedari</u>
115	IEBF115	SAKSHI VASUDEO NIKAM	<u>S. Nikam</u>	12	<u>S. Nikam</u>	13	13	<u>S. Nikam</u>
116	IEBF116	SAMEER SITARAM DHEBE	<u>S. Dhebe</u>	11	<u>S. Dhebe</u>	11	11	<u>S. Dhebe</u>
117	IEBF117	SANGHARSHA BHAJANDAS PAWAR	<u>S. Pawar</u>	12	<u>S. Pawar</u>	13	13	<u>S. Pawar</u>
118	IEBF118	SANIKA SANJAY THOPATE	<u>S. Thopate</u>	12	<u>S. Thopate</u>	12	12	<u>S. Thopate</u>
119	IEBF119	SANIKA SUNIL JAGTAP	<u>S. Jagtap</u>	12	<u>S. Jagtap</u>	12	12	<u>S. Jagtap</u>
120	IEBF120	SANSKRUTI VINOD VEYWHARE	<u>S. Veywhare</u>	12	<u>S. Veywhare</u>	12	12	<u>S. Veywhare</u>
121	IEBF121	SARFARAZ SALIM SAYYAD		12		13	13	
122	IEBF122	SARTHAK SHIVAJI SHETE	<u>S. Shete</u>	12	<u>S. Shete</u>	12	12	<u>S. Shete</u>



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123	IEBF123	SARTHAK SOMNATH PAYGUDE	<u>Sarthak</u>	10	<u>Sarthak</u>	12	12	<u>Sarthak</u>
124	IEBF124	SHLOK DNYANESHWAR YADAV		10	<u>Yadav</u>	10	10	<u>Yadav</u>
125	IEBF125	SHRAVAN RAMESH NALAWADE	<u>Nalawade</u>	10	<u>Nalawade</u>	10	10	<u>Nalawade</u>
126	IEBF126	SHRAVANI ANIL GAVAND	<u>Gavand</u>	11	<u>Gavand</u>	11	11	<u>Gavand</u>
127	IEBF127	SHRAVANI NARENDRA DAYAL	<u>Shravani</u>	11	<u>Shravani</u>	11	11	<u>Shravani</u>
128	IEBF128	SHRAVANI SANTOSH HOLKAR	<u>Shravani</u>	12	<u>Shravani</u>	13	13	<u>Shravani</u>
129	IEBF129	SHREYA PRITHVIRAJ CHAVAN	<u>Chavan</u>	12	<u>Chavan</u>	13	13	<u>Chavan</u>
130	IEBF130	SHREYAS SACHIN WALAMBE	<u>Walambe</u>	12	<u>Walambe</u>	14	14	<u>Walambe</u>
131	IEBF131	SHRIKANT BHARAT KUSUMALE	<u>Kusumale</u>	12	<u>Kusumale</u>	14	14	<u>Kusumale</u>
132	IEBF132	SHRIMAY HARISH PADHYE	<u>Padhye</u>	12	<u>Padhye</u>	15	15	<u>Padhye</u>
133	IEBF133	SIDDHESH SHASHANK VAIDYA		13		14	14	
134	IEBF134	SIDDHI SAMEER MANDEKAR	<u>Mandekar</u>	12	<u>Mandekar</u>	12	12	<u>Mandekar</u>
135	IEBF135	SIDDHI SANDEEP JANGAM	<u>Jangam</u>	12	<u>Jangam</u>	13	13	<u>Jangam</u>
136	IEBF136	SMIT BHUPENDRA MESHAM		12		14	14	
137	IEBF137	SNEHA ANIL SAKPAL	<u>Sneha</u>	12	<u>Sneha</u>	12	12	<u>Sneha</u>
138	IEBF138	SNEHA SATISH ANANDE	<u>Sneha</u>	12	<u>Sneha</u>	14	14	<u>Sneha</u>
139	IEBF139	SNEHAL MANOHAR DEWALE	<u>Dewale</u>	10	<u>Dewale</u>	10	10	<u>Dewale</u>
140	IEBF140	SOHAM MANGESH SONAWANE	<u>Soham</u>	10	<u>Soham</u>	10	10	<u>Soham</u>
141	IEBF141	SOHAM MANOJ TAGADE	<u>Soham</u>	12	<u>Soham</u>	13	13	<u>Soham</u>
142	IEBF142	SOHAM PRAKASH LOLE	<u>Soham</u>	12	<u>Soham</u>	12	12	<u>Soham</u>
143	IEBF143	SOUMITRA SAMEET CHAVARE		11		11	11	
144	IEBF144	SOURAV SACHIN KADAM	<u>Sourav</u>	10	<u>Sourav</u>	10	10	<u>Sourav</u>
145	IEBF145	SRUSHTI VINAYAK DESHMUKH	<u>Deshmukh</u>	11	<u>Deshmukh</u>	12	12	<u>Deshmukh</u>
146	IEBF146	SUDIKSHA DEEPAK DHAVADE	<u>Dhavade</u>	12	<u>Dhavade</u>	13	13	<u>Dhavade</u>
147	IEBF147	SUJAL SHAILESH SHELAR	<u>Shelar</u>	10	<u>Shelar</u>	12	12	<u>Shelar</u>
148	IEBF148	SUJIT VIJAY GHALME	<u>Sujit</u>	10	<u>Sujit</u>	13	13	<u>Sujit</u>
149	IEBF149	SUMIT PAVAN SUPEKAR	<u>Sumit</u>	10	<u>Sumit</u>	13	13	<u>Sumit</u>
150	IEBF150	SUPRIYA HANUMANT KOLAGE	<u>Kolage</u>	10	<u>Kolage</u>	15	15	<u>Kolage</u>
151	IEBF151	SURAJ DIPAK NANAWARE	<u>Nanaware</u>	10	<u>Nanaware</u>	14	14	<u>Nanaware</u>
152	IEBF152	SWAPNIL SUNIL AGATKAR	<u>Agatkar</u>	10	<u>Agatkar</u>	14	14	<u>Agatkar</u>
153	IEBF153	SWARADA SUHAS DEO	<u>Deo</u>	11	<u>Deo</u>	14	14	<u>Deo</u>
154	IEBF154	SWARAJ SURYAKANT SALUNKE	<u>Salunke</u>	11	<u>Salunke</u>	14	14	<u>Salunke</u>
155	IEBF155	SWATI AJAY BARGE	<u>Barge</u>	11	<u>Barge</u>	14	14	<u>Barge</u>
156	IEBF156	TANISHA KAMLESH PARDESHI	<u>Pardehi</u>	12	<u>Pardehi</u>	13	13	<u>Pardehi</u>
157	IEBF157	TANMAY TATYASO NALAWADE	<u>Nalawade</u>	10	<u>Nalawade</u>	10	10	<u>Nalawade</u>
158	IEBF158	TANUJA RAJU KAMBLE	<u>Kamble</u>	11	<u>Kamble</u>	13	13	<u>Kamble</u>
159	IEBF159	TANUJA SATISH KHADE	<u>Khadet</u>	12	<u>Khadet</u>	12	12	<u>Khadet</u>
160	IEBF160	TEJAS SATISH SAWANT	<u>Sawant</u>	11	<u>Sawant</u>	15	15	<u>Sawant</u>
161	IEBF161	TEJAS SURYAKANT JARANDE	<u>T.J</u>	12	<u>T.J</u>	14	14	<u>T.J</u>
162	IEBF162	VAISHNAVI BALASAHEB MATE	<u>V.B.Mate</u>	11	<u>V.B.Mate</u>	14	14	<u>V.B.Mate</u>
163	IEBF163	VANSH SHARAD JOSHI	<u>V.Joshi</u>	12	<u>V.Joshi</u>	14	14	<u>V.Joshi</u>
164	IEBF164	VEDANT SANTOSH DHAMAL	<u>Dhamal</u>	12	<u>Dhamal</u>	12	12	<u>Dhamal</u>
165	IEBF165	VEDKUMAR PRASHANT PATIL		12		12	12	
166	IEBF166	VIDHI SUNIL MANE	<u>Mane</u>	11	<u>Mane</u>	13	13	<u>Mane</u>



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167	IEBF167	VINAYAK SANJAY GHULE	¹ <i>[Signature]</i>	10	³ <i>[Signature]</i>	12	12	⁶ <i>[Signature]</i>
168	IEBF168	VISHAL ANKUSH YEDE	<i>[Signature]</i>	10	<i>[Signature]</i>	10	10	<i>[Signature]</i>
169	IEBF169	VISHWADEEPTI AJAY CHAVAN	<i>[Signature]</i>	10	<i>[Signature]</i>	14	14	<i>[Signature]</i>
170	IEBF170	VISHWAJA VIJAY PANGARE	<i>[Signature]</i>	11	<i>[Signature]</i>	11	11	<i>[Signature]</i>
171	IEBF171	VISHWAS MARUTI KAMBLE	<i>[Signature]</i>	11	<i>[Signature]</i>	13	13	<i>[Signature]</i>
172	IEBF172	VIVEK DATTATRAY PATIL	<i>[Signature]</i>	11	<i>[Signature]</i>	11	11	<i>[Signature]</i>
173	IEBF173	VIVEK YASHWANT BHISE	<i>[Signature]</i>	10	<i>[Signature]</i>	13	13	<i>[Signature]</i>
174	IEBF174	YASH DATTATRAY KUDALE	<i>[Signature]</i>	10	<i>[Signature]</i>	12	12	<i>[Signature]</i>
175	IEBF175	YASH SACHIN PATIL	<i>[Signature]</i>	11	<i>[Signature]</i>	12	12	<i>[Signature]</i>
176	IEBF176	YOGESH MAHADEO KATE	<i>[Signature]</i>	11	<i>[Signature]</i>	11	11	<i>[Signature]</i>
177	IEBF-177	Devany Gopinath Patil	<i>[Signature]</i>	11	<i>[Signature]</i>	11	11	<i>[Signature]</i>
Prof. Mohini Pardeshi			Prof. Pardeshi					
Name of Subject Teacher			Signature of Subject Teacher					



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Roll No.	Date	Assignment No.	Sign



Linear Algebra (Que. Bank)

CH. I. Vector Spaces.

- 1) Is \mathbb{R}^2 a subspace of \mathbb{R}^3 ?
- 2) Is the set represented by $H = \left\{ \begin{bmatrix} p \\ q \\ 0 \end{bmatrix} \mid p, q \in \mathbb{R} \right\}$ subspace of \mathbb{R}^3 ? Justify?
- 3) Consider the following system of homogeneous eqⁿ.

$$\begin{aligned} x_1 - 3x_2 - 2x_3 &= 0 \\ -5x_1 + 9x_2 + x_3 &= 0 \end{aligned}$$
 And let $u = \begin{bmatrix} 5 \\ 3 \\ -2 \end{bmatrix}$. Determine whether u belongs to the null space of A .
- 4) Find a matrix A s.t. $w = \text{col } A$. where $w = \left\{ \begin{bmatrix} 6a-b \\ a+b \\ b-7a \end{bmatrix} \mid a, b \in \mathbb{R} \right\}$
- 5) Find a spanning set for the null space of a matrix,

$$A = \begin{bmatrix} -3 & 6 & -1 & 1 & -7 \\ 1 & -2 & 2 & 3 & -1 \\ 2 & -4 & 5 & 8 & -4 \end{bmatrix}$$
- 6) If $\text{col } A = \left\{ \begin{bmatrix} 2s+3t \\ r+s-2t \\ 4r+s \\ 3r-s-t \end{bmatrix} \mid r, s, t \in \mathbb{R} \right\}$ then find A ?
- 7) If $A = \begin{bmatrix} 1 & 4 & 0 & 2 & -1 \\ 3 & 12 & 1 & 5 & 5 \\ 2 & 8 & 1 & 3 & 2 \\ 5 & 20 & 2 & 8 & 8 \end{bmatrix}$, find basis for $\text{Null}(A)$.
- 8) Find x has co-ordinate vector $[x]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$, where $B = \{b_1, b_2\}$ for \mathbb{R}^2 as $b_1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$, $b_2 = \begin{bmatrix} 1 \\ 7 \end{bmatrix}$.



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Linear Algebra (Que. Bank)

- 26) Find all the eigen values and eigenvectors of the matrix
 $A = \begin{bmatrix} 3 & -2 \\ 6 & -4 \end{bmatrix}$
- 27) Find all eigen values and eigen vectors of matrix $B = \begin{bmatrix} 4 & 2 & 1 \\ 2 & 4 & 2 \\ 2 & 2 & 4 \end{bmatrix}$
- 28) Diagonalize the matrix $A = \begin{bmatrix} 1 & 0 \\ 6 & -1 \end{bmatrix}$. Find invertible matrix P and diagonal matrix D st. $A = PDP^{-1}$
- 29) Write the definition of eigenvalue and eigenvector.
- 30) Find eigen-values and corresponding eigenvectors for the following matrices:
- a) $\begin{bmatrix} 5 & 0 \\ 2 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 5 & 2 & -2 \\ 2 & 5 & -2 \\ -2 & -2 & 5 \end{bmatrix}$
- 31) Diagonalize the following matrix if possible, where $A = \begin{bmatrix} 2 & 4 & 3 \\ 4 & -6 & -5 \\ 3 & 3 & 1 \end{bmatrix}$



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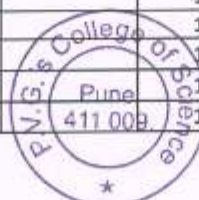
P.V.G's College of Science & Commerce, Pune 9

Class : F.Y.B.Sc. (Computer Science)
Subject: MTC121 - Linear Algebra

Sem:II

Academic Year: 2022-23
Internal Evaluation Record

Seat No.	Roll No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int.Test Score (15)	Best of 2 (15)	
3214	FBCS114	PATASKAR ANISH NILESH		14		14	14	
3215	FBCS124	PHALKE NAYAN DHANANJAY		15		15	15	
3216	FBCS111	PANGUL ABHIJEET TUKARAM		15		15	15	Abhijeet
3217	FBCS003	ANAWALIKAR NILAJA ANANDRAJ		13		13	13	Nilaja
3218	FBCS065	KALE ATHARVA AVINASH		13		13	13	Male
3219	FBCS004	BADHE RACHANA YASHWANT		14		14	14	Rachana
3220	FBCS005	BADODKAR GAYATRI SACHIN		11		9	11	GSO
3221	FBCS007	BARGE ABHISHEK MILIND		14		14	14	Abhishek
3222	FBCS008	BARGE SWATI AJAY		13		13	13	Swati
3223	FBCS009	BET ADITYA VINOD		15		15	15	Aditya
3224	FBCS019	BHOJ ADITYA GANESH		10		8	10	Aditya
3225	FBCS013	BORA RONAK SACHIN		15		15	15	Ronak
3226	FBCS016	CHAVARE SOUMITRA SAMEER		14		14	14	Samritha
3227	FBCS018	CHOUHARY INDRAJEET RATARAM		8		AB	8	Indrajit
3228	FBCS021	DATIR DEVANG GOPINATH		15		15	15	Devang
3229	FBCS022	DEO NIKHIL GIRISH		15		15	15	Nikhil
3230	FBCS023	DEO PRADYUMNA ASHUTOSH		15		15	15	Pradyumna
3231	FBCS024	DEO SWARADA SUHAS		12		12	12	Swarada
3232	FBCS025	DESHMUKH ATHARVA MANGESH		11		11	11	Atharva
3233	FBCS027	DESHPANDE DHRUV MANOJ		15		15	15	Dhruv
3234	FBCS076	KHANEKAR DEVDAS GORAKSHNATH		13		13	13	Devdas
3235	FBCS084	KULKARNI DEVEN MAHESH		12		12	12	Deven
3236	FBCS029	DHAMAL VEDANT SANTOSH DHAMAL		12		12	12	Vedant
3237	FBCS032	DHEBE SAMEER SITARAM		14		14	14	Dhebe
3238	FBCS037	GAIKWAD OMAR MILIND		15		15	15	Omkar
3239	FBCS040	GAVAND SHRAVANI ANIL		15		15	15	Shravani
3240	FBCS041	GHALME SUJIT VUAY		14		14	14	Sujit
3241	FBCS043	GHOARE ANKITA ANKUSH		14		14	14	Ankita
3242	FBCS045	GOTAD ATHARVA NILESH		15		15	15	Atharva
3243	FBCS047	HOMKAR PRATIK MAHADEV		15		15	15	Pratik
3244	FBCS052	JAGTAP NANDINI DEEPAK		10		9	10	Nandini
3245	FBCS054	JANGAM SIDDHI SANDEEP		12		12	12	Siddhi
3246	FBCS055	JARANDE TEJAS SURYAKANT		10		6	10	Tejas
3247	FBCS051	JOSHI OMAR ANIRUDDHA		10		7	10	Aniruddha
3248	FBCS063	KADAM SOURAV SACHIN		10		10	10	Sourav
3249	FBCS064	KALBHOR RADHIKA SACHIN		14		14	14	Radhika
3250	FBCS067	KAMBLE TANUJA RAJU		14		14	14	Tanuja
3251	FBCS068	KAMBLE VISHWAS MARUTI		10		10	10	Vishwas
3252	FBCS069	KARANDE PRATIK BABURAO		10		10	10	Pratik
3253	FBCS070	KARBHARI PARTHIV VINAYAK		10		7	10	Partthiv
3254	FBCS072	KATE YOGESH MAHADEO		14		14	14	Yogesh
3255	FBCS073	KEDARI SAKSHI SANTOSH		12		12	12	Sakshi
3256	FBCS075	KHADKE SAKSHI PRAKASH		13		13	13	Sakshi
3257	FBCS077	KHAROTE SAHIL RAJESH		13		13	13	Sahil
3258	FBCS078	KHATPE ANUJ SANTOSH		13		13	13	Anuj
3259	FBCS079	KHOPADE OMAR DNYANESHWAR		13		13	13	Omkar
3260	FBCS080	KHOSE AKANKSHA CHANDRAKANT		15		15	15	Akanksha
3261	FBCS066	KOLAGE SUPRIYA HANUMANT		15		15	15	Supriya
3262	FBCS083	KUDALE YASH DATTATRAY		11		11	11	Yash
3263	FBCS085	KULKARNI MEGHANA ANIL		12		12	12	Meghana

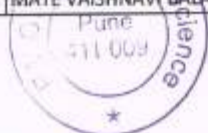


Principal

P.V.G's College of Science
Vidyanagari, S. No. 44, Pravati,
Pune - 411 009.

Seat No.	Roll No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	
3264	FBCS087	KUSUMALE SHRIKANT BHARAT	<i>Kusumale</i>	10	<i>Kusumale</i>	9	10	<i>Kusumale</i>
3265	FBCS098	LANGHI LOUKIK DATTATRAYA	<i>L. D. Langhi</i>	14	<i>L. D. Langhi</i>	14	14	<i>L. D. Langhi</i>
3266	FBCS090	MAHTO ABHILASHA ARJUN	<i>A. Mahato</i>	14		14	14	<i>A. Mahato</i>
3267	FBCS092	MANE AISHWARYA ANIL	<i>Aishwarya Mane</i>	10		10	10	<i>Aishwarya Mane</i>
3268	FBCS093	MANE ARYAN SANTOSH		13		13	13	<i>A. Mahato</i>
3269	FBCS097	MESHAM SMIT BHUPENDRA		8		AB	8	
3270	FBCS134	NAIK ADITI MILIND	<i>A. M. Naik</i>	10	<i>A. M. Naik</i>	9	10	<i>A. M. Naik</i>
3271	FBCS147	NALWADE ARNAV GOPI	<i>Ramwade</i>	12	<i>Ramwade</i>	12	12	<i>Ramwade</i>
3272	FBCS103	NANAWARE SURAJ DIPAK		13		13	13	
3273	FBCS110	PANGARE VISHWAJA VIJAY	<i>P. V. Pangare</i>	15	<i>P. V. Pangare</i>	15	15	<i>P. V. Pangare</i>
3274	FBCS112	PANSARE AMIR HARUN	<i>A. H. Pansare</i>	11	<i>A. H. Pansare</i>	11	11	<i>A. H. Pansare</i>
3275	FBCS113	PARDESHI TANISHA KAMLESH	<i>T. Kamlesh</i>	10	<i>T. Kamlesh</i>	10	10	<i>T. Kamlesh</i>
3276	FBCS171	PARREK KHUSHI KAMAL		12		12	12	
3277	FBCS117	PATIL VIVEK DATTATRAY	<i>V. D. Patil</i>	15	<i>V. D. Patil</i>	15	15	<i>V. D. Patil</i>
3278	FBCS119	PAWAR ADESH SOMNATH	<i>A. Somnath</i>	15	<i>A. Somnath</i>	15	15	<i>A. Somnath</i>
3279	FBCS121	PAWAR SAKSHI JAYWANT	<i>S. Jaywant</i>	14	<i>S. Jaywant</i>	14	14	<i>S. Jaywant</i>
3280	FBCS122	PAWAR SANGHARSHA BHAJANDAS	<i>P. B. Pawar</i>	12	<i>P. B. Pawar</i>	12	12	<i>P. B. Pawar</i>
3281	FBCS123	PAYGUDE SARTHAK SOMNATH	<i>S. Somnath</i>	15	<i>S. Somnath</i>	15	15	<i>S. Somnath</i>
3282	FBCS125	PISAL PRANAV MHASKU	<i>P. M. Pisal</i>	15	<i>P. M. Pisal</i>	15	15	<i>P. M. Pisal</i>
3283	FBCS126	PISE AAKASH PRAVIN	<i>P. A. Pise</i>	15	<i>P. A. Pise</i>	15	15	<i>P. A. Pise</i>
3284	FBCS049	INGOLE PRATHMESH RAJU	<i>P. R. Ingole</i>	14	<i>P. R. Ingole</i>	14	14	<i>P. R. Ingole</i>
3285	FBCS163	VEER PRATIKSHA SAGAR	<i>P. S. Veer</i>	14	<i>P. S. Veer</i>	14	14	<i>P. S. Veer</i>
3286	FBCS059	JOSHI PUSHKAR PURUSHOTTAM		14		14	14	
3287	FBCS128	RAJGURU MIHIR PRAKASH	<i>M. P. Rajguru</i>	9	<i>M. P. Rajguru</i>	7	9	<i>M. P. Rajguru</i>
3288	FBCS129	REPALE NEHA SUHAS	<i>N. S. Repale</i>	9	<i>N. S. Repale</i>	7	9	<i>N. S. Repale</i>
3289	FBCS164	VEER RUTVIK PARSHURAM	<i>P. R. Veer</i>	14	<i>P. R. Veer</i>	14	14	<i>P. R. Veer</i>
3290	FBCS131	SAHANI HARSHAVARDHAN D.	<i>H. D. Sahani</i>	12	<i>H. D. Sahani</i>	12	12	<i>H. D. Sahani</i>
3291	FBCS056	SAMAL ISHWAR AMAR <i>Sahil Kawade</i>	<i>S. A. Samal</i>	15	<i>S. A. Samal</i>	15	15	<i>S. A. Samal</i>
3292	FBCS133	SALUNKE SWARAJ SURYAKANT	<i>S. S. Salunke</i>	10	<i>S. S. Salunke</i>	9	10	<i>S. S. Salunke</i>
3293	FBCS082	SAMAL ISHWAR	<i>S. I. Samal</i>	10	<i>S. I. Samal</i>	14	14	<i>S. I. Samal</i>
3294	FBCS135	SATVILKAR DASIM MURAD	<i>D. M. Satvilkar</i>	11	<i>D. M. Satvilkar</i>	14	14	<i>D. M. Satvilkar</i>
3295	FBCS136	SAWANT ADITYA ANAND	<i>A. A. Sawant</i>	13	<i>A. A. Sawant</i>	14	14	<i>A. A. Sawant</i>
3296	FBCS137	SAWANT SAHIL NITIN	<i>S. N. Sawant</i>	14	<i>S. N. Sawant</i>	15	15	<i>S. N. Sawant</i>
3297	FBCS139	SAYYAD SARFARAZ SALIM	<i>S. S. Sayyad</i>	13	<i>S. S. Sayyad</i>	14	14	<i>S. S. Sayyad</i>
3298	FBCS140	SHAIKH NOORJAHAN. N.	<i>N. N. Shaikh</i>	15	<i>N. N. Shaikh</i>	15	15	<i>N. N. Shaikh</i>
3299	FBCS141	SHELAR SUJAL SHAILESH	<i>S. S. Shelar</i>	13	<i>S. S. Shelar</i>	13	13	<i>S. S. Shelar</i>
3300	FBCS143	SHINDE ADITYA DHANAJI	<i>D. D. Shinde</i>	14	<i>D. D. Shinde</i>	15	15	<i>D. D. Shinde</i>
3301	FBCS101	NALWADE SHRAVAN RAMESH	<i>R. S. Nalwade</i>	14	<i>R. S. Nalwade</i>	13	14	<i>R. S. Nalwade</i>
3302	FBCS038	SHRAVANI NARENDRA DAYAL	<i>N. D. Shrivani</i>	15	<i>N. D. Shrivani</i>	15	15	<i>N. D. Shrivani</i>
3303	FBCS107	PADHYE SHRIMAY HARISH	<i>H. S. Padhye</i>	14	<i>H. S. Padhye</i>	14	14	<i>H. S. Padhye</i>
3304	FBCS151	SUPEKAR SUMIT PAVAN	<i>P. S. Supekar</i>	14	<i>P. S. Supekar</i>	15	15	<i>P. S. Supekar</i>
3305	FBCS155	TAGADE SOHAM MANOJ	<i>M. S. Tagade</i>	14	<i>M. S. Tagade</i>	15	15	<i>M. S. Tagade</i>
3306	FBCS156	TASKAR AKSHAT NISHANT	<i>N. A. Taskar</i>	14	<i>N. A. Taskar</i>	13	14	<i>N. A. Taskar</i>
3307	FBCS159	UGHADE ADITYA NITIN	<i>A. N. Ughade</i>	13	<i>A. N. Ughade</i>	14	14	<i>A. N. Ughade</i>
3308	FBCS116	PATIL VEDKUMAR PRASHANT	<i>P. V. Patil</i>	14	<i>P. V. Patil</i>	14	14	<i>P. V. Patil</i>
3309	FBCS165	VEYWHARE SANSKRUTI VINOD	<i>V. S. Veywhare</i>	12	<i>V. S. Veywhare</i>	13	13	<i>V. S. Veywhare</i>
3310	FBCS167	VIBHUTE ASHUTOSH SANJAY	<i>A. S. Vibhute</i>	10	<i>A. S. Vibhute</i>	12	12	<i>A. S. Vibhute</i>
3311	FBCS173	YEDE VISHAL ANKUSH	<i>A. K. Yede</i>	14	<i>A. K. Yede</i>	14	14	<i>A. K. Yede</i>
3312	FBCS168	WABLE ROHAN SANDIP		10	<i>R. Sandip</i>	4	10	<i>R. Sandip</i>
3313	FBCS176	YADAV SHLOK DNYANESHWAR	<i>S. D. Yadav</i>	13	<i>S. D. Yadav</i>	12	13	<i>S. D. Yadav</i>
3314	FBCS175	ZAMBRE HARSHVARDHAN T.	<i>H. T. Zambre</i>	14	<i>H. T. Zambre</i>	15	15	<i>H. T. Zambre</i>
3315	FBCS001	AGATKAR SWAPNIL SUNIL	<i>S. S. Agatkar</i>	15	<i>S. S. Agatkar</i>	15	15	<i>S. S. Agatkar</i>
3316	FBCS002	ANANDE SNEHA SATISH	<i>S. S. Anande</i>	14	<i>S. S. Anande</i>	14	14	<i>S. S. Anande</i>
3317	FBCS006	BANSOD AKSHATA ANAND	<i>A. A. Bansod</i>	14	<i>A. A. Bansod</i>	14	14	<i>A. A. Bansod</i>
3318	FBCS130	RUTUJA BHADIRGE RAJENDRA	<i>R. R. Rutuja</i>	15	<i>R. R. Rutuja</i>	15	15	<i>R. R. Rutuja</i>
3319	FBCS010	BHISE VIVEK YASHWANT	<i>Y. V. Bhise</i>	15	<i>Y. V. Bhise</i>	15	15	<i>Y. V. Bhise</i>
3320	FBCS011	BHORDE KOMAL CHANDRAKANT	<i>K. C. Bhorde</i>	14	<i>K. C. Bhorde</i>	14	14	<i>K. C. Bhorde</i>
3321	FBCS012	BONGALE PURVA DHANVAKUMAR	<i>P. D. Bongale</i>	15	<i>P. D. Bongale</i>	15	15	<i>P. D. Bongale</i>

Seat No.	Roll No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	
3322	FBCS014	CHAVAN SHREYA PRITHVIRAJ	<u>S. Phansavkar</u>	15	<u>S. Phansavkar</u>	15	15	<u>S. Phansavkar</u>
3323	FBCS015	CHAVAN VISHWADEEPTI AJAY	<u>Vish</u>	15	<u>Vish</u>	15	15	<u>Vish</u>
3324	FBCS017	CHODHARUY MRUNAL VITTHAL	<u>M. Chodhary</u>	15	<u>M. Chodhary</u>	15	15	<u>M. Chodhary</u>
3325	FBCS026	DESHMUKH SRUSHTI VINAYAK	<u>S. Deshmukh</u>	14	<u>S. Deshmukh</u>	14	14	<u>S. Deshmukh</u>
3326	FBCS028	DEWALE SNEHAL MANOHAR	<u>S. Dewale</u>	15	<u>S. Dewale</u>	15	15	<u>S. Dewale</u>
3327	FBCS030	DHANDE NARAYAN RAJABHAU	<u>N. Dhande</u>	15	<u>N. Dhande</u>	15	15	<u>N. Dhande</u>
3328	FBCS031	DHAVADE SUDIKA DEEPAK	<u>S. Dhavade</u>	13	<u>S. Dhavade</u>	13	13	<u>S. Dhavade</u>
3329	FBCS033	DHIWAR MUGDHA SUNIL	<u>M. Dhiwar</u>	11	<u>M. Dhiwar</u>	11	11	<u>M. Dhiwar</u>
3330	FBCS039	DHOTRE SAKSHI SANTOSH	<u>S. Dhotre</u>	15	<u>S. Dhotre</u>	15	15	<u>S. Dhotre</u>
3331	FBCS034	DUDHAL ISHITA KISHOR	<u>I. Dudhal</u>	15	<u>I. Dudhal</u>	15	15	<u>I. Dudhal</u>
3332	FBCS035	GADEKAR PRATIKSHA ANIL	<u>P. Gadekar</u>	15	<u>P. Gadekar</u>	15	15	<u>P. Gadekar</u>
3333	FBCS036	GAIKWAD NAMRATA NITIN	<u>N. Gaikewad</u>	15	<u>N. Gaikewad</u>	15	15	<u>N. Gaikewad</u>
3334	FBCS099	NAGTILAK GANESH KALIDAS	<u>G. Nagtilak</u>	12	<u>G. Nagtilak</u>	12	12	<u>G. Nagtilak</u>
3335	FBCS042	GHODEKAR OM BALASAHEB	<u>O. Ghodekar</u>	14	<u>O. Ghodekar</u>	14	14	<u>O. Ghodekar</u>
3336	FBCS044	GHULE VINAYAK SANJAY	<u>V. Ghule</u>	15	<u>V. Ghule</u>	15	15	<u>V. Ghule</u>
3337	FBCS046	HOLKAR SHRAVANI SANTOSH	<u>S. Holkar</u>	15	<u>S. Holkar</u>	15	15	<u>S. Holkar</u>
3338	FBCS048	HONRAO RUDRESH LALIT	<u>R. Honrao</u>	15	<u>R. Honrao</u>	15	15	<u>R. Honrao</u>
3339	FBCS050	JADHAV RUTUJA AJIT	<u>R. Jadhav</u>	15	<u>R. Jadhav</u>	15	15	<u>R. Jadhav</u>
3340	FBCS053	JAGTAP SANIKA SUNIL	<u>S. Jagtap</u>	12	<u>S. Jagtap</u>	12	12	<u>S. Jagtap</u>
3341	FBCS057	JOSHI JANHAVI PRADIP	<u>J. Joshi</u>	15	<u>J. Joshi</u>	15	15	<u>J. Joshi</u>
3342	FBCS058	JOSHI KARAN JHUMBERLAL JI JOSHI	<u>K. Joshi</u>	13	<u>K. Joshi</u>	13	13	<u>K. Joshi</u>
3343	FBCS061	KADAM KAJAL KISHOR	<u>K. Kadam</u>	11	<u>K. Kadam</u>	11	11	<u>K. Kadam</u>
3344	FBCS062	KADAM KARAN JALINDAR	<u>K. Kadam</u>	14	<u>K. Kadam</u>	14	14	<u>K. Kadam</u>
3345	FBCS071	KARPE ATHARVA DEEPAK	<u>A. Karpe</u>	14	<u>A. Karpe</u>	14	14	<u>A. Karpe</u>
3346	FBCS074	KHADE TANUJA SATISH	<u>T. Khade</u>	13	<u>T. Khade</u>	13	13	<u>T. Khade</u>
3347	FBCS081	KONDHALKAR SAE MADHUKAR	<u>S. Kondhalkar</u>	15	<u>S. Kondhalkar</u>	15	15	<u>S. Kondhalkar</u>
3348	FBCS086	KUMBHAR DIKSHA KISHOR	<u>D. Kumbhar</u>	15	<u>D. Kumbhar</u>	15	15	<u>D. Kumbhar</u>
3349	FBCS088	KUTE ADITYA MANOJ NIVRUTTI KUTE	<u>A. Kute</u>	13	<u>A. Kute</u>	13	13	<u>A. Kute</u>
3350	FBCS089	LOLE SOHAM PRAKASH	<u>S. Lole</u>	11	<u>S. Lole</u>	11	11	<u>S. Lole</u>
3351	FBCS109	MANDEKAR SIDDHI SAMEER	<u>S. Mandekar</u>	14	<u>S. Mandekar</u>	14	14	<u>S. Mandekar</u>
3352	FBCS094	MANE VIDHI SUNIL	<u>V. Mane</u>	13	<u>V. Mane</u>	13	13	<u>V. Mane</u>
3353	FBCS100	NAIR ABHINAV ACHUTHAN	<u>A. Nair</u>	13	<u>A. Nair</u>	13	13	<u>A. Nair</u>
3354	FBCS102	NALAWADE TANMAY TATYASO	<u>T. Nalawade</u>	13	<u>T. Nalawade</u>	13	13	<u>T. Nalawade</u>
3355	FBCS170	WAGHMARE NEHA SHANKAR	<u>N. Waghmare</u>	14	<u>N. Waghmare</u>	14	14	<u>N. Waghmare</u>
3356	FBCS104	NIBANDHE PRATHAMESH PRADIP	<u>P. Nibandhe</u>	12	<u>P. Nibandhe</u>	12	12	<u>P. Nibandhe</u>
3357	FBCS105	NIKAM SAKSHI VASUDEO	<u>S. Nikam</u>	15	<u>S. Nikam</u>	15	15	<u>S. Nikam</u>
3358	FBCS106	NIMBALKAR OMKAR VIJAY	<u>O. Nimbalkar</u>	15	<u>O. Nimbalkar</u>	15	15	<u>O. Nimbalkar</u>
3359	FBCS154	PAIGUDE NEEL MILIND	<u>N. Paigude</u>	15	<u>N. Paigude</u>	15	15	<u>N. Paigude</u>
3360	FBCS108	PANCHAL RUTUJA DATTATRAY	<u>R. Panchal</u>	13	<u>R. Panchal</u>	13	13	<u>R. Panchal</u>
3361	FBCS115	PATIL PRANALI RAVINDRA	<u>P. Patil</u>	15	<u>P. Patil</u>	15	15	<u>P. Patil</u>
3362	FBCS118	PATIL YASH SACHIN	<u>Y. Patil</u>	15	<u>Y. Patil</u>	15	15	<u>Y. Patil</u>
3363	FBCS120	PAWAR APURVA RAJENDRA	<u>A. Pawar</u>	15	<u>A. Pawar</u>	15	15	<u>A. Pawar</u>
3364	FBCS152	SURYAWANSHI PRITAM PRABHAKAR	<u>P. Suryawanshi</u>	15	<u>P. Suryawanshi</u>	15	15	<u>P. Suryawanshi</u>
3365	FBCS132	SAKPAL SNEHA ANIL	<u>S. Sakpal</u>	12	<u>S. Sakpal</u>	12	12	<u>S. Sakpal</u>
3366	FBCS138	SAWANT TEJAS SATISH	<u>T. Sawant</u>	15	<u>T. Sawant</u>	15	15	<u>T. Sawant</u>
3367	FBCS142	SHETE SARTHAK SHIVAJI	<u>S. Shete</u>	15	<u>S. Shete</u>	15	15	<u>S. Shete</u>
3368	FBCS144	SHINDE PRAGATI MANOJ	<u>P. Shinde</u>	15	<u>P. Shinde</u>	15	15	<u>P. Shinde</u>
3369	FBCS145	SHINDE PRANAV DHANAJI	<u>P. Shinde</u>	11	<u>P. Shinde</u>	11	11	<u>P. Shinde</u>
3370	FBCS146	SHINDE RIYA MANOJ	<u>R. Shinde</u>	15	<u>R. Shinde</u>	15	15	<u>R. Shinde</u>
3371	FBCS148	SHIRURE KAUSHIK KONDIBA	<u>K. Shirure</u>	15	<u>K. Shirure</u>	15	15	<u>K. Shirure</u>
3372	FBCS149	SONAWANE RIYA PANDHARINATH	<u>R. Sonawane</u>	12	<u>R. Sonawane</u>	12	12	<u>R. Sonawane</u>
3373	FBCS150	SONAWANE SOHAM MANGESH	<u>S. Sonawane</u>	10	<u>S. Sonawane</u>	10	10	<u>S. Sonawane</u>
3374	FBCS153	SUVARNA DHANUSH PADMANABHA	<u>D. Suvarna</u>	14	<u>D. Suvarna</u>	14	14	<u>D. Suvarna</u>
3375	FBCS157	THOPATE SANIKA SANJAY	<u>S. Thopate</u>	14	<u>S. Thopate</u>	14	14	<u>S. Thopate</u>
3376	FBCS158	TIWARI MANSI RAJESH	<u>M. Tiwari</u>	14	<u>M. Tiwari</u>	14	14	<u>M. Tiwari</u>
3377	FBCS160	UJGAONKAR ADITYA SURESH	<u>A. Ujgaonkar</u>	14	<u>A. Ujgaonkar</u>	14	14	<u>A. Ujgaonkar</u>
3378	FBCS161	VAIDYA SIDDHESH SHASHANK	<u>S. Vaidya</u>	13	<u>S. Vaidya</u>	13	13	<u>S. Vaidya</u>
3379	FBCS096	MATE VAISHNAVI BALASAHEB	<u>V. Mate</u>	14	<u>V. Mate</u>	14	14	<u>V. Mate</u>



Seat No.	Roll No.	Name	Internal Marks (out of 15)					
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	Signature
3380	FBCS162	VATTURKAR ARYAN HARSHAL		14		14	14	
3381	FBCS166	VHARKAT BHAVANA MAHESH		14		14	14	
3382	FBCS172	WALAMBE SHREYAS SACHIN		15		15	15	
3383	FBCS174	YELWANDE HARSHADA SHIVAJI		15		15	15	
 Name of Subject Teacher			 Signature Of Subject Teacher					

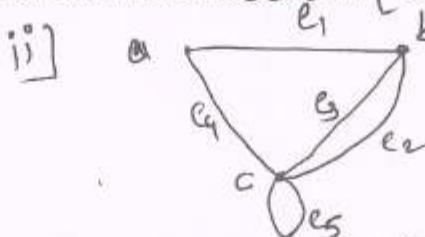
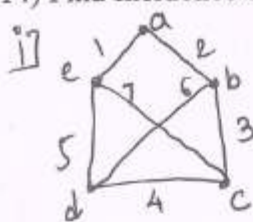


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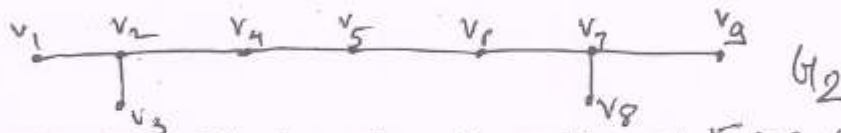
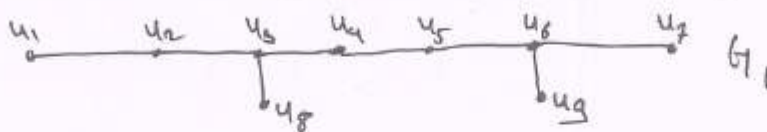
Mathematics -II

Graph Theory Questions Bank

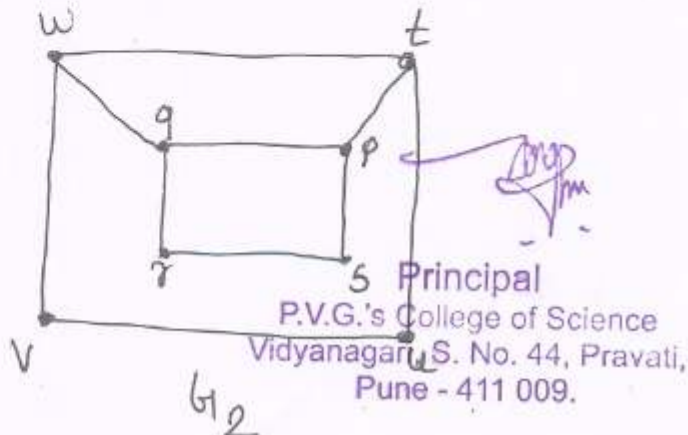
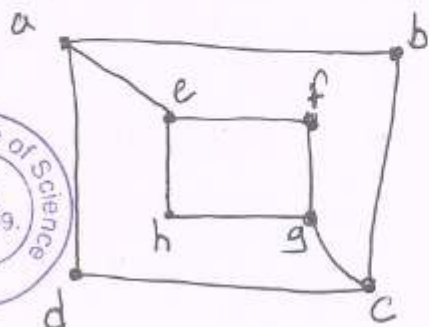
- 1) Define complete bipartite graph with example $[C_01, C_02, P_01, P_02, P_03]$
- 2) Define the following terms with suitable example i) Complete graph ii) Regular graph. iii) Null Graph $[C_02, C_03, P_01, P_04]$
- 3) Define isomorphism of two graphs. $[C_01, C_03, C_04, P_02, P_03, P_04]$
- 4) Define the following terms with suitable example i) Subgraph ii) Spanning graph. $[C_01, C_02, P_01]$
- 5) Define the following sub graphs of a graph a) Closed Walk and Open walk b) Trail c) Path d) Cycle $[C_01, C_02, C_03, P_01, P_04]$
- 6) Define Bipartite Graph, Multiple graph. $[C_04, P_02, P_03]$
- 7) Find the vertex connectivity & edge connectivity of the complete graph K_n . $[C_01, C_02, P_01, P_02]$
- 8) Draw K_5 complete graph. $[C_01, C_02, P_02, P_03]$
- 9) Give an Example of a self complementary graph on 5 vertices. $[C_03, P_04, P_01, P_02, P_03]$
- 10) Define Spanning Tree & Spanning subgraph. $[C_02, C_03, P_04]$
- 11) Define Branches & Chords of Spanning Tree. $[C_03, P_01, P_02, P_04]$
- 12) If T is Spanning tree of K_9 . How many bridges T Contains. $[C_01, C_02, P_01, P_02]$
- 13) State the handshaking lemma & justify with proper example. $[C_01, C_02, C_03, P_01, P_02]$
- 14) Find Incidence & adjacent matrices of following graphs: $[C_01, C_02, P_01, P_02]$



- 15) Determine if the following graphs G_1 & G_2 are isomorphic. $[C_02, C_03, P_03, P_04]$

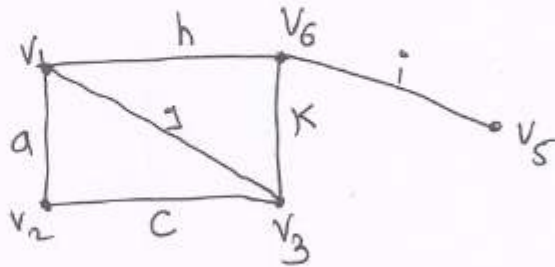
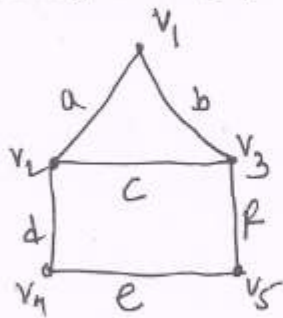


- 16) Determine whether following graphs are isomorphic or not. $[C_02, C_03, P_03, P_04]$

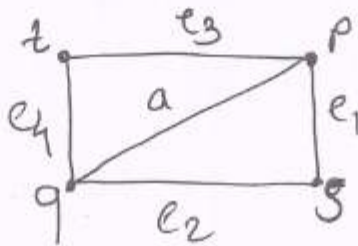
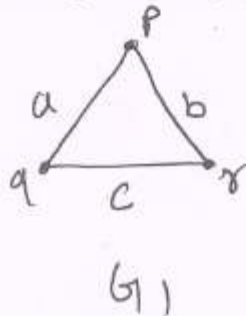


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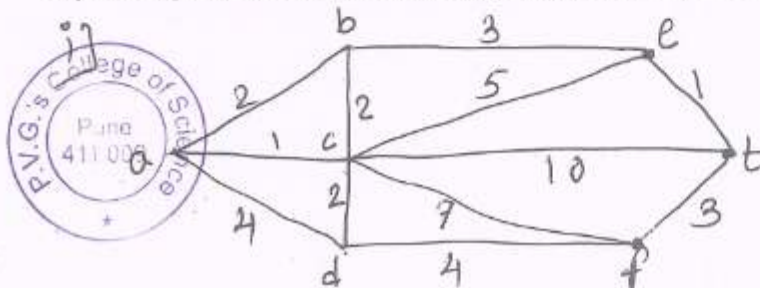
- 17) Draw any four non-isomorphic spanning subgraphs of the graph K_4 . [C01, C03, P02, P04]
 18. For the given two graphs G_1 & G_2 find $G_1 \cap G_2$ & $G_1 \oplus G_2$ also draw graph [C01, C03, P03, P04]



19. For the given two graphs G_1 & G_2 find $G_1 \cup G_2$ & $G_1 \oplus G_2$ also draw graph [C01, C03, P02, P04]

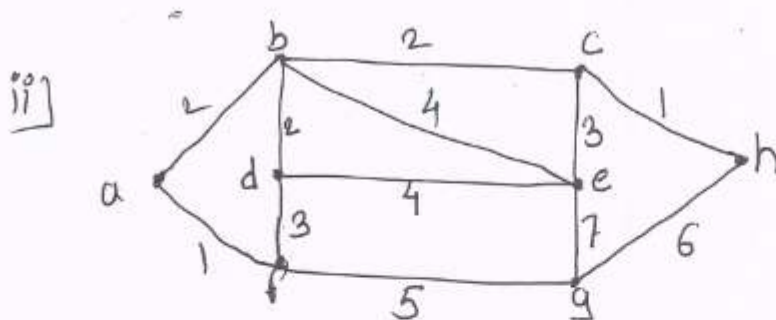


20. If G is a simple graph on n vertices & q edges with k components, then prove that $n - k \leq q$ [C01, P04]
 21) Give an example of graph with vertex connectivity $K(G) = 4$ & edge connectivity $\lambda(G) = 5$. Justify your answer. [C02, C03, P03, P04]
 22) The edge connectivity of graph G cannot exceed the smallest degree of a vertex in G . (C02, C03)
 23) Judge whether the following are true or false with justification: {C02, C03, P04}
 a) Every subgraph of a connected graph is connected.
 b) If G has isthmus then it has a cut vertex.
 c) Vertex Connectivity of a cycle is 3.
 d) A bipartite graph is always connected graph.
 24) Use dijkstra's algorithm to obtain shortest path from a to all vertices in the following graph.



[C01, C02, P02, P03, P04]

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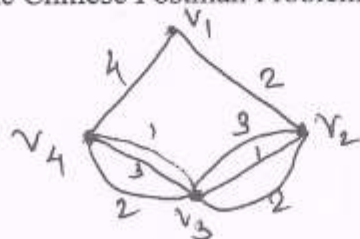
25) Find maximum edge connectivity of graph having 10 vertices & 16 edges. [CO1, CO2, PO2, PO4]

26) A connected graph G is an Eulerian graph if & only if all vertices of G are of even degree.

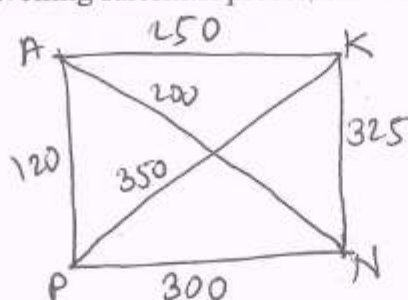
27) Define Hamiltonian & Eulerian Graph. (CO1, CO2, PO1, PO2)

28) Explain Fleury's algorithm. [CO2, CO3, PO4]

29) Solve the Chinese Postman Problem for the graph given below. [CO1, CO2, PO2, PO3]



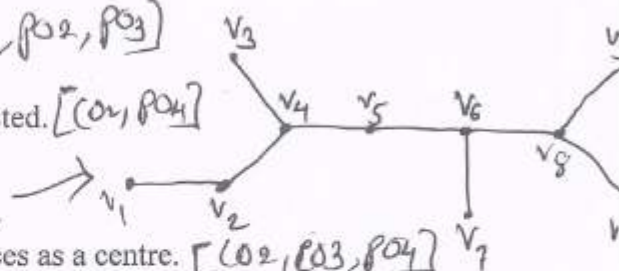
30) Solve the travelling salesman problem for the following graph. [CO1, CO2, PO1, PO3]



31) Define tree, Eccentricity, center, radius. [CO2, CO3, PO2, PO3]

32) A graph G is a tree if & only if it is minimally connected. [CO1, PO4]

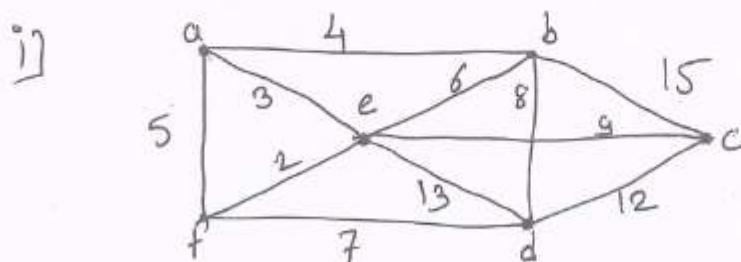
33) Find Center, radius & diameter of the following tree.



34) Every tree has either one centre or two adjacent vertices as a centre. [CO2, CO3, PO4]

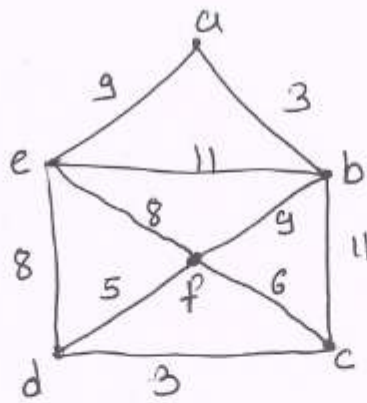
35) Write Kruskal's Algorithm to find the minimum weighted spanning tree in a graph. [CO1, CO2, PO3]

36) Using Kruskal's Algorithm find shortest spanning tree of following graph. [CO3, PO1, PO2]



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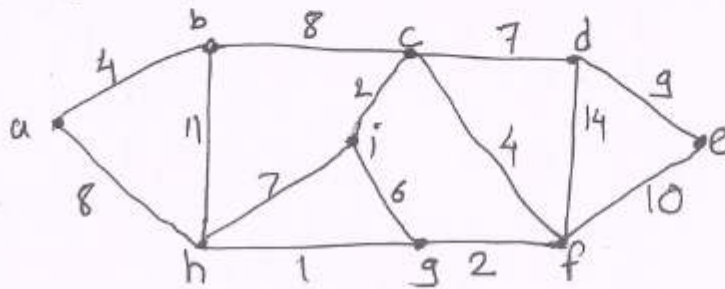




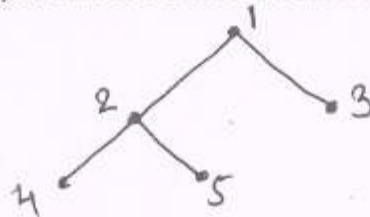
37) Draw all non isomorphic binary trees of height 2. [C02, C03, P02, P04]

38) Find maximum & minimum height of binary tree with 13 vertices. Draw such tree. [C03, P04]

39) Use prim's algorithm to find minimum weighted spanning tree of G [C02, P02, P04]



40) Find preorder, Inorder & Postorder transversal of following tree [C01, C02, P01, P02]



41) What is the value of the following prefix expressions? [C02, C03, P03, P03]

$+ - * 235 / \uparrow 234$.

42) What is the value of the following postfix expressions? [C02, C03, P02, P03]

$723 \times -4 \uparrow 93 / +$.

43) Draw the graph neither Eulerian nor Hamiltonian graph. [C02, C03, P02, P03]

44) Draw the graph Eulerian but not Hamiltonian graph. -11-

45) Draw the graph Eulerian as well as Hamiltonian graph. -11-



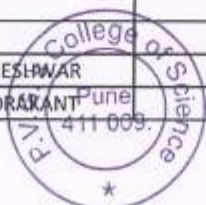
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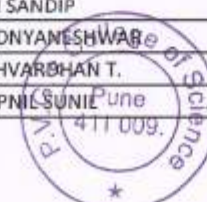
Class : F.Y.B.Sc. (Computer Science) Sem:II
Subject: MTC-122 GRAPH THEORY

Academic Year: 2022-23
Internal Evaluation Record

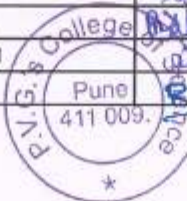
Seat No.	Roll No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	
3214	FBCS114	PATASKAR ANISH NILESH		11		14	14	
3215	FBCS124	PHALKE NAYAN DHANANJAY		12		14	14	
3216	FBCS111	PANGUL ABHIJEET TUKARAM		12		14	14	Abhijeet
3217	FBCS003	ANAWALIKAR NILAJA ANANDRAJ		12		13	13	Nilaja
3218	FBCS065	KALE ATHARVA AVINASH		12		14	14	Arav
3219	FBCS004	BADHE RACHANA YASHWANT		12		13	13	Rachana
3220	FBCS005	BADODKAR GAYATRI SACHIN		11		11	11	G.S.B.
3221	FBCS007	BARGE ABHISHEK MILIND		10		10	10	Arav
3222	FBCS008	BARGE SWATI AJAY		10		14	14	Arav
3223	FBCS009	BET ADITYA VINOD		15		15	15	
3224	FBCS019	BHOJ ADITYA GANESH		12		11	12	
3225	FBCS013	BORA RONAK SACHIN		14		14	14	Ronak
3226	FBCS016	CHAVARE SOUMITRA SAMEER		13		13	13	Sumit
3227	FBCS018	CHOUDHARY INDRAJEET RATARAM		9		AB	9	Indrajit
3228	FBCS021	DATIR DEVANG GOPINATH		13		12	13	Devang
3229	FBCS022	DEO NIKHIL GIRISH		13		13	13	Nikhil
3230	FBCS023	DEO PRADYUMNA ASHUTOSH		12		11	12	Pradyumna
3231	FBCS024	DEO SWARADA SUHAS		13		13	13	Swarada
3232	FBCS025	DESHMUKH ATHARVA MANGESH		10		8	10	Arav
3233	FBCS027	DESHPANDE DHRUV MANOJ		13		13	13	Dhruv
3234	FBCS076	KHANEKAR DEVDAS GORAKSHNATH		12		13	13	Devdas
3235	FBCS084	KULKARNI DEVEN MAHESH		12		11	12	Deven
3236	FBCS029	DHAMAL VEDANT SANTOSH DHAMAL		12		13	13	Vedant
3237	FBCS032	DHEBE SAMEER SITARAM		13		14	14	Sameer
3238	FBCS037	GAIKWAD OMAR MILIND		10		14	14	Omkar
3239	FBCS040	GAVAND SHRAVANI ANIL		13		14	14	Shravani
3240	FBCS041	GHALME SUJIT VIJAY		13		14	14	Sujit
3241	FBCS043	GHOARE ANKITA ANKUSH		13		15	15	Ankita
3242	FBCS045	GOTAD ATHARVA NILESH		12		12	12	Arav
3243	FBCS047	HOMKAR PRATIK MAHADEV		12		14	14	Pratik
3244	FBCS052	JAGTAP NANDINI DEEPAK		12		14	14	Nandini
3245	FBCS054	JANGAM SIDDHI SANDEEP		12		14	14	Siddhi
3246	FBCS055	JARANDE TEJAS SURYAKANT		12		14	14	T.J.
3247	FBCS051	JOSHI OMAR ANIRUDDHA		12		5	12	Omkar
3248	FBCS063	KADAM SOURAV SACHIN		12		11	12	Sourav
3249	FBCS064	KALBHOR RADHIKA SACHIN		12		13	13	Radhika
3250	FBCS067	KAMBLE TANUJA RAJU		10		14	14	Tanuja
3251	FBCS068	KAMBLE VISHWAS MARUTI		12		12	12	Vishwas
3252	FBCS069	KARANDE PRATIK BABURAO		12		12	12	Pratik
3253	FBCS070	KARBHARI PARTHIV VINAYAK		10		12	12	P.V.K.
3254	FBCS072	KATE YOGESH MAHADEO		12		13	13	Yogesh
3255	FBCS073	KEDARI SAKSHI SANTOSH		10		12	12	Sakshi
3256	FBCS075	KHADKE SAKSHI PRAKASH		12		13	13	Sakshi
3257	FBCS077	KHAROTE SAHIL RAJESH		11		13	13	Sahil
3258	FBCS078	KHATPE ANUJ SANTOSH		11		13	13	Anuj
3259	FBCS079	KHOPADE OMAR DNYANESHWAR		11		13	13	Omkar
3260	FBCS080	KHOSE AKANKSHA CHANDRANANT		11		14	14	Akanksha



Seat No.	Roll No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	
3261	FBCS066	KOLAGE SUPRIYA HANUMANT		11		14	14	
3262	FBCS083	KUDALE YASH DATTATRAY		12		13	13	
3263	FBCS085	KULKARNI MEGHANA ANIL		11		12	12	
3264	FBCS087	KUSUMALE SHRIKANT BHARAT	<i>Kusumale</i>	12	<i>Kusumale</i>	10	12	<i>Kusumale</i>
3265	FBCS098	LANGHI LOUKIK DATTATRAYA	<i>L.D. Langhi</i>	10	<i>L.D. Langhi</i>	15	15	<i>L.D. Langhi</i>
3266	FBCS090	MAHTO ABHILASHA ARJUN		12		13	13	<i>A. Mahale</i>
3267	FBCS092	MANE AISHWARYA ANIL		10		5	10	<i>A. Mahale</i>
3268	FBCS093	MANE ARYAN SANTOSH		12		10	12	<i>A. Mahale</i>
3269	FBCS097	MESHRAM SMIT BHUPENDRA		8		AB	8	
3270	FBCS134	NAIK ADITI MILIND	<i>A.M. Naik</i>	12	<i>A.M. Naik</i>	7	12	<i>A. Mahale</i>
3271	FBCS147	NALAWADE ARNAV GOPI	<i>Nalawade</i>	12	<i>Nalawade</i>	14	14	<i>A. Mahale</i>
3272	FBCS103	NANAWARE SURAJ DIPAK		12		14	14	
3273	FBCS110	PANGARE VISHWAJA VIJAY	<i>Vijay</i>	12	<i>Vijay</i>	14	14	<i>Vijay</i>
3274	FBCS112	PANSARE AMIR HARUN	<i>Amir</i>	12	<i>Amir</i>	14	14	<i>Amir</i>
3275	FBCS113	PARDESHI TANISHA KAMLESH	<i>Tanisha</i>	12	<i>Tanisha</i>	12	12	<i>Tanisha</i>
3276	FBCS171	PAREEK KHUSHI KAMAL		12		12	12	
3277	FBCS117	PATIL VIVEK DATTATRAY	<i>VPatil</i>	11	<i>VPatil</i>	14	14	<i>VPatil</i>
3278	FBCS119	PAWAR ADESH SOMNATH	<i>Adesh</i>	12	<i>Adesh</i>	14	14	<i>Adesh</i>
3279	FBCS121	PAWAR SAKSHI JAYWANT	<i>Sakshi</i>	12	<i>Sakshi</i>	14	14	<i>Sakshi</i>
3280	FBCS122	PAWAR SANGHARSHA BHAJANDAS	<i>Sangharsha</i>	11	<i>Sangharsha</i>	12	12	<i>Sangharsha</i>
3281	FBCS123	PAYGUDE SARTHAK SOMNATH	<i>Sarthak</i>	12	<i>Sarthak</i>	14	14	<i>Sarthak</i>
3282	FBCS125	PISAL PRANAV MHASKU	<i>P. M. Pisal</i>	12	<i>P. M. Pisal</i>	14	14	<i>P. M. Pisal</i>
3283	FBCS126	PISE AAKASH PRAVIN	<i>A. Pise</i>	12	<i>A. Pise</i>	14	14	<i>A. Pise</i>
3284	FBCS049	INGOLE PRATHMESH RAJU	<i>Prathmesh</i>	12	<i>Prathmesh</i>	13	13	<i>Prathmesh</i>
3285	FBCS163	VEER PRATIKSHA SAGAR	<i>Pratiksha</i>	12	<i>Pratiksha</i>	15	15	<i>Pratiksha</i>
3286	FBCS059	JOSHI PUSHKAR PURUSHOTTAM	<i>Pushkar</i>	13	<i>Pushkar</i>	14	14	<i>Pushkar</i>
3287	FBCS128	RAJGURU MIHIR PRAKASH	<i>Mihir</i>	10	<i>Mihir</i>	5	10	<i>Mihir</i>
3288	FBCS129	REPALE NEHA SUHAS	<i>Nehe</i>	10	<i>Nehe</i>	9	10	<i>Nehe</i>
3289	FBCS164	VEER RUTVIK PARSHURAM	<i>Rutvik</i>	12	<i>Rutvik</i>	15	15	<i>Rutvik</i>
3290	FBCS131	SAHANI HARSHAVARDHAN D.	<i>Harshavardhan</i>	11	<i>Harshavardhan</i>	13	13	<i>Harshavardhan</i>
3291	FBCS056	KAWADE SAHIL SUNIL	<i>Sahil</i>	12	<i>Sahil</i>	14	14	<i>Sahil</i>
3292	FBCS133	SALUNKE SWARAJ SURYAKANT	<i>Swaraj</i>	11	<i>Swaraj</i>	12	12	<i>Swaraj</i>
3293	FBCS082	SAMAL ISHWAR	<i>Ishwar</i>	12	<i>Ishwar</i>	14	14	<i>Ishwar</i>
3294	FBCS135	SATVILKAR DASIM MURAD	<i>Dasim</i>	11	<i>Dasim</i>	13	13	<i>Dasim</i>
3295	FBCS136	SAWANT ADITYA ANAND	<i>Aditya</i>	12	<i>Aditya</i>	14	14	<i>Aditya</i>
3296	FBCS137	SAWANT SAHIL NITIN	<i>Sahil</i>	12	<i>Sahil</i>	14	14	<i>Sahil</i>
3297	FBCS139	SAYYAD SARFARAZ SALIM	<i>Sarfaz</i>	12	<i>Sarfaz</i>	14	14	<i>Sarfaz</i>
3298	FBCS140	SHAIKH NOORJAHAN. N.	<i>Noorjahan</i>	12	<i>Noorjahan</i>	15	15	<i>Noorjahan</i>
3299	FBCS141	SHELAR SUJAL SHAILESH	<i>Sujal</i>	12	<i>Sujal</i>	14	14	<i>Sujal</i>
3300	FBCS143	SHINDE ADITYA DHANAJI	<i>Aditya</i>	12	<i>Aditya</i>	14	14	<i>Aditya</i>
3301	FBCS101	NALAWADE SHRAVAN RAMESH	<i>Shravan</i>	12	<i>Shravan</i>	13	13	<i>Shravan</i>
3302	FBCS038	SHRAVANI NARENDRA DAYAL	<i>Shravani</i>	12	<i>Shravani</i>	13	13	<i>Shravani</i>
3303	FBCS107	PADHYE SHRIMAY HARISH	<i>Shrimay</i>	10	<i>Shrimay</i>	12	12	<i>Shrimay</i>
3304	FBCS151	SUPEKAR SUMIT PAVAN	<i>Sumit</i>	12	<i>Sumit</i>	14	14	<i>Sumit</i>
3305	FBCS155	TAGADE SOHAM MANOJ	<i>Soham</i>	12	<i>Soham</i>	14	14	<i>Soham</i>
3306	FBCS156	TASKAR AKSHAT NISHANT	<i>Akshat</i>	12	<i>Akshat</i>	13	13	<i>Akshat</i>
3307	FBCS159	UGHADE ADITYA NITIN	<i>Aditya</i>	12	<i>Aditya</i>	14	14	<i>Aditya</i>
3308	FBCS116	PATIL VEDKUMAR PRASHANT	<i>Vedkumar</i>	10	<i>Vedkumar</i>	14	14	<i>Vedkumar</i>
3309	FBCS165	VEYWHARE SANSKRUTI VINOD	<i>Sanskriti</i>	12	<i>Sanskriti</i>	11	12	<i>Sanskriti</i>
3310	FBCS167	VIBHUTE ASHUTOSH SANJAY	<i>A.S. Vibhute</i>	12	<i>A.S. Vibhute</i>	13	13	<i>A.S. Vibhute</i>
3311	FBCS173	YEDE VISHAL ANKUSH	<i>Vishal</i>	12	<i>Vishal</i>	15	15	<i>Vishal</i>
3312	FBCS168	WABLE ROHAN SANDIP		10		4	10	<i>Rohit</i>
3313	FBCS176	YADAV SHLOK DNYANESHWAR	<i>Shlok</i>	12	<i>Shlok</i>	13	13	<i>Shlok</i>
3314	FBCS175	ZAMBRE HARSHVARDHAN T.	<i>Harsh</i>	12	<i>Harsh</i>	13	13	<i>Harsh</i>
3315	FBCS001	AGATKAR SWAPNIL SUNIL	<i>Swapnil</i>	12	<i>Swapnil</i>	13	13	<i>Swapnil</i>



Seat No.	Roll No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	
3316	FBCS002	ANANDE SNEHA SATISH	Sneha	12	Sneha	12	12	Sneha
3317	FBCS006	BANSOD AKSHATA ANAND	Akshata	11	Akshata	11	11	Akshata
3318	FBCS130	RUTUJA BHADIRGE RAJENDRA	Rutuja	12	Rutuja	11	12	Rutuja
3319	FBCS010	BHISE VIVEK YASHWANT	Vivek	14	Vivek	14	14	Vivek
3320	FBCS011	BHORDE KOMAL CHANDRAKANT	KBhorde	13	KBhorde	12	13	KBhorde
3321	FBCS012	BONGALE PURVA DHANVAKUMAR	Bongale	14	Bongale	14	14	Bongale
3322	FBCS014	CHAVAN SHREYA PRITHVIRAJ	Chavan	14	Chavan	14	14	Chavan
3323	FBCS015	CHAVAN VISHWADEEPTI AJAY	Vish	14	Vish	14	14	Vish
3324	FBCS017	CHOUDHARUY MRUNAL VITTHAL	Choudhary	12	Choudhary	12	12	Choudhary
3325	FBCS026	DESHMUKH SRUSHTI VINAYAK	Srushti	12	Srushti	13	13	Srushti
3326	FBCS028	DEWALE SNEHAL MANOHAR	Snehal	13	Snehal	13	13	Snehal
3327	FBCS030	DHANDE NARAYAN RAJABHAU	Narayan	12	Narayan	13	13	Narayan
3328	FBCS031	DHAVADE SUDI KSHA DEEPAK	Sudiksha	11	Sudiksha	13	13	Sudiksha
3329	FBCS033	DHIWAR MUGDHA SUNIL	Mugdha	12	Mugdha	13	13	Mugdha
3330	FBCS039	DHOTRE SAKSHI SANTOSH	Sakshi	12	Sakshi	14	14	Sakshi
3331	FBCS034	DUDHAL ISHITA KISHOR	Ishita	12	Ishita	14	14	Ishita
3332	FBCS035	GADEKAR PRATIKSHA ANIL	Pradek	14	Pradek	14	14	Pradek
3333	FBCS036	GAIKWAD NAMRATA NITIN	Namrata	12	Namrata	14	14	Namrata
3334	FBCS099	NAGTILAK GANESH KALIDAS	Ganesh	11	Ganesh	12	12	Ganesh
3335	FBCS042	GHODEKAR OM BALASAHEB	Om	13	Om	14	14	Om
3336	FBCS044	GHULE VINAYAK SANJAY	Vinayak	12	Vinayak	11	12	Vinayak
3337	FBCS046	HOLKAR SHRAVANI SANTOSH	Shravani	11	Shravani	12	12	Shravani
3338	FBCS048	HONRAO RUDRESH LALIT	Rudresh	14	Rudresh	13	14	Rudresh
3339	FBCS050	JADHAV RUTUJA AJIT	Rutuja	12	Rutuja	13	13	Rutuja
3340	FBCS053	JAGTAP SANIKA SUNIL	Sanika	14	Sanika	14	14	Sanika
3341	FBCS057	JOSHI JANHAVI PRADIP	Janhavi	12	Janhavi	13	13	Janhavi
3342	FBCS058	JOSHI KARAN JHUMBERLAL JI JOSHI	Karan	12	Karan	13	13	Karan
3343	FBCS061	KADAM KAJAL KISHOR	Kajal	14	Kajal	14	14	Kajal
3344	FBCS062	KADAM KARAN JALINDAR	Kadam	12	Kadam	11	12	Kadam
3345	FBCS071	KARPE ATHARVA DEEPAK	Atharva	11	Atharva	14	14	Atharva
3346	FBCS074	KHADE TANUJA SATISH	Tanuja	12	Tanuja	13	13	Tanuja
3347	FBCS081	KONDHALKAR SAEED MADHUKAR	Saeed	11	Saeed	14	14	Saeed
3348	FBCS086	KUMBHAR DIKSHA KISHOR	Diksha	11	Diksha	13	13	Diksha
3349	FBCS088	KUTE ADITYA MANOJ NIVRUTTI KUTE	Aditya	12	Aditya	11	12	Aditya
3350	FBCS089	LOLE SOHAM PRAKASH	Soham	12	Soham	11	12	Soham
3351	FBCS109	MANDEKAR SIDDHI SAMEER	Siddhi	12	Siddhi	13	13	Siddhi
3352	FBCS094	MANE VIDHI SUNIL	Mane	11	Mane	12	12	Mane
3353	FBCS100	NAIR ABHINAV ACHUTHAN	Abhinav	11	Abhinav	12	12	Abhinav
3354	FBCS102	NALAWADE TANMAY TATYASO	Tanmay	12	Tanmay	11	12	Tanmay
3355	FBCS170	WAGHMARE NEHA SHANKAR	Neha	12	Neha	14	14	Neha
3356	FBCS104	NIBANDHE PRATHAMESH PRADIP	Prathamesh	12	Prathamesh	15	15	Prathamesh
3357	FBCS105	NIKAM SAKSHI VASUDEO	Sakshi	12	Sakshi	14	14	Sakshi
3358	FBCS106	NIMBALKAR OMKAR VIJAY	Omkar	12	Omkar	15	15	Omkar
3359	FBCS154	PAIGUDE NEEL MILIND	Neel	12	Neel	14	14	Neel
3360	FBCS108	PANCHAL RUTUJA DATTATRAY	Rutuja	10	Rutuja	12	12	Rutuja
3361	FBCS115	PATIL PRANALI RAVINDRA	P. Patil	12	P. Patil	14	14	P. Patil
3362	FBCS118	PATIL YASH SACHIN	Yash	12	Yash	14	14	Yash
3363	FBCS120	PAWAR APURVA RAJENDRA	Apurva	12	Apurva	13	13	Apurva
3364	FBCS152	SURYAWANSHI PRITAM PRABHAKAR	Pritam	12	Pritam	14	14	Pritam
3365	FBCS132	SAKPAL SNEHA ANIL	Sneha	11	Sneha	13	13	Sneha
3366	FBCS138	SAWANT TEJAS SATISH	Tejas	12	Tejas	14	14	Tejas
3367	FBCS142	SHETE SARTHA SHIVAJI	Sarttha	12	Sarttha	14	14	Sarttha
3368	FBCS144	SHINDE PRAGATI MANOJ	Pragati	12	Pragati	14	14	Pragati
3369	FBCS145	SHINDE PRANAV DHANAJI	Pranav	12	Pranav	13	13	Pranav
3370	FBCS146	SHINDE RIYA MANOJ	Riya	12	Riya	14	14	Riya



Seat No.	Roll No.	Name	Internal Marks (out of 15)					
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	Signature
3371	FBCS148	SHIRURE KAUSHIK KONDIBA	<u>Kaushik</u>	12	<u>Kaushik</u>	12	12	<u>Kaushik</u>
3372	FBCS149	SONAWANE RIYA PANDHARINATH	<u>Riya</u>	12	<u>Riya</u>	13	13	<u>Riya</u>
3373	FBCS150	SONAWANE SOHAM MANGESH		12		11	12	
3374	FBCS153	SUVARNA DHANUSH PADMANABHA	<u>Dhanush</u>	12	<u>Dhanush</u>	13	13	<u>Dhanush</u>
3375	FBCS157	THOPATE SANIKA SANJAY	<u>Sanika</u>	12	<u>Sanika</u>	14	14	<u>Sanika</u>
3376	FBCS158	TIWARI MANSI RAJESH	<u>Mansi</u>	12	<u>Mansi</u>	15	15	<u>Mansi</u>
3377	FBCS160	UJGAONKAR ADITYA SURESH	<u>Aditya</u>	12	<u>Aditya</u>	14	14	<u>Aditya</u>
3378	FBCS161	VAIDYA SIDDHESH SHASHANK	<u>Siddhesh</u>	12	<u>Siddhesh</u>	13	13	<u>Siddhesh</u>
3379	FBCS096	MATE VAISHNAVI BALASAHEB	<u>Vaishnavi</u>	12	<u>Vaishnavi</u>	13	13	<u>Vaishnavi</u>
3380	FBCS162	VATTURKAR ARYAN HARSHAL	<u>Aryan</u>	12	<u>Aryan</u>	13	13	<u>Aryan</u>
3381	FBCS166	VHARKAT BHAVANA MAHESH	<u>Bhavana</u>	12	<u>Bhavana</u>	14	14	<u>Bhavana</u>
3382	FBCS172	WALAMBE SHREYAS SACHIN	<u>Shreyas</u>	12	<u>Shreyas</u>	14	14	<u>Shreyas</u>
3383	FBCS174	YELWANDE HARSHADA SHIVAJI	<u>Harshada</u>	12	<u>Harshada</u>	13	13	<u>Harshada</u>
Mehini Pardehi			Pardehi					
Name of Subject Teacher			Signature Of Subject Teacher					



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Pune Vidyarthi Griha's College of Science, Pune-09

2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

S.Y.B.Sc (CS) 2022-23 SEM-III

MTC 231: Group & Coding Theory

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

CO4: A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: Inculcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: Infuse ethical, human and professional values and responsibilities to make their contribution to the society.



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S. Y.B.Sc.(CS) M-1 Groups & Coding Theory - 1

1. Define Division Algorithm. (CO1, CO2, PO2, PO3)
2. State Theorem of GCD. (CO1, CO2, PO2, PO3)
3. Let $a, b, & c$ integers. If a/b and a/c then $a/bx+cy$, for any integers x & y . (CO1, CO2, PO2, PO3)
4. Find GCD of numbers 4999 & also 1109 also express as $4999x+1109y$, where x & $y \in \mathbb{Z}$. (CO1, CO2, PO2, PO3)
5. Find GCD of numbers 3997 & 2947. (CO1, CO2, PO2, PO3)
6. Let a & b be integers, not both zero. Then a & b are relatively prime if & only if there exists integers x & y such that $1 = ax + by$. (CO1, CO2, PO2, PO3)
7. Show that congruence relation on set of integers is an equivalence relation. (CO1, CO2, PO2, PO3)
8. i) Find all congruence classes of \mathbb{Z} modulo 6 ii) Find all congruence classes of \mathbb{Z} modulo 4
9. If a, b, c, d is in \mathbb{Z} and n is in \mathbb{N} and $a \equiv b \pmod{n}$, $c \equiv d \pmod{n}$ then
i) $a+c \equiv b+d \pmod{n}$ ii) $a-c \equiv b-d \pmod{n}$ iii) $ac \equiv bd \pmod{n}$. (CO1, CO2, PO2, PO3)
10. Show that similarity of two triangles is an equivalence relation on the set of all triangles.
11. Define Group. (CO1, CO2, PO2, PO3)
12. Let $W = \{1, -1, i, -i\}$ be a subset of complex numbers. Show that W is a group under complex multiplication. (CO1, CO2, PO2, PO3)
13. Let $\mathbb{Z}_4 = \{0, 1, 2, 3\}$ be a set of all residue classes modulo 4. Show that $(\mathbb{Z}_4, +_4)$ is a group
14. Show that the set $\mathbb{R}^n = \{(a_1, a_2, \dots, a_n) / a_1, a_2, \dots, a_n \in \mathbb{R}\}$ is a group under componentwise addition. (CO1, CO2, PO2, PO3)
15. We define $U(n)$ as the set of all positive integers less than n & relatively prime to n . Show that $U(10)$ forms a group under, multiplication modulo 10. (CO2, CO3, PO1, PO4)
16. State & prove Cancellation Laws. (CO2, CO3, PO1, PO4)
17. State & prove socks - shoes Property. (CO2, CO3, PO1, PO4)
18. Show that the equation $a*x=b$ has a unique solution for any $a, b \in G$. (CO1, CO2, PO2, PO3)
19. If in a group G , The square of every element is the identity element then prove that G is abelian. (CO2, CO3, PO1, PO4)
20. Prove that a group G is abelian if and only if $(a*b)^{-1} = a^{-1}*b^{-1}$ for all $a, b \in G$. (CO2, CO3, PO1, PO4)
21. Define Order of Group, Order of Elements
22. Find the order of each element of a group $(\mathbb{Z}_{10}, +_{10})$. (CO2, CO3, PO1, PO4)
23. Prove that the order of an element of a group is the same as that of its inverse a^{-1} .
24. State & Prove One - Step Subgroup Test. (CO2, CO3, PO1, PO4)
25. Find all subgroups of \mathbb{Z}_{12} . (CO2, CO3, PO1, PO4)
26. Is $U(10)$, a multiplicative group modulo 10 is a cyclic group? (CO2, CO3, PO1, PO4)
27. Subgroup of a cyclic group is cyclic. (CO2, CO3, PO1, PO4)
28. Define: Permutation of Group, Degree of Permutation, Identity Permutations, Inverse Permutations. (CO2, CO3, PO1, PO4)
29. Let G be a group of order 12. Find all possible orders of subgroups of G . (CO2, CO3, PO1, PO4)
30. Let $G = \mathbb{Z}_4$ & $H = \{0, 2\}$ be its subgroup under addition modulo 4. Find all cosets of H in G . (CO2, CO3, PO1, PO4)
31. Define encoding function $e: B^3 \rightarrow B^4$ as follows $e(b) = b_1b_2b_3b_4$ where $b_4 = b_1$ for $m = 3$ write code words. (CO1, CO2, CO3, PO1, PO3, PO4)



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32. For $e: B^3 \rightarrow B^6$, (3, 6) encoding function, find the minimum distance.
 $e(000)=00000, e(001)=001001, e(010)=010010, e(011)=011011, e(100)=100100, e(101)=10101, e(110)=110110, e(111)=111111$.(CO1, CO2,CO3,PO1, PO3,PO4)

33. Define Parity Check Matrix .(CO1, CO2,CO3,PO1, PO3,PO4)

34. Consider the (3, 5) encoding function $e: B^3 \rightarrow B^5$ defined as:
 $e(000) = 00000, e(100)=10011, e(001)=00110, e(101)=10101, e(010)=01001, e(110)=11010$
 $e(011)=01111, e(111)=11100$.(CO1, CO2,CO3,PO1, PO3,PO4)

Decode the following words using maximum likelihood decoding function.
 11001 b)01010 c) 00111. .(CO1, CO2,CO3,PO1, PO3,PO4)

35. Let $p=11$, $q=5$ and $e=7$. Using RSA method encode the message 'GOOD'. .(CO1, CO2,CO3,PO1, PO3,PO4)

36. Encode the word **MATHS** using RSA method. Let $p=3, q=11$ & $e=3$. .(CO1, CO2,CO3,PO1, PO3,PO4)

37. Decode the message **MACNY** using RSA method where, public key is 3 & $p=3, q=11$. .(CO1, CO2,CO3,PO1, PO3,PO4)

38. Determine the public key s, n if $p=79, q=89$ & $t=119$. .(CO1, CO2,CO3,PO1, PO3,PO4)

39. Define Message & word. .(CO1, CO2,CO3,PO1, PO3,PO4)

40. Define Code word & Weight of a code or Hamming Weight. .(CO1, CO2,CO3,PO1, PO3,PO4)



A handwritten signature in purple ink, appearing to be "G.P.P." followed by a flourish.

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P.V.G's College of Science, Pune 9

Class : S.Y.B.Sc. (Computer Science)	Semester: III	Academic Year: 2022-23
Subject: <u>Groups 4 coding Theory</u>		Internal Evaluation Record

Sr. No.	Roll No.	Name	Internal Evaluation					Sign of Student
			Assignme nt submitted	Assignme nt (15)	Internal Test attendanc e	Int.Test Score (15)	Best of Two	
1	IEBS1	ABDULRAUF PEERJADE MOHAMMAD SAAD	saad	12	saad	15	15	saad
2	IEBS2	ADAGALE SWAPNIL RAVINDRA		12		15	15	
3	IEBS3	ADMANE GAYATRI YASHODHAN	<u>Gayatri</u>	12	<u>Gayatri</u>	12	12	<u>Gayatri</u>
4	IEBS4	AINAPURE ARYA HEMANT	<u>Arya</u>	12	<u>Arya</u>	13	13	<u>Arya</u>
5	IEBS5	ANDE RUCHITA AVINASH	<u>Ruchita</u>	12	<u>Ruchita</u>	13	13	<u>Ruchita</u>
6	IEBS6	BARVE PRACHI ANAND	<u>Prachi</u>	12	<u>Prachi</u>	14	14	<u>Prachi</u>
7	IEBS7	BADADE NEHA SUNIL	<u>Badade</u>	12	<u>Badade</u>	15	15	<u>Badade</u>
8	IEBS8	BANDAL SIDDHESH SANTOSH		12		12	12	
9	IEBS9	BANSOD ADITI BHARAT	<u>Aditi</u>	12	<u>Aditi</u>	12	12	<u>Aditi</u>
10	IEBS10	BARGIR ATHARV SUNIL	<u>A.S. Bargir</u>	12	<u>A.S. Bargir</u>	14	14	<u>A.S. Bargir</u>
11	IEBS11	BATHE ATHARVA RAVINDRA	<u>Atharva</u>	12	<u>Atharva</u>	13	13	<u>Atharva</u>
12	IEBS12	BEKE MANAS DHANANJAY		12		13	13	
13	IEBS13	BHAGAT SWARAJ SACHIN		12		15	15	
14	IEBS14	BHAGWAT RUTUJA RAMKISAN	<u>Bhagwat</u>	12	<u>Bhagwat</u>	13	13	<u>Bhagwat</u>
15	IEBS15	BHIVARE MOHIT HANUMANT	<u>Bhivare</u>	13	<u>Bhivare</u>	15	15	<u>Bhivare</u>
16	IEBS16	BHORADE VAISHNAVI VITTHAL	<u>Bhorade</u>	13	<u>Bhorade</u>	15	15	<u>Bhorade</u>
17	IEBS17	BHOSALE ATHARVA BHARAT	<u>AB</u>	13	<u>AB</u>	14	15	<u>AB</u>
18	IEBS18	BODHANI SOHAM RAHUL	<u>Soham</u>	12	<u>Soham</u>	15	15	<u>Soham</u>
19	IEBS19	BORADE YASH NILESH	<u>Yash</u>	12	<u>Yash</u>	12	12	<u>Yash</u>
20	IEBS20	BRAMHE UTKARSH PRAKASH	<u>Utkarsh</u>	12	<u>Utkarsh</u>	15	15	<u>Utkarsh</u>
21	IEBS21	CHAVAN VAISHNAVI JAGANNATH	<u>Chavan</u>	13	<u>Chavan</u>	15	15	<u>Chavan</u>
22	IEBS22	CHHALLARE YUGANDHARA HARSHAD	<u>Yug</u>	12	<u>Yug</u>	12	12	<u>Yug</u>
23	IEBS23	CHOUDHARI SUMIT SANJAY	<u>Sumit</u>	10	<u>Sumit</u>	10	10	<u>Sumit</u>
24	IEBS24	DABKE SWARAJ SAMEER	<u>SD</u>	13	<u>SD</u>	13	13	<u>SD</u>
25	IEBS25	DANGI MAHENDRA MAHAVIR	<u>Mahavir</u>	13	<u>Mahavir</u>	13	13	<u>Mahavir</u>
26	IEBS26	DANVE PRANITA ANIL	<u>Pranita</u>	13	<u>Pranita</u>	12	12	<u>Pranita</u>
27	IEBS27	DESHMUKH HARSHADA VIDYADHAR	<u>Harshada</u>	12	<u>Harshada</u>	15	15	<u>Harshada</u>
28	IEBS28	DESHPANDE ATHARV MORESHWAR	<u>Moreshwar</u>	12	<u>Moreshwar</u>	13	13	<u>Moreshwar</u>
29	IEBS29	DESHPANDE MEGHANA UMESH	<u>Meghna</u>	12	<u>Meghna</u>	14	14	<u>Meghna</u>
30	IEBS30	DEVKATE CHAITRALI ABASAHEB	<u>Chaitrali</u>	13	<u>Chaitrali</u>	15	15	<u>Chaitrali</u>
31	IEBS31	DHUMAL PRIYARAJ AJIT	<u>Priyaraaj</u>	13	<u>Priyaraaj</u>	15	15	<u>Priyaraaj</u>
32	IEBS32	FALKE KAUSHAL SANTOSH	<u>Kaushal</u>	13	<u>Kaushal</u>	14	14	<u>Kaushal</u>
33	IEBS33	GAIKWAD DARSHANA ANIL	<u>Darshana</u>	13	<u>Darshana</u>	15	15	<u>Darshana</u>
34	IEBS34	GANGAPURKAR RIDDHI ASHISH	<u>Riddhi</u>	13	<u>Riddhi</u>	15	15	<u>Riddhi</u>
35	IEBS35	GAVADE NIKITA SURESH	<u>Nikita</u>	12	<u>Nikita</u>	15	15	<u>Nikita</u>
36	IEBS36	GAVALI ARYA PRASHANT	<u>Prashant</u>	12	<u>Prashant</u>	15	15	<u>Prashant</u>
37	IEBS37	GHATE SANSKAR RAMDAS	<u>Sanskar</u>	12	<u>Sanskar</u>	15	15	<u>Sanskar</u>
38	IEBS38	GHORPADE RAJ YOGESH	<u>Raj</u>	12	<u>Raj</u>	15	15	<u>Raj</u>
39	IEBS39	GODBOLE PRUTHI RAHUL	<u>Pruthi</u>	12	<u>Pruthi</u>	12	12	<u>Pruthi</u>
40	IEBS40	GOGAWALE RUTUJA RAJENDRA	<u>Rutuja</u>	13	<u>Rutuja</u>	15	15	<u>Rutuja</u>
41	IEBS41	GUGALE SHREYA RAJU	<u>Shreya</u>	13	<u>Shreya</u>	15	15	<u>Shreya</u>
42	IEBS42	GUNDA NITESH GUNDA	<u>Gunda</u>	13	<u>Gunda</u>	12	12	<u>Gunda</u>
43	IEBS43	GURAV PARTH DATTATRAY	<u>Parth</u>	13	<u>Parth</u>	14	14	<u>Parth</u>
44	IEBS44	HARER ANISH ARVIND	<u>Anish</u>	12	<u>Anish</u>	14	14	<u>Anish</u>
45	IEBS45	HUNDA ANILNATH TEJANATH		12		14	14	
46	IEBS46	INGALE SIDDHI RAJESH	<u>Siddhi</u>	12	<u>Siddhi</u>	13	13	<u>Siddhi</u>



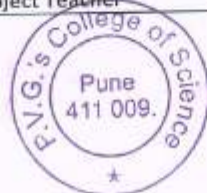
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103	IEBS103	PANDE AKANKSHA AVINASH	Pandey	10	Pandey	19	14	Pandey
104	IEBS104	PARTE ABHIRAJ GANESH	Parth	10	Parth	15	15	Parth
105	IEBS105	PATEL JUNAID JALIL	Patel	12	Patel	15	15	Patel
106	IEBS106	PATIL MOHINI NITIN	Patil	12	Patil	15	15	Patil
107	IEBS107	PATIL PRAJYOT PRAVIN	P. Patil	12	P. Patil	19	14	P. Patil
108	IEBS108	PATIL PRANJAL GIRISH	Pranjal	10	Pranjal	15	14	Pranjal
109	IEBS109	PATIL SHRAVANI SANTOSH	Shravani	10	Shravani	15	14	Shravani
110	IEBS110	PETHSANGAVIKAR ANISHA BALASAHEB	Anisha	10	Anisha	19	13	Anisha
111	IEBS111	PILAWARE SHRUTI BALASAHEB	Shruti	12	Shruti	15	15	Shruti
112	IEBS112	PISAL SUYASH SUBHASH	Suyash	12	Suyash	15	15	Suyash
113	IEBS113	PORE TANVI SAMEER	Tanvi	12	Tanvi	12	12	Tanvi
114	IEBS114	PURANDARE MAYUR MANOJ	Mayur	12	Mayur	14	14	Mayur
115	IEBS115	RAJE NIRAJ ANIL	Niraj	13	Niraj	15	15	Niraj
116	IEBS116	RASKAR NEEL PANDURANG	Neel	12	Neel	13	13	Neel
117	IEBS117	SALUNKE VAISHNAVI VITTHAL	Salunke	12	Salunke	13	13	Salunke
118	IEBS118	SALVE YASH DAULAT	Yash	13	Yash	12	12	Yash
119	IEBS119	SANKLECHA VIVA PRAVIN	Vivas	19	Vivas	14	14	Vivas
120	IEBS120	SARPALE SIDDHI SANTOSH	Siddhi	12	Siddhi	15	15	Siddhi
121	IEBS121	SASTE AJINKYA MANGESH	Ajinkya	12	Ajinkya	15	15	Ajinkya
122	IEBS122	SHAIKH AMAN ABID	Aman	12	Aman	15	15	Aman
123	IEBS123	SHAIKH ARBAJ SIRAJ	Arba	10	Arba	15	15	Arba
124	IEBS124	SHELAR SOHAN RAJENDRA	Sohan	10	Sohan	15	15	Sohan
125	IEBS125	SHENDGE SAGARIKA MARUTI	Shendge	11	Shendge	15	15	Shendge
126	IEBS126	SHILIMKAR ROHAN RAJAN	Rohan	11	Rohan	12	12	Rohan
127	IEBS127	SHINDE AISHWARYA MAHENDRA	Aishwarya	12	Aishwarya	14	14	Aishwarya
128	IEBS128	SHINDE MANSEE SHASHIKANT	Mansee	10	Mansee	15	15	Mansee
129	IEBS129	SHINDE SAMEER SAKHARAM	Sameer	11	Sameer	14	14	Sameer
130	IEBS130	SHUME KONAL DHANANJAY	Komal	11	Komal	14	14	Komal
131	IEBS131	SNEHAL AMOL	Snehal	12	Snehal	14	14	Snehal
132	IEBS132	SOMAN YUVRAJ RAMCHANDRA	Yuvraj	11	Yuvraj	13	13	Yuvraj
133	IEBS133	SONAWANE SHREYA ANIL	Shreya	10	Shreya	12	12	Shreya
134	IEBS134	SUKHDEVE SHREYASH ARVIND	Shreyash	10	Shreyash	15	15	Shreyash
135	IEBS135	SULAKHE PRATHMESH RAVINDRA	Prathmesh	10	Prathmesh	14	14	Prathmesh
136	IEBS136	SUPEKAR AKSHADA KALIDAS	Akshada	12	Akshada	12	12	Akshada
137	IEBS137	SUTAR SANIL KISAN	Sanil	12	Sanil	14	14	Sanil
138	IEBS138	TAKAWALE SAKSHI SANJAY	Sakshi	12	Sakshi	15	15	Sakshi
139	IEBS139	TAWDE AKANKSHA PANDURANG	Akanksha	13	Akanksha	14	14	Akanksha
140	IEBS140	TEKE PARTH PRASHANT	Parth	12	Parth	12	12	Parth
141	IEBS141	THORAT SAKSHI KIRAN	Sakshi	12	Sakshi	13	13	Sakshi
142	IEBS142	THORAT SRUSHTI SUNIL	THORAT	12	THORAT	13	13	THORAT
143	IEBS143	VANARASE AMOD AVINASH	Amod	12	Amod	13	13	Amod
144	IEBS144	VAWAL SIDDHI SACHIN	Siddhi	13	Siddhi	15	15	Siddhi
145	IEBS145	VISPUTE KAUSTUBH MOHAN	Kaustubh	13	Kaustubh	15	15	Kaustubh
146	IEBS146	WAGHMARE EKTA DEEPAK	Ekta	12	Ekta	13	13	Ekta
147	IEBS147	WAGHMARE SALOMI VISHWAS	Salomi	12	Salomi	13	13	Salomi
148	IEBS148	WAGHRESHA KRISH DEVENDRA	Krish	12	Krish	13	13	Krish
149	IEBS149	YADAV ATHARVA VIJAY	Atharva	12	Atharva	13	13	Atharva
150	IEBS150	YADAV YASH SANTAJI	Yash	13	Yash	13	13	Yash
151	IEBS151	YANDE SAMRUDDHI SANDIP	Sandip	13	Sandip	13	13	Sandip
152	IEBS152	YELBHAR SHRAVANI ANIL	Shravani	13	Shravani	14	14	Shravani
153	IEBS153	ZAMBRE JANHAVI PRASHANT	Janhavi	13	Janhavi	14	14	Janhavi

Mohini Paradeshi

Name of Subject Teacher

Signature of Subject Teacher



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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

S.Y.B.Sc (CS) 2022-23 SEM-III

MTC 231: Numerical Techniques II

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

CO4: A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

Program Outcome:

PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: Inculcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: Infuse ethical, human and professional values and responsibilities to make their contribution to the society.



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MTC 231: Numerical Techniques II

- 1 Define relative error.(CO1,CO2,PO2,PO3)
- 2 If approximate value of 2.013 is 2. Find the percentage error. .(CO1,CO2,PO2,PO3)
- 3 Find the relative error of the number $1/3$ whose approximate value is 0.3333. (CO1,CO2,PO2,PO3)
- 4 Round off 0.745250 correct to four significant figure and find out absolute and relative, Percentage error. .(CO1,CO2,PO2,PO3)
- 5 Round off 0.859378 correct to four significant figure. .(CO1,CO2,PO2,PO3)
- 6 Write the formula for regular-falsi method. .(CO1,CO2,PO2,PO3)
- 7 Using false position method, find the real root of the equation $X^2 - X - 2 = 0$ (perform 1 iteration). .(CO1,CO2,PO2,PO3)
- 8 Find the real root of the equation $\log X - \cos X = 0$ correct to three decimal places using Newton –Raphson method (take $X_0 = 1.3$). .(CO1,CO2,PO2,PO3)
- 9 Find a real root of the equation $X \sin X + \cos X = 0$ correct to three decimal places using Newton –Raphson method. (CO1,CO2,PO2,PO3)
- 10 Use Regular –Falsi method to find approximate root of equation $X^3 - 4X - 2 = 0$ in the Interval (2,3) correct upto 2 decimal places. (CO1,CO2,PO2,PO3)
- 11 Find 4th root of 74 using Newton-Raphson method correct upto 4 decimal places.(CO3,PO1,PO4)
- 12 Obtain Newton-Raphson formula to find square root of a given number say p.(CO4,PO3,PO4)
- 13 Write comparison between False position method and Newton-Raphson method.(CO1,CO2)
- 14 Find the square root of 12 using Newton –Raphson method.(CO1,PO2)
- 15 Find a real root of, $X^3 - 2X - 5 = 0$ correct up to a decimal places.(CO2,PO3,PO4)
- 16 Prepare forward differences tables for the following data.(CO2,CO3,PO4)

x	0	2	4	6	8	10	12
y	12	7	6	7	13	32	77

- 17 State and prove Newton-Gregory formula for forward interpolation.(CO1,CO2,PO3)
- 18 Find y_{48} if the data is(CO1,CO2,PO2,PO3)

x	45	50	55	60	65
y	2.871	2.404	2.083	1.862	1.712

- 19 In an examination, number of students scoring certain marks is given below.
Find number of candidates scoring less than 30 marks. (CO1,CO2,PO2,PO3)





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Marks less than	0-19	20-39	40-49	60-79	80-99
No. of candidates	41	62	65	50	17

20 From the following table of yearly premium for policies maturing at coming ages,

Estimate the premiums for policies maturing at the age of 46 years.
(CO1,CO2,PO2,PO3)

AGE x :	45	50	55	60	65
PREMIUM y :	2.871	2.404	2.083	1.862	1.712

21 Find the y at $x = 1.5$ by using Newton -Gregory forward interpolation formula from the following data (CO1,CO2,PO2,PO3)

x	1	2	3	4	5
Y	2	4	8	16	32

22 From the following data, find y when $x = 1.45$ (CO1,CO2,PO2,PO3)

x	1	1.2	1.4	1.6	1.8	2
y	0.0	-0.112	-0.016	0.336	0.992	2

23 From the following data, find the value of $f(0.665)$. (CO1,CO2,PO2,PO3)

x	0.61	0.62	0.63	0.64	0.65	0.66	0.67
y	1.840431	1.858928	1.877610	1.896481	1.915541	1.934792	1.954237

24 Prepare a backward difference table and hence calculate $y(2.2)$ for the following set of

Data(CO1,CO2,PO2,PO3)

x	-2	-1	0	1	2	3
y	8	-3	0	-3	8	45

25 Derive Lagrange's interpolation formula. (CO1,CO2, PO2,PO3)

26 Find $f(5)$ using the following data (CO1,CO2,PO2,PO3)

x	1	2	3	4	5
F(x)	0	1	48	180	900

27 Find first divided difference for the data (CO1,CO2,PO2,PO3)

x	0	1	2	3
y	5	8	10	12


28 From the following data find $f(0)$ by Newton's divided difference formula (CO1,CO2,PO2,PO3)

x	3	5	11	27	34
f(x)	-13	23	899	17315	35606

29 Given a set of x and y by Newton's divided difference formula. find y at $x = 1$

x	0	1.5	2	3	3.5
y	1	-1.625	-1	7	15.875




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30 Given $f(3) = 24$, $f(5) = 120$, $f(8) = 504$, $f(9) = 720$ and $f(12) = 1716$. Find $f(7)$ by Using Newton's divided difference interpolation formula. (CO1,CO2,PO2,PO3)

31 Derive Quadrature formula for numerical integration. (CO1,CO2,PO2,PO3)

32 Evaluate the following integral by using trapezoidal rule. Also find the error introduced.

$$\int_{4.0}^{5.2} \log_e x \, dx \text{ with } h = 0.1 \text{ (CO1,CO2,PO2,PO3)}$$

33 Evaluate $\int_0^{\pi/2} e^{\sin x} \, dx$ by dividing the interval into 10 equal parts. (CO1,CO2,PO2,PO3)

34 State and derive Simpson's (1/3)rd rule for numerical integration (CO1,CO2,PO2,PO3)

35 Evaluate $\int_0^{\pi/2} \sqrt{\cos \theta} \, d\theta$ by dividing the interval into 10 equal parts. (CO1,CO2,PO2,PO3)

36 Evaluate $\int_1^3 dx/x$ using Simpson's (1/3)rd rule. (CO1,CO2,PO2,PO3)

37 State and derive Simpson's 3/8th rule for numerical integration. (CO1,CO2,PO2,PO3)

38 Evaluate $\int_{2.2}^1 \sin t \, dt$ with $h = 0.1$ (CO1,CO2,PO2,PO3)

39 Evaluate $\int_0^6 y \, dx$ by using Simpson's ($\frac{3}{8}$)th rule from the data given below.

x	0	1	2	3	4	5	6
y	1	0.5	0.2	0.1	0.0588	0.0385	0.027

40 Evaluate $\int_0^6 \frac{dx}{(1+x)^2}$ by using Simpson's ($\frac{3}{8}$)th rule. (take $h = 1$)

41 Evaluate $\int_4^{5.2} \log_e x \, dx$ by Simpson's ($\frac{3}{8}$)th rule (take $h = 0.2$)

42 If $f(0) = 1$, $f(0.6) = 0.625$, $f(1.2) = 0.4545$. find $\int_0^{1.2} f(x) \, dx$ using Simpson's ($\frac{1}{3}$)rd rule. (CO1,CO2,PO2,PO3)

43 Evaluate $\int_1^3 \frac{dx}{x}$ using Simpson's ($\frac{1}{3}$)rd rule (CO1,CO2,PO2,PO3)

44 Use Trapezoidal rule to evaluate $\int_0^1 x^3 \, dx$ consider 5 subintervals

45 Evaluate $\int_0^3 \frac{dx}{1+x}$ using Simpson's ($\frac{3}{8}$)th rule (CO1,CO2,PO2,PO3)

46 Given $\frac{dy}{dx} = x^2 + y$; $y(0) = 1$. Find $y(0.1)$, using Euler's method (CO1,CO2,PO2,PO3)

47 Given $\frac{dy}{dx} = x^2 - y$; $y(0) = 1$. Find $y(0.02)$, using Euler's method (CO1,CO2,PO2,PO3)



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- 48 Solve $\frac{dy}{dx} = -2y$; $y(0) = 1$. Using Euler's method . find $y(0.1)$
(CO1,CO2,PO2,PO3)
- 49 Find $y(0.2)$, $\frac{dy}{dx} = -y$; $y(0) = 1$, using Euler's method
- 50 Determine the value of $y(0.1)$ upto 4 decimal places by using Euler's modified Method (CO1,CO2,PO2,PO3)
- Given $y(0)=1$, $\frac{dy}{dx} = x + y$ ($h = 0.05$)
- 51 Write the formula for Runge-kutta method of second order (CO1,CO2,PO2,PO3)
- 52 Solve $\frac{dy}{dx} = x + y$; $y(0) = 1$, using Runge-Kutta second order formula . find $y(0)$
And $y(0.2)$ (CO1,CO2,PO1,PO3)
- 53 Determine the value of y when $x=0.1$ by Euler's modified method $y(0)=1$,
 $y(1) = x^2 + y$ (CO1,CO3,PO1,PO3)
- 54 Solve $\frac{dy}{dx} = y - \frac{2x}{y}$ using Euler's modified method. Determine the value of y correct
Upto 3 decimal places when $x = 0.1$ Given that $y(0)=1$ (CO1,CO3,PO1,PO3)
- 55 Use the Runge-Kutta fourth order formula to find the value of y when $x=1$.
Given that $y(0)=1$, $\frac{dy}{dx} = \frac{y-x}{y+x}$ (CO1,CO2,PO2,PO3)
- 56 Using Runge-Kutta second order method find approximate value of $y(0.2)$
Given that $\frac{dy}{dx} = 1 + y^2$, $y(0)=0$, $h=0.2$ (CO1,CO2,PO2,PO3)
- 57 Determine the value of y when $x=0.1$ by Euler's modified method
Given that $\frac{dy}{dx} = x^2 + y$, with $y(0) = 0.94$ (CO1,CO2,PO2,PO3)
- 58 Solve $\frac{dy}{dx} = 1 - y$; $y(0)=0$ Find $y(0.1)$, $y(0.2)$, $y(0.3)$ using Euler's method
(CO1,CO2,PO2,PO3)
- 59 Solve $\frac{dy}{dx} = 1 + y^2$, $y(0)=0$, find $y(0.1)$, $y(0.2)$, $y(0.3)$ using Euler's method
(CO1,CO2,PO2,PO3)



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Class : S.Y.B.Sc. (Computer Science)	Semester: III	Academic Year: 2022-23
Subject: Numerical Tech.		Internal Evaluation Record

Sr. No.	Roll No.	Name	Internal Evaluation					Sign of Student
			Assignme nt submitted	Assignme nt (15)	Internal Test attendanc e	Int. Test Score (15)	Best of Two	
1	IEBS1	ABDULRAUF PEERJADE MOHAMMAD SAAD	Submitted	12	Submitted	9	12	Submitted
2	IEBS2	ADAGALE SWAPNIL RAVINDRA		10		7	10	
3	IEBS3	ADMANE GAYATRI YASHODHAN	Submitted	10	Submitted	7	10	Submitted
4	IEBS4	AINAPURE ARYA HEMANT	Submitted	10	Submitted	7	10	Submitted
5	IEBS5	ANDE RUCHITA AVINASH	Submitted	15	Submitted	14	15	Submitted
6	IEBS6	BARVE PRACHI ANAND	Submitted	12	Submitted	9	12	Submitted
7	IEBS7	BADADE NEHA SUNIL	Submitted	11	Submitted	8	11	Submitted
8	IEBS8	BANDAL SIDDHESH SANTOSH		8		5	8	
9	IEBS9	BANSOD ADITI BHARAT	Submitted	9	Submitted	6	9	Submitted
10	IEBS10	BARGIR ATHARV SUNIL	Submitted	12	Submitted	9	12	Submitted
11	IEBS11	BATHE ATHARVA RAVINDRA	Submitted	12	Submitted	9	12	Submitted
12	IEBS12	BEKE MANAS DHANANJAY		11		8	11	
13	IEBS13	BHAGAT SWARAJ SACHIN		13		10	13	
14	IEBS14	BHAGWAT RUTUJA RAMKISAN	Submitted	12	Submitted	9	12	Submitted
15	IEBS15	BHIVARE MOHIT HANUMANT	Submitted	12	Submitted	9	12	Submitted
16	IEBS16	BHORADE VAISHNAVI VITTHAL	Submitted	12	Submitted	9	12	Submitted
17	IEBS17	BHOSALE ATHARVA BHARAT	Submitted	9	Submitted	6	9	Submitted
18	IEBS18	BODHANI SOHAM RAHUL	Submitted	10	Submitted	7	10	Submitted
19	IEBS19	BORADE YASH NILESH	Submitted	9	Submitted	6	9	Submitted
20	IEBS20	BRAMHE UTKARSH PRAKASH	Submitted	10	Submitted	7	10	Submitted
21	IEBS21	CHAVAN VAISHNAVI JAGANNATH	Submitted	10	Submitted	7	10	Submitted
22	IEBS22	CHHALLARE YUGANDHARA HARSHAD	Submitted	12	Submitted	9	12	Submitted
23	IEBS23	CHOUDHARI SUMIT SANJAY	Submitted	13	Submitted	10	13	Submitted
24	IEBS24	DABKE SWARAJ SAMEER	Submitted	13	Submitted	10	13	Submitted
25	IEBS25	DANGI MAHENDRA MAHAVIR	Submitted	11	Submitted	8	11	Submitted
26	IEBS26	DANVE PRANITA ANIL	Submitted	9	Submitted	6	9	Submitted
27	IEBS27	DESHMUKH HARSHADA VIDYADHAR	Submitted	9	Submitted	6	9	Submitted
28	IEBS28	DESHPANDE ATHARV MORESHWAR	Submitted	12	Submitted	9	12	Submitted
29	IEBS29	DESHPANDE MEGHANA UMESH	Submitted	12	Submitted	9	12	Submitted
30	IEBS30	DEVKATE CHAITRALI ABASAHEB	Submitted	11	Submitted	8	11	Submitted
31	IEBS31	DHUMAL PRIYARAJ AJIT	Submitted	12	Submitted	9	12	Submitted
32	IEBS32	FALKE KAUSHAL SANTOSH	Submitted	12	Submitted	9	12	Submitted
33	IEBS33	GAIKWAD DARSHANA ANIL		9		6	9	
34	IEBS34	GANGAPURKAR RIDDHI ASHISH	Submitted	12	Submitted	9	12	Submitted
35	IEBS35	GAVADE NIKITA SURESH	Submitted	14	Submitted	11	14	Submitted
36	IEBS36	GAVALI ARYA PRASHANT		11		8	11	
37	IEBS37	GHATE SANSKAR RAMDAS	Submitted	11	Submitted	8	11	Submitted
38	IEBS38	GHORPADE RAJ YOGESH		12		9	12	
39	IEBS39	GODBOLE PRUTHI RAHUL	Submitted	12	Submitted	9	12	Submitted
40	IEBS40	GOGAWALE RUTUJA RAJENDRA	Submitted	13	Submitted	10	13	Submitted
41	IEBS41	GUGALE SHREYA RAJU	Submitted	14	Submitted	11	14	Submitted
42	IEBS42	GUNDA NITESH GUNDA		11		8	11	
43	IEBS43	GURAV PARTH DATTATRAY	Submitted	11	Submitted	8	11	Submitted
44	IEBS44	HARER ANISH ARVIND	Submitted	10	Submitted	7	10	Submitted
45	IEBS45	HUNDA ANILNATH TEJANATH		13		10	13	
46	IEBS46	INGALE SIDDHI RAJESH	Submitted	14	Submitted	11	14	Submitted



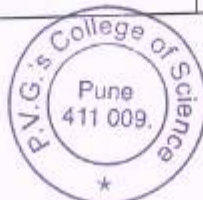
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103	IEBS103	PANDE AKANKSHA AVINASH	K. Pande	12	K. Pande	9	12	3/ Pande
104	IEBS104	PARTE ABHIRAJ GANESH	T. Parte	11	T. Parte	11	11	T. Parte
105	IEBS105	PATEL JUNAID JALIL	R. Patel	11	R. Patel	11	11	R. Patel
106	IEBS106	PATIL MOHINI NITIN	P. Patil	12	P. Patil	9	12	P. Patil
107	IEBS107	PATIL PRĀJYOT PRAVIN	P. Patil	10	P. Patil	7	10	P. Patil
108	IEBS108	PATIL PRANJAL GIRISH	P. Patil	11	P. Patil	11	11	P. Patil
109	IEBS109	PATIL SHRAVANI SANTOSH	P. Patil	11	P. Patil	11	11	P. Patil
110	IEBS110	PETHSANGAVIKAR ANISHA BALASAHEB	A. Pethsangavikar	11	A. Pethsangavikar	11	11	A. Pethsangavikar
111	IEBS111	PILAWARE SHRUTI BALASAHEB	S. Pilaware	12	S. Pilaware	11	12	S. Pilaware
112	IEBS112	PISAL SUYASH SUBHASH	S. Pisal	11	S. Pisal	11	11	S. Pisal
113	IEBS113	PORE TANVI SAMEER	T. Pore	11	T. Pore	11	11	T. Pore
114	IEBS114	PURANDARE MAYUR MANOJ	M. Purandare	11	M. Purandare	11	11	M. Purandare
115	IEBS115	RAJE NIRAJ ANIL	N. Raje	11	N. Raje	11	11	N. Raje
116	IEBS116	RASKAR NEEL PANDURANG	N. Raskar	11	N. Raskar	11	11	N. Raskar
117	IEBS117	SALUNKE VAISHNAVI VITTHAL	V. Salunke	11	V. Salunke	11	11	V. Salunke
118	IEBS118	SALVE YASH DAULAT	Y. Salve	11	Y. Salve	11	11	Y. Salve
119	IEBS119	SANKLECHA VIVA PRAVIN	V. Sanklecha	13	V. Sanklecha	10	13	V. Sanklecha
120	IEBS120	SARPALE SIDDHI SANTOSH	S. Sarpale	14	S. Sarpale	11	14	S. Sarpale
121	IEBS121	SASTE AJINKYA MANGESH	A. Saste	10	A. Saste	8	10	A. Saste
122	IEBS122	SHAIKH AMAN ABID	A. Shaikh	11	A. Shaikh	8	11	A. Shaikh
123	IEBS123	SHAIKH ARBAJ SIRAJ	A. Shaikh	10	A. Shaikh	7	10	A. Shaikh
124	IEBS124	SHELAR SOHAN RAJENDRA	S. Shelar	10	S. Shelar	7	10	S. Shelar
125	IEBS125	SHENDGE SAGARIKA MARUTI	S. Shendge	10	S. Shendge	7	10	S. Shendge
126	IEBS126	SHILIMKAR ROHAN RAJAN	R. Shilimkar	11	R. Shilimkar	7	11	R. Shilimkar
127	IEBS127	SHINDE AISHWARYA MAHENDRA	A. Shinde	10	A. Shinde	7	10	A. Shinde
128	IEBS128	SHINDE MANSEE SHASHIKANT	M. Shinde	11	M. Shinde	8	11	M. Shinde
129	IEBS129	SHINDE SAMEER SAKHARAM	S. Shinde	12	S. Shinde	9	12	S. Shinde
130	IEBS130	SHUME KONAL DHANANJAY	K. Shume	10	K. Shume	7	10	K. Shume
131	IEBS131	SNEHAL AMOL	S. Snehal	13	S. Snehal	10	13	S. Snehal
132	IEBS132	SOMAN YUVRAJ RAMCHANDRA	Y. Soman	11	Y. Soman	8	11	Y. Soman
133	IEBS133	SONAWANE SHREYA ANIL	S. Sonawane	11	S. Sonawane	8	11	S. Sonawane
134	IEBS134	SUKHDEVE SHREYASH ARVIND	S. Sukhdeve	10	S. Sukhdeve	7	10	S. Sukhdeve
135	IEBS135	SULAKHE PRATHMESH RAVINDRA	P. Sulake	11	P. Sulake	8	11	P. Sulake
136	IEBS136	SUPEKAR AKSHADA KALIDAS	A. Supekar	15	A. Supekar	12	15	A. Supekar
137	IEBS137	SUTAR SANIL KISAN	S. Sutar	15	S. Sutar	12	15	S. Sutar
138	IEBS138	TAKAWALE SAKSHI SANJAY	S. Takawale	14	S. Takawale	11	14	S. Takawale
139	IEBS139	TAWDE AKANKSHA PANDURANG	A. Tawde	14	A. Tawde	11	14	A. Tawde
140	IEBS140	TEKE PARTH PRASHANT	P. Teke	11	P. Teke	8	11	P. Teke
141	IEBS141	THORAT SAKSHI KIRAN	S. Thorat	12	S. Thorat	9	12	S. Thorat
142	IEBS142	THORAT SRUSHTI SUNIL	S. Thorat	10	S. Thorat	7	10	S. Thorat
143	IEBS143	VANARASE AMOD AVINASH	A. Vanarase	13	A. Vanarase	10	13	A. Vanarase
144	IEBS144	VAWAL SIDDHI SACHIN	S. Vawal	11	S. Vawal	8	11	S. Vawal
145	IEBS145	VISPUTE KAUSTUBH MOHAN	K. Vispute	10	K. Vispute	7	10	K. Vispute
146	IEBS146	WAGHMARE EKTA DEEPAK	E. Waghmare	11	E. Waghmare	8	11	E. Waghmare
147	IEBS147	WAGHMARE SALOMI VISHWAS	S. Waghmare	10	S. Waghmare	7	10	S. Waghmare
148	IEBS148	WAGHRESHA KRISH DEVENDRA	K. Waghresha	13	K. Waghresha	10	13	K. Waghresha
149	IEBS149	YADAV ATHARVA VIJAY	A. Yadav	13	A. Yadav	10	13	A. Yadav
150	IEBS150	YADAV YASH SANTAJI	Y. Yadav	12	Y. Yadav	9	12	Y. Yadav
151	IEBS151	YANDE SAMRUDDHI SANDIP	S. Yande	15	S. Yande	12	15	S. Yande
152	IEBS152	YELBHAR SHRAVANI ANIL	S. Yelbhar	14	S. Yelbhar	11	14	S. Yelbhar
153	IEBS153	ZAMBRE JANHAVI PRASHANT	J. Zambre	11	J. Zambre	8	11	J. Zambre

Smita S. Muley
Name of Subject Teacher

Signature of Subject Teacher



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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

S.Y.B.Sc(CS) 2022-23 SEM-IV
MTC 242: Operations Research

Course Outcome:

- CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.
- CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.
- CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

Program Outcome:


PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: In culcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In fuse ethical, human and professional values and responsibilities to make their contribution to the society.




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Assignment No.1 Linear Programming Problem

Define Operation Research (CO1,PO1,PO4)

Explain Scope of Operation Research(CO1,CO3,PO2)

Applications & Limitations Of OR(CO2,CO3,PO3)

Mathematical Model of LPP (CO1,CO2,PO2,PO3)

Draw a Feasible region for the following constraints.

(CO1,CO2,PO2,PO3)

$$x+2y \geq 10$$

$$x+y=6 \quad x,y \geq 0$$

Find feasible region for the following LPP: (CO1,CO2,PO2,PO3)

Maximize $Z = x+y$

Subject to, $2x+3y=5$

$$2x+3y=3 \quad x,y \geq 0$$

A Production manager wants to determine the quantity to be produced per month of products A & B manufactured by his firm. The raw materials required per unit of product A is 60 Kg. & that for per unit of product B is 20 Kg. The availability of the raw material is 12,00 Kg. Machine hours required per piece of product A & B is 8 & 5 respectively. The assembly of products A & B per piece required 3 man hours & 4 man hours respectively. The machine hours & man hours available to maximum of 600 & 500 respectively. The profit per unit of A is Rs.30 & B is Rs.40. Formulate the LPP & solve it by graphical method. ((CO1,CO2,PO2,PO3)

A firm manufactures headache pills in two sizes A & B. Size A contains 2 grains of aspirin, 5 grains of bicarbonate & 1 gram of codeine. Size B contains 1 grain of aspirin, 8 grains of bicarbonate & 6 grains of codeine. It is found by users that it requires at least 12 grains of aspirin, 74 grains of bicarbonate & 24 grains of codeine for providing immediate effect. It is required to determine the least number of pills a patient should take to get immediate relief. Formulate the problem as a LPP & solve it by graphically. (CO1,CO2,PO2,PO3)

Solve following LPP by graphically & find optimum solution (CO1,CO2,CO3,PO2,PO3)

a) $\text{Max } Z = 24x + 8y$

b) $\text{Min } Z = 3x + 4y$

Subject to, $2x + 3y \leq 40$

Subject to, $2x + 3y \geq 36$

$$(CO1,CO2,PO2,PO3) 4x + y \leq 20$$

$$2x + 2y \geq 28$$

$$10x + 8y \leq 60 \quad x, y \geq 0$$

$$8x + 2y \geq 32, x, y \geq 0$$

c) $\text{Max } Z = 80x + 120y$

d) $\text{Min } Z = 40x + 100y$

Subject to, $x + y \leq 9$

Subject to, $12x + 6y \leq 3000$


$$x \geq 2, \quad y \geq 3,$$

$$4x + 10y \leq 900$$

$$6x + 5y \leq 60 \quad x, y \geq 0$$

$$2x + 3y \leq 900 \quad x, y \geq 0$$




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Assignment No.1

Que.1) Find the initial basic feasible solution of the following transportation problem by North West Corner Method. Is this solution optimal? If not find an optimal solution. (CO1, PO1, PO2)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	7	3	8	6	60
O ₂	4	2	5	10	100
O ₃	2	6	5	1	40
Demand	20	50	50	80	

Que.2) Find the initial basic feasible solution of the following transportation problem by North West Corner Method. Is this solution optimal? If not find an optimal solution. (CO1, CO2, PO2, PO3)

	I	II	III	Supply
A	16	20	12	200
B	14	8	18	160
C	26	24	16	90
Demand	180	120	150	

Que.3) Find the IBFS for the following transportation problem by matrix minima Method. (CO2, CO3, PO2, PO3, PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	2	4	1	3	200
O ₂	2	2	1	4	250
Demand	150	75	200	100	

Ques.4) Find the IBFS for the following transportation problem by matrix minima Method. (CO2, CO3, PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
	1	2	1	4	30
	3	3	2	1	50
	4	2	5	9	20
Demand	20	40	30	10	

Que.5) Find IBFS for the following T.P. using VAM. Also find the optimal solution by MODI Method. (CO2, CO3, PO4)

Origin	D ₁	D ₂	D ₃	Supply
O ₁	40	70	90	300
O ₂	12	80	30	400
O ₃	60	90	45	200
Demand	300	300	300	



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Que.6) Find IBFS for the following T.P. using VAM. Also find the optimal solution by MODI Method. (CO2, CO3, PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	5	3	6	4	30
O ₂	3	4	7	8	15
O ₃	9	6	5	8	15
Demand	10	25	18	7	

Que.7) Solve the following T.P. by VAM to maximize the profit. (CO2, CO3, PO3, PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	90	90	100	100	200
O ₂	50	70	130	85	100
Demand	75	100	100	30	


Que.8) Solve the following T.P. by VAM to maximize the profit. (CO2, CO3, PO3, PO4)

Origin	D ₁	D ₂	Supply
O ₁	19	17	20
O ₂	8	1	30
O ₃	12	5	40
Demand	35	30	

Que.9) Explain mathematical Formulation of T.P. (CO2, CO3, PO3, PO4)

Que.10) Explain degeneracy in the T.P. How it can be resolved. (CO2, CO3, PO3, PO4)




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Assignment No.3

Que.1 Solve the following assignment problems to maximize the profit
(CO1,CO2,CO3,PO1,PO2)

1)

	A	B	C	D	E
I	30	37	40	28	40
II	40	24	27	21	36
III	40	32	33	30	35
IV	25	38	40	36	36
V	29	32	41	34	39

2)

	M ₁	M ₂	M ₃	M ₄
J ₁	5	7	11	6
J ₂	8	5	9	6
J ₃	4	7	10	7
J ₄	10	4	8	3

3)

	1	2	3	4
I	30	37	40	28
II	40	24	27	21
III	40	32	33	30
IV	25	38	40	36
V	29	32	41	34

4)

	A	B	C	D	E
1	62	78	50	101	82
2	71	84	61	73	59
3	87	92	111	71	81
4	48	64	87	77	80

Que.2) Solve the assignment problems for minimum costs. (CO3,PO2,PO3,PO4)

1)

	M ₁	M ₂	M ₃	M ₄
J ₁	10	10	-	7
J ₂	12	9	7	8
J ₃	14	8	10	-
J ₄	12	7	11	12

2)

	I	II	III	IV	V
A	3	4	10	15	8
B	4	7	15	18	8
C	8	12	20	20	12
D	5	5	8	10	6
E	10	10	15	25	10

3)

	A	B	C
J ₁	470	580	410
J ₂	385	920	740
J ₃	880	550	430



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4) Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows. Determine the optimum assignment schedule.(CO1,CO3,PO3,PO4)

		Job				
		1	2	3	4	5
Person	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

5) Solve the following assignment problem. (CO1, CO2, CO3, PO3, PO4)

		Men		
		1	2	3
Task	P	9	26	15
	Q	13	27	6
	R	35	20	15
	S	18	30	20

6) Mathematical representation of Assignment problem. (CO1, PO1, PO4)

7) Explain Hungarian Method to solve Assignment problem. (CO1, PO1, PO4)

MCQ QUESTIONS: (CO1, PO1, PO4)

- If the number of rows and columns in an assignment problem are not equal than it is called problem. (a) Prohibited (b) infeasible (c) unbounded (d) unbalanced
- The method of solution of assignment problems is called method.
(a) NWCR (b) VAM (c) LCM (d) Hungarian
- When a maximization assignment problem is converted in minimization problem, the resulting matrix is called (a) Cost matrix (b) Profit matrix (c) Regret matrix (d) Dummy matrix
- The extra row or column which is added to balance an assignment problem is called
(a) Regret (b) epsilon (c) dummy (d) extra
- When a particular assignment in the given problem is not possible or restricted as a condition, it is called a problem.
(a) Infeasible (b) degenerate (c) unbalanced (d) prohibited
- If in an assignment problem, number of rows is not equal to number of columns then
(a) Problem is degenerate (b) Problem is unbalanced (c) It is a maximization problem (d) Optimal solution is not possible



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Class : S.Y.B.Sc. (Computer Science) Sem:IV	Academic Year: 2022-23
Subject: MTC-242 OPERATION RESEARCH	Internal Evaluation Record


Roll No.	Seat No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int.Test Score (15)	Best of 2 (15)	
SBCS003	3385	ADMANE GAYATRI YASHODHAN	<i>Gayatri</i>	11	<i>Gayatri</i>	6	11	<i>Gayatri</i>
SBCS101	3386	PALAVE ANJALI SIDDHESHWAR	<i>Anjali</i>	12	<i>Anjali</i>	9	12	<i>Anjali</i>
SBCS071	3387	KOLHAPURE ASHISH SHRIDHAR	<i>Ashish</i>	12	<i>Ashish</i>	12	12	<i>Ashish</i>
SBCS070	3388	KEDARI ATHARVA AMAR	<i>Amar</i>	13	<i>Amar</i>	13	13	<i>Amar</i>
SBCS011	3389	BATHE ATHARVA RAVINDRA	<i>Atharva</i>	13	<i>Atharva</i>	13	13	<i>Atharva</i>
SBCS009	3390	BANSOD ADITI BHARAT	<i>Aditi</i>	13	<i>Aditi</i>	13	13	<i>Aditi</i>
SBCS012	3391	BEKE MANAS DHANANJAY	<i>Manas</i>	13	<i>Manas</i>	12	13	<i>Manas</i>
SBCS013	3392	BHAGAT SWARAJ SACHIN	<i>Swaraj</i>	13	<i>Swaraj</i>	13	13	<i>Swaraj</i>
SBCS018	3393	BODHANI SOHAM RAHUL	<i>Soham</i>	13	<i>Soham</i>	9	13	<i>Soham</i>
SBCS022	3394	CHHALLARE YUGANDHARA HARSHAD	<i>Harshad</i>	12	<i>Harshad</i>	12	12	<i>Harshad</i>
SBCS028	3395	DESHPANDE ATHARV MORESHWAR	<i>Atharv</i>	11	<i>Atharv</i>	6	11	<i>Atharv</i>
SBCS030	3396	DEVKATE CHAITRALI ABASAHEB	<i>Chaitrali</i>	12	<i>Chaitrali</i>	11	12	<i>Chaitrali</i>
SBCS031	3397	DHUMAL PRIYARAJ AJIT	<i>Priyarak</i>	11	<i>Priyarak</i>	10	11	<i>Priyarak</i>
SBCS129	3398	DHUME KOMAL DHANANJAY	<i>Komal</i>	12	<i>Komal</i>	12	12	<i>Komal</i>
SBCS032	3399	FALKE KAUSHAL SANTOSH	<i>Kaushal</i>	12	<i>Kaushal</i>	10	12	<i>Kaushal</i>
SBCS034	3400	GANGAPURKAR RIDDHI ASHISH	<i>Riddhi</i>	12	<i>Riddhi</i>	11	12	<i>Riddhi</i>
SBCS036	3401	GAVALI ARYA PRASHANT	<i>Prashant</i>	13	<i>Prashant</i>	13	13	<i>Prashant</i>
SBCS137	3402	GHATE SANSKAR RAMDAS	<i>Sanskar</i>	13	<i>Sanskar</i>	12	13	<i>Sanskar</i>
SBCS037	3403	GHORPADE RAJ YOGESH	<i>Raj</i>	12	<i>Raj</i>	12	12	<i>Raj</i>
SBCS038	3404	GODBOLE PRUTHI RAHUL	<i>Pruthi</i>	12	<i>Pruthi</i>	12	12	<i>Pruthi</i>
SBCS039	3405	GOGAWALE RUTUJA RAJENDRA	<i>Rutuja</i>	12	<i>Rutuja</i>	12	12	<i>Rutuja</i>
SBCS040	3406	GUGALE SHREYA RAJU	<i>Shreya</i>	13	<i>Shreya</i>	12	13	<i>Shreya</i>
SBCS041	3407	GUNDA NITESH GUNDA	<i>Nitesh</i>	12	<i>Nitesh</i>	12	12	<i>Nitesh</i>
SBCS042	3408	GURAV PARTH DATTATRAY	<i>Parth</i>	12	<i>Parth</i>	12	12	<i>Parth</i>
SBCS043	3409	HARER ANISH ARVIND	<i>Anish</i>	12	<i>Anish</i>	12	12	<i>Anish</i>
SBCS045	3410	INGALE SIDDHI RAJESH	<i>Siddhi</i>	12	<i>Siddhi</i>	11	12	<i>Siddhi</i>
SBCS047	3411	JADHAV AJAY KISHOR	<i>Ajay</i>	11	<i>Ajay</i>	8	11	<i>Ajay</i>
SBCS050	3412	JADHAV KARAN ANIL	<i>Karan</i>	12	<i>Karan</i>	11	12	<i>Karan</i>
SBCS055	3413	JANGAM MAKARAND MANOJ	<i>Makarand</i>	12	<i>Makarand</i>	10	12	<i>Makarand</i>
SBCS057	3414	JOGAWADE ADITYA SUJIT	<i>Aditya</i>	11	<i>Aditya</i>	10	11	<i>Aditya</i>
SBCS060	3415	KADU SIDDHANT SANJAY	<i>Siddhant</i>	12	<i>Siddhant</i>	9	12	<i>Siddhant</i>
SBCS062	3416	KALYANKAR SUYASH SUDHEER	<i>Suyash</i>	12	<i>Suyash</i>	12	12	<i>Suyash</i>
SBCS064	3417	KAMTHE ANURAG PURUSHOTTAM	<i>Anurag</i>	12	<i>Anurag</i>	12	12	<i>Anurag</i>
SBCS065	3418	KANDHARE AYUSH HANUMANT	<i>Ayush</i>	12	<i>Ayush</i>	11	12	<i>Ayush</i>
SBCS066	3419	KARALE ARYA KAILAS	<i>Arya</i>	12	<i>Arya</i>	11	12	<i>Arya</i>
SBCS067	3420	KARANDE SUSHANT SANJAY	<i>Sushant</i>	13	<i>Sushant</i>	13	13	<i>Sushant</i>
SBCS068	3421	KASBE YASH RAJESH	<i>Yash</i>	13	<i>Yash</i>	13	13	<i>Yash</i>
SBCS145	3422	VISPUTE KAUSTUBH MOHAN	<i>Kaustubh</i>	12	<i>Kaustubh</i>	11	12	<i>Kaustubh</i>
SBCS072	3423	KUBADE SAHIL VINAYAK	<i>Sahil</i>	12	<i>Sahil</i>	12	12	<i>Sahil</i>
SBCS077	3424	LOKHANDE AKANKSHA RAMCHANDRA	<i>Akanksha</i>	12	<i>Akanksha</i>	8	12	<i>Akanksha</i>
SBCS078	3425	MADANE PRASHANT SOPAN	<i>Prashant</i>	12	<i>Prashant</i>	12	12	<i>Prashant</i>
SBCS079	3426	MALI ADITYA DIPAK	<i>Aditya</i>	12	<i>Aditya</i>	9	12	<i>Aditya</i>
SBCS081	3427	MANDAL BIPIN DEEPAK	<i>Bipin</i>	12	<i>Bipin</i>	11	12	<i>Bipin</i>
SBCS082	3428	MANDHARE PRATIK VIJAY	<i>Pratik</i>	12	<i>Pratik</i>	10	12	<i>Pratik</i>
SBCS084	3429	MARATHE SHRUTIKA VASANT	<i>Shrutika</i>	12	<i>Shrutika</i>	11	12	<i>Shrutika</i>
SBCS085	3430	MORE ADITYA SATISH	<i>Aditya</i>	12	<i>Aditya</i>	10	12	<i>Aditya</i>
SBCS087	3431	MUSALE NISHA EKNATH	<i>Nisha</i>	12	<i>Nisha</i>	12	12	<i>Nisha</i>
SBCS088	3432	NAGARKAR SHREYAS SHRINIWAS	<i>Shreyas</i>	12	<i>Shreyas</i>	7	12	<i>Shreyas</i>
SBCS089	3433	NAIK ISHWARI NANDLAL	<i>Ishwari</i>	12	<i>Ishwari</i>	7	12	<i>Ishwari</i>
SBCS090	3434	NAIR RITIN VIJAY	<i>Ritin</i>	12	<i>Ritin</i>	12	12	<i>Ritin</i>
SBCS093	3435	NIGADE SHWETA GOPAL	<i>Shweta</i>	13	<i>Shweta</i>	12	13	<i>Shweta</i>
SBCS094	3436	NILEE LALIT AMAR	<i>Lalith</i>	11	<i>Lalith</i>	8	11	<i>Lalith</i>
SBCS095	3437	NIRGUN SAKSHI PRATAP	<i>Sakshi</i>	12	<i>Sakshi</i>	10	12	<i>Sakshi</i>
SBCS096	3438	NIVANGUNE SIDDHI RAMDAS	<i>Siddhi</i>	12	<i>Siddhi</i>	9	12	<i>Siddhi</i>
SBCS051	3439	JADHAV OMKAR DEEPAK	<i>Omkar</i>	11	<i>Omkar</i>	9	11	<i>Omkar</i>



SBCS103	3440	PARTE ABHIRAJ GANESH	3parte	12	3parte	12	12	3parte
SBCS104	3441	PATEL JUNAID JALIL	Junaid	12	Junaid	12	12	Junaid
SBCS107	3442	PATIL PRANJAL GIRISH	Pranjal	12	Pranjal	9	12	Pranjal
SBCS108	3443	PATIL SHRAVANI SANTOSH	Shravani	12	Shravani	9	12	Shravani
SBCS130	3444	SNEHAL AMOL PISAL	Snehal	12	Snehal	11	12	Snehal
SBCS113	3445	PURANDARE MAYUR MANOJ	mayur	12	mayur	12	12	mayur
SBCS114	3446	RAJE NIRAJ ANIL	Niraj	13	Niraj	12	13	Niraj
SBCS115	3447	RASKAR NEEL PANDURANG		12		12	12	
SBCS080	3448	MALPOTE SAKSHI SANTOSH	sakshi	13	sakshi	11	13	sakshi
SBCS116	3449	SALUNKE VAISHNAVI VITTHAL		12		12	12	
SBCS117	3450	SALVE YASH DAULAT	Yash	10	Yash	4	10	Yash
SBCS121	3451	SHAIKH AMAN ABID	Aman	12	Aman	12	12	Aman
SBCS122	3452	SHAIKH ARBAJ SIRAJ	Arba	12	Arba	11	12	Arba
SBCS124	3453	SHENDGE SAGARIKA MARUTI	Sagari	12	Sagari	9	12	Sagari
SBCS126	3454	SHINDE AISHWARYA MAHENDRA	Shinde	12	Shinde	9	12	Shinde
SBCS127	3455	SHINDE MANSEE SHASHIKANT		12		10	12	
SBCS128	3456	SHINDE SAMEER SAKHARAM	Shinde	12	Shinde	12	12	Shinde
SBCS110	3457	PILAWARE SHRUTI BALASAHEB	Shruti	12	Shruti	11	12	Shruti
SBCS123	3458	SHELAR SOHAN RAJENDRA	Sohan	12	Sohan	11	12	Sohan
SBCS131	3459	SOMAN YUVRAJ RAMCHANDRA	Yuvraj	9	Yuvraj	AB	9	Yuvraj
SBCS132	3460	SONAWANE SHREYA ANIL	Shreya	13	Shreya	9	13	Shreya
SBCS133	3461	SUKHDEVE SHREYASH ARVIND	Shreyon	13	Shreyon	13	13	Shreyon
SBCS134	3462	SULAKHE PRATHMESH RAVINDRA		12		8	12	
SBCS023	3463	CHOUDHARI SUMIT SANJAY	Sumit	12	Sumit	12	12	Sumit
SBCS135	3464	SUPEKAR AKSHADA KALIDAS	Aksh	13	Aksh	13	13	Aksh
SBCS111	3465	PISAL SUYASH SUBHASH	Suyash	12	Suyash	10	12	Suyash
SBCS002	3466	ADAGALE SWAPNIL RAVINDRA	Swapnil	10	Swapnil	10	10	Swapnil
SBCS138	3467	TAKAWALE SAKSHI SANJAY	Sakshi	13	Sakshi	13	13	Sakshi
SBCS139	3468	TAWDE AKANKSHA PANDURANG	Akank	12	Akank	11	12	Akank
SBCS140	3469	TEKE PARTH PRASHANT	Parth	13	Parth	13	13	Parth
SBCS141	3470	THORAT SAKSHI KIRAN	Sakshi	12	Sakshi	9	12	Sakshi
SBCS142	3471	THORAT SRUSHTI SUNIL	Srushti	12	Srushti	12	12	Srushti
SBCS020	3472	BRAMHE UTKARSH PRAKASH	Utkarsh	12	Utkarsh	12	12	Utkarsh
SBCS021	3473	CHAVAN VAISHNAVI JAGANNATH	Chavan	12	Chavan	12	12	Chavan
SBCS143	3474	VANARASE AMOD AVINASH	Amod	12	Amod	9	12	Amod
SBCS144	3475	VAWAL SIDDHI SACHIN	Siddhi	12	Siddhi	11	12	Siddhi
SBCS149	3476	YADAV ATHARVA VIJAY	Atharva	12	Atharva	12	12	Atharva
SBCS004	3477	AINAPURE ARYA HEMANT	Arya	11	Arya	5	11	Arya
SBCS005	3478	ANDE RUCHITA AVINASH	Ruchita	13	Ruchita	13	13	Ruchita
SBCS044	3479	HUNDA ANILNATH TEJANATH	Anil	12	Anil	11	12	Anil
SBCS063	3480	KAMBLE ATHARVA ANIL	Atharva	14	Atharva	12	14	Atharva
SBCS017	3481	BHOSALE ATHARVA BHARAT	Atharva	13	Atharva	13	13	Atharva
SBCS007	3482	BADADE NEHA SUNIL	Badade	13	Badade	13	13	Badade
SBCS008	3483	BANDAL SIDDHESH SANTOSH	Siddhesh	13	Siddhesh	13	13	Siddhesh
SBCS010	3484	BARGIR ATHARV SUNIL	Atharv	13	Atharv	13	13	Atharv
SBCS006	3485	BARVE PRACHI ANAND	Prachi	14	Prachi	14	14	Prachi
SBCS014	3486	BHAGWAT RUTUJA RAMKISAN	Bhagwat	12	Bhagwat	12	12	Bhagwat
SBCS015	3487	BHIVARE MOHIT HANUMANT	Mohit	13	Mohit	13	13	Mohit
SBCS016	3488	BHORADE VAISHNAVI VITTHAL	Bhormade	13	Bhormade	13	13	Bhormade
SBCS019	3489	BORADE YASH NILESH	Yash	12	Yash	12	12	Yash
SBCS025	3490	DANGI MAHENDRA MAHAVIR	Mahend	13	Mahend	12	13	Mahend
SBCS026	3491	DANVE PRANITA ANIL	Pranita	12	Pranita	11	12	Pranita
SBCS027	3492	DESHMUKH HARSHADA VIDYADHAR		13		9	13	
SBCS029	3493	DESHPANDE MEGHANA UMESH	Meghna	12	Meghna	10	12	Meghna
SBCS033	3494	GAIKWAD DARSHANA ANIL	Darshana	12	Darshana	12	12	Darshana
SBCS035	3495	GAVADE NIKITA SURESH	Nikita	13	Nikita	13	13	Nikita
SBCS046	3496	JADHAV AARYA AVINASH	Aaryav	12	Aaryav	11	12	Aaryav
SBCS048	3497	JADHAV AMAR VITTHAL	Amar	12	Amar	11	12	Amar
SBCS049	3498	JADHAV ANIKET TATYA	Aniket	12	Aniket	10	12	Aniket
SBCS053	3499	JADHAV VISHAL VIJAY	Vishal	12	Vishal	11	12	Vishal
SBCS054	3500	JAGDALE DHIRAJ VUJAY	Dhiraj	12	Dhiraj	12	12	Dhiraj
SBCS056	3501	JEDHE ATHARVA SHANKAR	A.S. Jedhe	12	A.S. Jedhe	10	12	A.S. Jedhe
SBCS058	3502	JOSHI SANJANA SANDEEP	Sanjana	14	Sanjana	13	14	Sanjana
SBCS059	3503	KADAM KARAN KAILAS	Kadam	12	Kadam	11	12	Kadam
SBCS061	3504	KAGADE DHAIYASHIL KALYANRAO	Dhishil	12	Dhishil	12	12	Dhishil
SBCS069	3505	KATARE DISHA DINESH	Disha	13	Disha	13	13	Disha
SBCS148	3506	WAGHRESHA KRISH DEVENDRA	Krish	13	Krish	12	13	Krish

SBCS073	3507	KUDAL GAYATRI ASHOK	Gayatri	12	Gayatri	12	12	Gayatri
SBCS074	3508	KUKKAR KHUSHI RAVINDRA	Khushi	13	Khushi	12	13	Khushi
SBCS075	3509	KULKARNI SHUBHANKAR ASHISH	Shubhankar	11	Shubhankar	11	11	Shubhankar
SBCS083	3510	MANDHARE YASH POPAT	Yash	12	Yash	11	12	Yash
SBCS086	3511	MORE DEVYANI SANJAY	Devi	13	Devi	13	13	Devi
SBCS091	3512	NANGUDE PIYUSHA PRAVIN	Piyusha	12	Piyusha	12	12	Piyusha
SBCS092	3513	NIGADE PAVAN SANDIP	Pavande	12	Pavande	11	12	Pavande
SBCS097	3514	PACHPUTE RUTUJA SANTOSH	Rutuja	12	Rutuja	11	12	Rutuja
SBCS098	3515	PADITKAR PRATIK CHANDRAHAS	Pratik	13	Pratik	11	13	Pratik
SBCS099	3516	PADRAT SAYALI SUNIL	Sayali	12	Sayali	12	12	Sayali
SBCS100	3517	PAIGUDE AASHISH RAHUL	Aashish	12	Aashish	11	12	Aashish
SBCS102	3518	PANDE AKANKSHA AVINASH	Akanksha	13	Akanksha	12	13	Akanksha
SBCS105	3519	PATIL MOHINI NITIN	Mohini	13	Mohini	11	13	Mohini
SBCS106	3520	PATIL PRAJYOT PRAVIN	P. Patil	12	P. Patil	10	12	P. Patil
SBCS001	3521	PEERJADE MOHAMMAD SAAD ABDULRAUF	Peerj	12	Peerj	10	12	Peerj
SBCS109	3522	PETHSANGAVIKAR ANISHA BALASAHEB	Anisha	13	Anisha	9	13	Anisha
SBCS112	3523	PORE TANVI SAMEER	Tanvi	13	Tanvi	11	13	Tanvi
SBCS076	3524	KUSEKAR SAKSHI VIJAY	Sakshi	13	Sakshi	11	13	Sakshi
SBCS147	3525	WAGHMARE SALOMI VISHWAS	Salomi	12	Salomi	11	12	Salomi
SBCS136	3526	SUTAR SANIL KISAN	Sanil	12	Sanil	12	12	Sanil
SBCS118	3527	SANKLECHA VIVA PRAVIN	Viva	13	Viva	13	13	Viva
SBCS119	3528	SARPALE SIDDHI SANTOSH	Siddhi	14	Siddhi	14	14	Siddhi
SBCS120	3529	SASTE AJINKYA MANGESH	Ajinkya	13	Ajinkya	13	13	Ajinkya
SBCS125	3530	SHILIMKAR ROHAN RAJAN	Rohankar	12	Rohankar	9	12	Rohankar
SBCS024	3531	DABKE SWARAJ SAMEER	SD	12	SD	10	12	SD
SBCS052	3532	JADHAV TANMAY SUBHASH	Tanmay	12	Tanmay	10	12	Tanmay
SBCS146	3533	WAGHMARE EKTA DEEPAK	Ekta	12	Ekta	10	12	Ekta
SBCS150	3534	YADAV YASH SANTAJI	Yash	12	Yash	12	12	Yash
SBCS151	3535	YANDE SAMRUDDHI SANDIP	Samruddhi	13	Samruddhi	13	13	Samruddhi
SBCS152	3536	YELBHAR SHRAVANI ANIL	Shravani	14	Shravani	13	14	Shravani
SBCS153	3537	ZAMBRE JANHAVI PRASHANT	Janhavi	12	Janhavi	10	12	Janhavi
Mohini Pardeshi			Pardeshi					
Name of Subject Teacher			Signature Of Subject Teacher					




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Class : S.Y.B.Sc. (Computer Science) Sem:IV
Subject: MTC241 - Computational Geometry

Academic Year: 2022-23
Internal Evaluation Record

Roll No.	Seat No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	
SBCS003	3385	ADMANE GAYATRI YASHODHAN	Gayatri	10	Gayatri	6	10	Gayatri
SBCS101	3386	PALAVE ANJALI SIDDHESHWAR	Anjali	11	Anjali	10	11	Anjali
SBCS071	3387	KOLHAPURE ASHISH SHRIDHAR	Ashish	12	Ashish	11	12	Ashish
SBCS070	3388	KEDARI ATHARVA AMAR	Atharva	11	Atharva	11	11	Atharva
SBCS011	3389	BATHE ATHARVA RAVINDRA	Atharva	14	Atharva	14	14	Atharva
SBCS009	3390	BANSOD ADITI BHARAT	Aditi	14	Aditi	14	14	Aditi
SBCS012	3391	BEKE MANAS DHANANJAY	Manas	14	Manas	13	14	Manas
SBCS013	3392	BHAGAT SWARAJ SACHIN	Swaraj	12	Swaraj	13	13	Swaraj
SBCS018	3393	BODHANI SOHAM RAHUL	Soham	10	Soham	9	10	Soham
SBCS022	3394	CHHALLARE YUGANDHARA HARSHAD	Yugandhara	11	Yugandhara	9	11	Yugandhara
SBCS028	3395	DESHPANDE ATHARV MORESHWAR	Atharv	10	Atharv	6	10	Atharv
SBCS030	3396	DEVKATE CHAITRALI ABASAHEB	Chaitrali	11	Chaitrali	9	11	Chaitrali
SBCS031	3397	DHUMAL PRIYARAJ AJIT	Priyarak	10	Priyarak	9	10	Priyarak
SBCS129	3398	DHUME KOMAL DHANANJAY	Komal	12	Komal	8	12	Komal
SBCS032	3399	FALKE KAUSHAL SANTOSH	Kaushal	10	Kaushal	9	10	Kaushal
SBCS034	3400	GANGAPURKAR RIDDHI ASHISH	Riddhi	14	Riddhi	14	14	Riddhi
SBCS036	3401	GAVALI ARYA PRASHANT	Arya	14	Arya	14	14	Arya
SBCS137	3402	GHATE SANSKAR RAMDAS	Sanskar	10	Sanskar	12	12	Sanskar
SBCS037	3403	GHORPADE RAJ YOGESH	Raj	14	Raj	14	14	Raj
SBCS038	3404	GODBOLE PRUTHI RAHUL	Pruthi	14	Pruthi	15	15	Pruthi
SBCS039	3405	GOGAWALE RUTUJA RAJENDRA	Rutuja	14	Rutuja	14	14	Rutuja
SBCS040	3406	GUGALE SHREYA RAJU	Shreya	14	Shreya	14	14	Shreya
SBCS041	3407	GUNDA NITESH GUNDA	Nitesh	12	Nitesh	14	14	Nitesh
SBCS042	3408	GURAV PARTH DATTATRAY	Parth	11	Parth	13	13	Parth
SBCS043	3409	HARER ANISH ARVIND	Anish	11	Anish	13	13	Anish
SBCS045	3410	INGALE SIDDHI RAJESH	Siddhi	11	Siddhi	9	11	Siddhi
SBCS047	3411	JADHAV AJAY KISHOR	Ajay	10	Ajay	6	10	Ajay
SBCS050	3412	JADHAV KARAN ANIL	Karan	11	Karan	11	11	Karan
SBCS055	3413	JANGAM MAKARAND MANOJ	Makarand	11	Makarand	11	11	Makarand
SBCS057	3414	JOGAWADE ADITYA SUJIT	Aditya	11	Aditya	11	11	Aditya
SBCS060	3415	KADU SIDDHANT SANJAY	Siddhant	11	Siddhant	11	11	Siddhant
SBCS062	3416	KALYANKAR SUYASH SUDHEER	Suyash	12	Suyash	14	14	Suyash
SBCS064	3417	KAMTHE ANURAG PURUSHOTTAM	Anurag	12	Anurag	14	14	Anurag
SBCS065	3418	KANDHARE AYUSH HANUMANT	Ayush	12	Ayush	14	14	Ayush
SBCS066	3419	KARALE ARYA KAILAS	Arya	12	Arya	6	12	Arya
SBCS067	3420	KARANDE SUSHANT SANJAY	Sushant	12	Sushant	9	12	Sushant
SBCS068	3421	KASBE YASH RAJESH	Yash	11	Yash	11	11	Yash
SBCS145	3422	VISPUTE KAUSTUBH MOHAN	Kaustubh	11	Kaustubh	10	11	Kaustubh
SBCS072	3423	KUBADE SAHIL VINAYAK	Sahil	12	Sahil	11	12	Sahil
SBCS077	3424	LOKHANDE AKANKSHA RAMCHANDRA	Akanksha	12	Akanksha	7	12	Akanksha
SBCS078	3425	MADANE PRASHANT SOPAN	Prashant	11	Prashant	11	11	Prashant
SBCS079	3426	MALI ADITYA DIPAK	Aditya	11	Aditya	7	11	Aditya
SBCS081	3427	MANDAL BIPIN DEEPAK	Bipin	10	Bipin	11	11	Bipin
SBCS082	3428	MANDHARE PRATIK VIJAY	Pratik	12	Pratik	6	12	Pratik
SBCS084	3429	MARATHE SHRUTIKA VASANT	Shrutika	10	Shrutika	8	10	Shrutika
SBCS085	3430	MORE ADITYA SATISH	Aditya	10	Aditya	7	10	Aditya
SBCS087	3431	MUSALE NISHA EKNATH	Nisha	10	Nisha	6	10	Nisha
SBCS088	3432	NAGARKAR SHREYAS SHRINIWAS	Shreyas	10	Shreyas	4	10	Shreyas
SBCS089	3433	NAIK ISHWARI NANDLAL	Ishwari	10	Ishwari	7	10	Ishwari
SBCS090	3434	NAIR RITIN VIJAY	Ritin	10	Ritin	11	11	Ritin
SBCS093	3435	NIGADE SHWETA GOPAL	Shweta	10	Shweta	7	10	Shweta
SBCS094	3436	NILEE LALIT AMAR	Lalit	10	Lalit	8	10	Lalit
SBCS095	3437	NIRGUN SAKSHI PRATAP	Sakshi	10	Sakshi	10	10	Sakshi
SBCS096	3438	NIVANGUNE SIDDHI RAMDAS	Siddhi	11	Siddhi	9	11	Siddhi
SBCS051	3439	JADHAV OMKAR DEEPAK	Omkar	11	Omkar	11	11	Omkar
SBCS103	3440	PARTE ABHIRAJ GANESH	Abhiraj	11	Abhiraj	12	12	Abhiraj



Roll No.	Seat No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	
SBCS104	3441	PATEL JUNAID JALIL	Junaid	11	Junaid	12	12	Junaid
SBCS107	3442	PATIL PRANJAL GIRISH	Pranjal	10	Pranjal	9	10	Pranjal
SBCS108	3443	PATIL SHRAVANI SANTOSH	Shravani	11	Shravani	10	11	Shravani
SBCS130	3444	SNEHAL AMOL PISAL	Snehal	12	Snehal	5	12	Snehal
SBCS113	3445	PURANDARE MAYUR MANOJ	Mayur	11	Mayur	8	11	Mayur
SBCS114	3446	RAJE NIRAJ ANIL	Niraj	12	Niraj	11	12	Niraj
SBCS115	3447	RASKAR NEEL PANDURANG	Neel	10	Neel	11	11	Neel
SBCS080	3448	MALPOTE SAKSHI SANTOSH	Sakshi	11	Sakshi	10	11	Sakshi
SBCS116	3449	SALUNKE VAISHNAVI VITTHAL	Salunke	11	Salunke	10	11	Salunke
SBCS117	3450	SALVE YASH DAULAT	Salve	8	Salve	1	8	Salve
SBCS121	3451	SHAIKH AMAN ABID	Aman	11	Aman	11	11	Aman
SBCS122	3452	SHAIKH ARBAJ SIRAJ	Arbaj	11	Arbaj	11	11	Arbaj
SBCS124	3453	SHENDGE SAGARIKA MARUTI	Sagatika	11	Sagatika	10	11	Sagatika
SBCS126	3454	SHINDE AISHWARYA MAHENDRA	Aishwarya	11	Aishwarya	10	11	Aishwarya
SBCS127	3455	SHINDE MANSEE SHASHIKANT	Mansee	13	Mansee	13	13	Mansee
SBCS128	3456	SHINDE SAMEER SAKHARAM	Shinde	11	Shinde	12	12	Shinde
SBCS110	3457	PILAWARE SHRUTI BALASAHEB	Shruti	14	Shruti	10	14	Shruti
SBCS123	3458	SHELAR SOHAN RAJENDRA	Sohan	11	Sohan	10	11	Sohan
SBCS131	3459	SOMAN YUVRAJ RAMCHANDRA	Yuvraj	8	Yuvraj	AB	8	Yuvraj
SBCS132	3460	SONAWANE SHREYA ANIL	Shreya	10	Shreya	6	10	Shreya
SBCS133	3461	SUKHDEVE SHREYASH ARVIND	Shreyash	10	Shreyash	8	10	Shreyash
SBCS134	3462	SULAKHE PRATHMESH RAVINDRA	Prathmesh	10	Prathmesh	10	10	Prathmesh
SBCS023	3463	CHOUDHARI SUMIT SANJAY	Sumit	10	Sumit	8	10	Sumit
SBCS135	3464	SUPEKAR AKSHADA KALIDAS	Akshada	10	Akshada	12	12	Akshada
SBCS111	3465	PISAL SUYASH SUBHASH	Suyash	10	Suyash	7	10	Suyash
SBCS002	3466	ADAGALE SWAPNIL RAVINDRA	Swapnil	10	Swapnil	7	10	Swapnil
SBCS138	3467	TAKAWALE SAKSHI SANJAY	Sakshi	10	Sakshi	12	12	Sakshi
SBCS139	3468	TAWDE AKANKSHA PANDURANG	Akanksha	10	Akanksha	12	12	Akanksha
SBCS140	3469	TEKE PARTH PRASHANT	Parth	10	Parth	12	12	Parth
SBCS141	3470	THORAT SAKSHI KIRAN	Sakshi	10	Sakshi	12	12	Sakshi
SBCS142	3471	THORAT SRUSHTI SUNIL	Srushti	10	Srushti	12	12	Srushti
SBCS020	3472	BRAMHE UTKARSH PRAKASH	Utkarsh	12	Utkarsh	8	12	Utkarsh
SBCS021	3473	CHAVAN VAISHNAVI JAGANNATH	Chavan	11	Chavan	8	11	Chavan
SBCS143	3474	VANARASE AMOD AVINASH	Amod	11	Amod	8	11	Amod
SBCS144	3475	VAWAL SIDDHI SACHIN	Siddhi	12	Siddhi	11	12	Siddhi
SBCS149	3476	YADAV ATHARVA VIJAY	Atharva	12	Atharva	12	12	Atharva
SBCS004	3477	AINAPURE ARYA HEMANT	Arya	10	Arya	3	10	Arya
SBCS005	3478	ANDE RUCHITA AVINASH	Ruchita	10	Ruchita	9	10	Ruchita
SBCS044	3479	HUNDA ANILNATH TEJANATH	Anilnath	11	Anilnath	12	12	Anilnath
SBCS063	3480	KAMBLE ATHARVA ANIL	Atharva	12	Atharva	14	14	Atharva
SBCS017	3481	BHOSALE ATHARVA BHARAT	Atharva	10	Atharva	10	10	Atharva
SBCS007	3482	BADADE NEHA SUNIL	Neha	14	Neha	13	14	Neha
SBCS008	3483	BANDAL SIDDHESH SANTOSH	Siddhesh	12	Siddhesh	13	13	Siddhesh
SBCS010	3484	BARGIR ATHARV SUNIL	Atharv	14	Atharv	14	14	Atharv
SBCS006	3485	BARVE PRACHI ANAND	Prachi	10	Prachi	9	10	Prachi
SBCS014	3486	BHAGWAT RUTUJA RAMKISAN	Rutuja	14	Rutuja	11	14	Rutuja
SBCS015	3487	BHIVARE MOHIT HANUMANT	Mohit	10	Mohit	11	11	Mohit
SBCS016	3488	BHORADE VAISHNAVI VITTHAL	Bhorade	13	Bhorade	11	13	Bhorade
SBCS019	3489	BORADE YASH NILESH	Yash	12	Yash	8	12	Yash
SBCS025	3490	DANGI MAHENDRA MAHAVIR	Mahendra	13	Mahendra	12	13	Mahendra
SBCS026	3491	DANVE PRANITA ANIL	Pranita	11	Pranita	11	11	Pranita
SBCS027	3492	DESHMUKH HARSHADA VIDYADHAR	Harshada	12	Harshada	10	12	Harshada
SBCS029	3493	DESHPANDE MEGHANA UMESH	Meghana	12	Meghana	9	12	Meghana
SBCS033	3494	GAIKWAD DARSHANA ANIL	Darshana	12	Darshana	12	12	Darshana
SBCS035	3495	GAVADE NIKITA SURESH	Nikita	12	Nikita	13	13	Nikita
SBCS046	3496	JADHAV AARYA AVINASH	Aaryav	10	Aaryav	7	10	Aaryav
SBCS048	3497	JADHAV AMAR VITTHAL	Amar	11	Amar	11	11	Amar
SBCS049	3498	JADHAV ANIKET TATYA	Aniket	11	Aniket	11	11	Aniket
SBCS053	3499	JADHAV VISHAL VIJAY	Vishal	11	Vishal	11	11	Vishal
SBCS054	3500	JAGDALE DHIRAJ VIJAY	Dhiraj	11	Dhiraj	12	12	Dhiraj
SBCS056	3501	JEDHE ATHARVA SHANKAR	Atharva	11	Atharva	13	13	Atharva
SBCS058	3502	JOSHI SANJANA SANDEEP	Sanjana	11	Sanjana	14	14	Sanjana
SBCS059	3503	KADAM KARAN KAILAS	Karan	11	Karan	12	12	Karan
SBCS061	3504	KAGADE DHAIRYASHIL KALYANRAO	Dhairya	11	Dhairya	15	15	Dhairya



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Roll No.	Seat No.	Name	Internal Marks (out of 15)					Signature
			Assignment submitted	Assignment (15)	Internal Attendance	Int. Test Score (15)	Best of 2 (15)	
SBCS069	3505	KATARE DISHA DINESH	Disha	12	Disha	12	12	Disha
SBCS148	3506	WAGHRESHA KRISH DEVENDRA	Krish	13	Krish	12	13	Krish
SBCS073	3507	KUDAL GAYATRI ASHOK	Gayatri	12	Gayatri	14	14	Gayatri
SBCS074	3508	KUKKAR KHUSHI RAVINDRA	Khushi	12	Khushi	14	14	Khushi
SBCS075	3509	KULKARNI SHUBHANKAR ASHISH	Shubhankar	12	Shubhankar	14	14	Shubhankar
SBCS083	3510	MANDHARE YASH POPAT	Yash	12	Yash	7	12	Yash
SBCS086	3511	MORE DEVYANI SANJAY	Devyani	10	Devyani	8	10	Devyani
SBCS091	3512	NANGUDE PIYUSHA PRAVIN	Piyusha	10	Piyusha	11	11	Piyusha
SBCS092	3513	NIGADE PAVAN SANDIP	Pavande	10	Pavande	8	10	Pavande
SBCS097	3514	PACHPUTE RUTUJA SANTOSH	Rutuja	11	Rutuja	8	11	Rutuja
SBCS098	3515	PADITKAR PRATIK CHANDRAHAS	Pratik	11	Pratik	9	11	Pratik
SBCS099	3516	PADRAT SAYALI SUNIL	Sayali	11	Sayali	11	11	Sayali
SBCS100	3517	PAIGUDE AASHISH RAHUL	Apaigude	11	Apaigude	11	11	Apaigude
SBCS102	3518	PANDE AKANKSHA AVINASH	Akande	11	Akande	9	11	Akande
SBCS105	3519	PATIL MOHINI NITIN	Mohini	11		11	11	Mohini
SBCS106	3520	PATIL PRAJYOT PRAVIN	P. Patil	11	P. Patil	10	11	P. Patil
SBCS001	3521	PEERJADE MOHAMMAD SAAD ABDULRAUF	Peerj	10	Peerj	8	10	Peerj
SBCS109	3522	PETHSANGAVIKAR ANISHA BALASAHEB	Anisha	13	Anisha	8	13	Anisha
SBCS112	3523	PORE TANVI SAMEER	Tanvi	13	Tanvi	8	13	Tanvi
SBCS076	3524	KUSEKAR SAKSHI VIJAY	Sakshi	11	Sakshi	13	13	Sakshi
SBCS147	3525	WAGHMARE SALOMI VISHWAS	Salomi	11	Salomi	10	11	Salomi
SBCS136	3526	SUTAR SANIL KISAN	Sanika	10	Sanika	12	12	Sanika
SBCS118	3527	SANKLECHA VIVA PRAVIN	Vivans	12	Vivans	10	12	Vivans
SBCS119	3528	SARPALE SIDDHI SANTOSH	Siddhi	12	Siddhi	11	12	Siddhi
SBCS120	3529	SASTE AJINKYA MANGESH	Ajinkya	12	Ajinkya	13	13	Ajinkya
SBCS125	3530	SHILUMKAR ROHAN RAJAN	R. Shilumkar	11	R. Shilumkar	10	11	R. Shilumkar
SBCS024	3531	DABKE SWARAJ SAMEER	SD	11	SD	8	11	SD
SBCS052	3532	JADHAV TANMAY SUBHASH	Tanmay	11	Tanmay	11	11	Tanmay
SBCS146	3533	WAGHMARE EKTA DEEPAK	Ekta	10	Ekta	8	10	Ekta
SBCS150	3534	YADAV YASH SANTAJI	Yash	12	Yash	12	12	Yash
SBCS151	3535	YANDE SAMRUDDHI SANDIP	Samy.	12	Samy.	12	12	Samy.
SBCS152	3536	YELBHAR SHRAVANI ANIL	Shravya	12	Shravya	12	12	Shravya
SBCS153	3537	ZAMBRE JANHAVI PRASHANT	Janavi	11	Janavi	9	11	Janavi
Smita S. Muley Name of Subject Teacher			Signature Of Subject Teacher					



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A.Y.

2022-
23

FYBSC (Computer Science)
Statistics Paper I (Descriptive Statistics) 2022-23

Assignment

Que no 1 Draw histogram, frequency polygon, less than cumulative frequency curve, more than cumulative frequency curve for the following data. (CO1, PO1, PO2)

Marks	0-20	20-40	40-60	60-80	80-100
No of students	2	18	42	28	5

Que no 2 Prepare stem and leaf chart for the following table. (CO1, PO1)
163, 168, 161, 172, 154, 161, 152, 158, 171, 148, 156, 152, 164, 147, 145, 151, 154, 145, 159, 153, 159, 156, 146, 162, 153, 165, 162, 151

Que No 3 Calculate mean, median, mode, Q1, Q2, Q3, variance, Standard deviation for the following data. (CO1, CO2)

Class	0-20	20-40	40-60	60-80	80-100
frequency	3	7	25	20	5

Que no 4 The data of runs scored by player A and B in 5 test matches are shown below. (CO3, CO4, CO5)

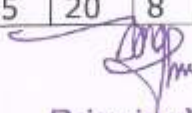
	Player A	Player B
Average	53	45
Standard Deviation	40	16

- Which player is more consistent?
- Which player is better in batting average?

Que no 5 compute the skewness and kurtosis based on the moments for following frequency distribution (CO1, PO2)

X	1	2	3	4	5	6	7
f	2	9	25	35	20	8	1




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P.V.G's College of Science, Pune 9

Class : F.Y.B.Sc. (Computer Science)	Semester:	Academic Year: 2022-23
Subject: <u>Descriptive Statistics</u> (CSST-III)		Internal Evaluation Record

Sr. No.	Roll No.	Name	Internal Evaluation					
			1 Assignme nt submitted	2 Assignme nt (15)	3 Internal Test attendanc e	4 Int. Test Score (15)	5 Best of Two	6 Sign of Student
1	IEBF1	AAKASH PRAVIN PISE	<u>Pise</u>	8	<u>Pise</u>	9	9	<u>Pise</u>
2	IEBF2	ABHIJEET TUKARAM PANGUL	<u>Abhijeet</u>	8	<u>Abhijeet</u>	7	8	<u>Abhijeet</u>
3	IEBF3	ABHILASHA ARJUN MAHTO	<u>A</u>	8	<u>A</u>	12	12	<u>A</u>
4	IEBF4	ABHINAV ACHUTHAN NAIR	<u>Abhy</u>	8	<u>Abhy</u>	11	11	<u>Abhy</u>
5	IEBF5	ABHISHEK MILIND BARGE	<u>Barge</u>	8	<u>Barge</u>	12	12	<u>Barge</u>
6	IEBF6	ADESH SOMNATH PAWAR	<u>Adawar</u>	8	<u>Adawar</u>	13	13	<u>Adawar</u>
7	IEBF7	ADITI MILIND NAIK	<u>A.M.Naik</u>	8	<u>A.M.Naik</u>	7	8	<u>A.M.Naik</u>
8	IEBF8	ADITYA ANAND SAWANT	<u>Sawant</u>	8	<u>Sawant</u>	9	9	<u>Sawant</u>
9	IEBF9	ADITYA DHANAJI SHINDE	<u>Shinde</u>	8	<u>Shinde</u>	10	10	<u>Shinde</u>
10	IEBF10	ADITYA EKNATH DAPHALE	<u>Aditya</u>	8	<u>Aditya</u>	12	12	<u>Aditya</u>
11	IEBF11	ADITYA GANESH BHOJ	<u>Bhoj</u>	8	<u>Bhoj</u>	11	11	<u>Bhoj</u>
12	IEBF12	ADITYA MANOJ KUTE	<u>Aditya</u>	8	<u>Aditya</u>	10	10	<u>Aditya</u>
13	IEBF13	ADITYA NITIN UGHAD	<u>Aditya</u>	8	<u>Aditya</u>	11	11	<u>Aditya</u>
14	IEBF14	ADITYA RAJENDRA POTDAT	<u>Potdat</u>	8	<u>Potdat</u>	10	10	<u>Potdat</u>
15	IEBF15	ADITYA SURESH UJGAONKAR	<u>Aditya</u>	8	<u>Aditya</u>	9	9	<u>Aditya</u>
16	IEBF16	ADITYA VINOD BET	<u>Aditya</u>	8	<u>Aditya</u>	12	12	<u>Aditya</u>
17	IEBF17	AISHWARYA ANIL MANE	<u>Aishwarya</u>	8	<u>Aishwarya</u>	12	12	<u>Aishwarya</u>
18	IEBF18	AKANKSHA CHANDRAKANT KHOSE	<u>Akanksha</u>	8	<u>Akanksha</u>	11	11	<u>Akanksha</u>
19	IEBF19	AKSHAT NISHANT TASKAR	<u>Akshat</u>	8	<u>Akshat</u>	10	10	<u>Akshat</u>
20	IEBF20	AKSHATA ANAND BANSOD	<u>Akshata</u>	8	<u>Akshata</u>	12	12	<u>Akshata</u>
21	IEBF21	AMIR HARUN PANSARE	<u>A.H.P</u>	8	<u>A.H.P</u>	12	12	<u>A.H.P</u>
22	IEBF22	ANISH NILESH PATASKAR	<u>Anish</u>	8	<u>Anish</u>	8	8	<u>Anish</u>
23	IEBF23	ANKITA ANKUSH GHOGARE	<u>Ankita</u>	8	<u>Ankita</u>	13	13	<u>Ankita</u>
24	IEBF24	ANUJ SANTOSH KHATPE	<u>Anukhatpe</u>	8	<u>Anukhatpe</u>	8	8	<u>Anukhatpe</u>
25	IEBF25	APURVA RAJENDRA PAWAR	<u>Apurva</u>	8	<u>Apurva</u>	13	13	<u>Apurva</u>
26	IEBF26	ARNAV GOPI NALAWADE	<u>Arnav</u>	8	<u>Arnav</u>	13	13	<u>Arnav</u>
27	IEBF27	ARYAN HARSHAL VATTURKAR	<u>Aryan</u>	8	<u>Aryan</u>	11	11	<u>Aryan</u>
28	IEBF28	ARYAN SANTOSH MANE	<u>Aryan</u>	8	<u>Aryan</u>	11	11	<u>Aryan</u>
29	IEBF29	ASHUTOSH SANJAY VIBHUTE	<u>A.S.Vibhute</u>	8	<u>A.S.Vibhute</u>	13	13	<u>A.S.Vibhute</u>
30	IEBF30	ATHARVA AVINASH KALE	<u>Atharva</u>	8	<u>Atharva</u>	13	13	<u>Atharva</u>
31	IEBF31	ATHARVA DEEPAK KARPE	<u>Atharva</u>	8	<u>Atharva</u>	12	12	<u>Atharva</u>
32	IEBF32	ATHARVA MANGESH DESHMUKH	<u>Atharva</u>	8	<u>Atharva</u>	12	12	<u>Atharva</u>
33	IEBF33	ATHARVA NILESH GOTAD	<u>Atharva</u>	8	<u>Atharva</u>	12	12	<u>Atharva</u>
34	IEBF34	BHAKTI KIRAN MAPRAKAR	<u>Bhakti</u>	8	<u>Bhakti</u>	11	11	<u>Bhakti</u>



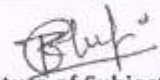
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			1	2	3	4	5	6
79	IEBF79	PRADYUMNA ASHUTOSH DEO	P. Ash	8	P. Ash	12	12	P. Ash
80	IEBF80	PRAGATI MANOJ SHINDE	P. Shinde	8	P. Shinde	11	11	P. Shinde
81	IEBF81	PRANALI RAVINDRA PATIL	P. Patil	8	P. Patil	10	10	P. Patil
82	IEBF82	PRANAV DHANAJI SHINDE	P. S	8	P. S	14	14	P. S
83	IEBF83	PRANAV MHASKU PISAL	P. m. Pisal	8	P. m. Pisal	11	11	P. m. Pisal
84	IEBF84	PRATHAM RAJESH DAVE		Cancelled				
85	IEBF85	PRATHAMESH PRADIP NIBANDHE	P. Nibandhe	8	P. Nibandhe	13	13	P. Nibandhe
86	IEBF86	PRATHMESH RAJU INGOLE	P. Ingole	8	P. Ingole	10	10	P. Ingole
87	IEBF87	PRATIK BABURAO KARANDE	P. Karande	8	P. Karande	13	13	P. Karande
88	IEBF88	PRATIK MAHADEV HOMKAR	P. Homkar	8	P. Homkar	12	12	P. Homkar
89	IEBF89	PRATIKSHA ANIL GADEKAR	P. Gadekar	8	P. Gadekar	11	11	P. Gadekar
90	IEBF90	PRATIKSHA SAGAR VEER	P. Veer	8	P. Veer	11	11	P. Veer
91	IEBF91	PRITAM PRABHAKAR SURYAWANSHI	P. Suryawansi	8	P. Suryawansi	11	11	P. Suryawansi
92	IEBF92	PURVA DHANVAKUMAR BONGALE	P. Bongale	8	P. Bongale	10	10	P. Bongale
93	IEBF93	PUSHKAR PURUSHOTTAM JOSHI	P. Joshi	8	P. Joshi	11	11	P. Joshi
94	IEBF94	RACHANA YASHWANT BADHE	R. Badhe	8	R. Badhe	11	11	R. Badhe
95	IEBF95	RADHIKA SACHIN KALBHOR	R. Kalbhore	8	R. Kalbhore	8	08	R. Kalbhore
96	IEBF96	RIYA MANOJ SHINDE	R. Shinde	8	R. Shinde	9	9	R. Shinde
97	IEBF97	RIYA PANDHARINATH SONAWANE	R. Sonawane		R. Sonawane	7	08	R. Sonawane
98	IEBF98	ROHAN SANDIP WABLE	R. Wable		R. Wable	13	13	R. Wable
99	IEBF99	RONAK SACHIN BORA	R. Bora		R. Bora	12	12	R. Bora
100	IEBF100	RUDRESH LALIT HONRAO	R. Honrao	8	R. Honrao	13	13	R. Honrao
101	IEBF101	RUSHIKESH RAMCHANDRA WAGH	R. Wagh		R. Wagh			R. Wagh
102	IEBF102	RUTUJA RAJENDRA BHADIRGE	R. Bhadirge	8	R. Bhadirge	12	12	R. Bhadirge
103	IEBF103	RUTUJA AJIT JADHAV	R. Jadhav	8	R. Jadhav	12	12	R. Jadhav
104	IEBF104	RUTUJA DATTATRAY PANCHAL	R. Panchal	8	R. Panchal	12	12	R. Panchal
105	IEBF105	RUTVIK PARSHURAM VEER	R. Veer	8	R. Veer	12	12	R. Veer
106	IEBF106	SAEE GANESH KHIRSAGAR	S. Khirsagar	8	S. Khirsagar	13	13	S. Khirsagar
107	IEBF107	SAEE MADHUKAR KONDHALKAR	S. Kondhalkar	8	S. Kondhalkar	12	12	S. Kondhalkar
108	IEBF108	SAHIL NITIN SAWANT	S. Sawant	8	S. Sawant	12	12	S. Sawant
109	IEBF109	SAHIL RAJESH KHAROTE	S. Kharote	8	S. Kharote	11	11	S. Kharote
110	IEBF110	SAHIL SUNIL KAWADE	S. Kawade	8	S. Kawade	11	11	S. Kawade
111	IEBF111	SAKSHI JAYWANT PAWAR	S. Pawar	8	S. Pawar	11	11	S. Pawar
112	IEBF112	SAKSHI PRAKASH KHADKE	S. Khadke	8	S. Khadke	8	08	S. Khadke
113	IEBF113	SAKSHI SANTOSH DHOTRE	S. Dhotre	8	S. Dhotre	12	12	S. Dhotre
114	IEBF114	SAKSHI SANTOSH KEDARI	S. Kedari		S. Kedari	08	08	S. Kedari
115	IEBF115	SAKSHI VASUDEO NIKAM	S. Nikam	8	S. Nikam	13	13	S. Nikam
116	IEBF116	SAMEER SITARAM DHEBE	S. Dhebe	8	S. Dhebe	8	08	S. Dhebe
117	IEBF117	SANGHARSHA BHAJANDAS PAWAR	S. Pawar	8	S. Pawar	8	08	S. Pawar
118	IEBF118	SANIKA SANJAY THOPATE	S. Thopate	8	S. Thopate	9	09	S. Thopate
119	IEBF119	SANIKA SUNIL JAGTAP	S. Jagtap	8	S. Jagtap	11	11	S. Jagtap
120	IEBF120	SANSKRUTI VINOD VEYWHARE	S. Veywhare	8	S. Veywhare	11	11	S. Veywhare
121	IEBF121	SARFARAZ SALIM SAYYAD	S. Sayyad	8	S. Sayyad	8	08	S. Sayyad
122	IEBF122	SARTHAK SHIVAJI SHETE	S. Shete	8	S. Shete	12	12	S. Shete




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			1	2	3	4	5	6
167	IEBF167	VINAYAK SANJAY GHULE	<u>ghule</u>	8	<u>ghule</u>	11	11	<u>ghule</u>
168	IEBF168	VISHAL ANKUSH YEDE	<u>yedat</u>	8	<u>yedat</u>	14	14	<u>yedat</u>
169	IEBF169	VISHWADEEPTI AJAY CHAVAN	<u>chav</u>	8	<u>chav</u>	13	13	<u>chav</u>
170	IEBF170	VISHWAJA VIJAY PANGARE	<u>pang</u>	8	<u>pang</u>	13	13	<u>pang</u>
171	IEBF171	VISHWAS MARUTI KAMBLE	<u>kamb</u>	8	<u>kamb</u>	11	11	<u>kamb</u>
172	IEBF172	VIVEK DATTATRAY PATIL	<u>patil</u>	8	<u>patil</u>	6	8	<u>patil</u>
173	IEBF173	VIVEK YASHWANT BHISE	<u>bhise</u>	8	<u>bhise</u>	11	11	<u>bhise</u>
174	IEBF174	YASH DATTATRAY KUDALE	<u>kudale</u>	8	<u>kudale</u>	12	12	<u>kudale</u>
175	IEBF175	YASH SACHIN PATIL	<u>patil</u>	8	<u>patil</u>	13	13	<u>patil</u>
176	IEBF176	YOGESH MAHADEO KATE	<u>kate</u>	8	<u>kate</u>	12	12	<u>kate</u>
177		Derang Natir		8		12	12	
Mrs. Pranjal Tarte			 Signature of Subject Teacher					
Name of Subject Teacher								




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to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: Inculcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In fuse ethical, human and professional values and responsibilities to make their contribution to the society.

Statistics Paper I (FYBSC. CS)
(Methods of Applied Statistics) 2022-23

- 1) Compute the value of Correlation coefficients for the following data (co1,po1)

Marks in paper I	65	45	50	60	40
Marks in Paper II	70	35	60	50	40

- 2) Calculate the spearman's Rank correlation for the following data. (CO2,CO1)

Rank by judge X	5	6	4	3	2	1
Rank by judge Y	6	2	1	3	4	5

- 3) Compute Spearman's Rank correlation for the following information(CO2,PO4)

Score of drawing	24	29	19	14	30	19	27
Score of Music	37	35	16	26	23	27	19

- 4) Derivation of fitting of regression line Y on X (CO3,PO3)
5) Derivation of fitting of regression line X on Y (PO3)
6) Fitting of Regression plane X1 on X2 and X3(CO2,PO2)
7) Karl Pearson's correlation coefficient between X and Y is 0.5 and their covariance is 12. If the variance Of X is 100 find Standard Deviation Of Y(CO1,PO2)
8) Estimate the trend values by taking three yearly moving average(PO4,CO4)

Year(t)	1970	1971	1972	1973	1974	1975	1976
birthrate(yt)	36.8	29.2	36.6	40	39	34.3	68

- 9) Estimate the trend values by taking four yearly moving average(PO4,CO4)

day	1	2	3	4	5	6	7	8	9	10	11
rate	90.36	90.36	90	90	90	90.36	90.56	90.56	90.65	90	90



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FBCS025	DESHMUKH ATHARVA MANGESH	3232	<u>Adesh</u>	6	<u>Adesh</u>	10	10
FBCS027	DESHPANDE DHRUV MANOJ	3233	<u>Phos</u>	6	<u>Phos</u>	14	14
FBCS076	KHANEKAR DEVDAS GORAKSHNATH	3234	<u>Pravati</u>	6	<u>Pravati</u>	13	13
FBCS084	KULKARNI DEVEN MAHESH	3235	<u>DK</u>	6	<u>DK</u>	13	13
FBCS029	DHAMAL VEDANT SANTOSH DHAMAL	3236	<u>DK</u>	6	<u>DK</u>	12	12
FBCS032	DHEBE SAMEER SITARAM	3237	<u>Dhebe</u>	6	<u>Dhebe</u>	12	12
FBCS037	GAIKWAD OMKAR MILIND	3238	<u>Gaikwad</u>	6	<u>Gaikwad</u>	14	14
FBCS040	GAVAND SHRAVANI ANIL	3239	<u>Gavand</u>	6	<u>Gavand</u>	13	13
FBCS041	GHALME SUJIT VIJAY	3240	<u>Sujit</u>	6	<u>Sujit</u>	11	11
FBCS043	GHOOGARE ANKITA ANKUSH	3241	<u>Aggar</u>	6	<u>Aggar</u>	11	11
FBCS045	GOTAD ATHARVA NILESH	3242	<u>G</u>	6	<u>G</u>	13	13
FBCS047	HOMKAR PRATIK MAHADEV	3243	<u>Phombas</u>	6	<u>Phombas</u>	14	14
FBCS052	JAGTAP NANDINI DEEPAK	3244	<u>Nandini</u>	6	<u>Nandini</u>	12	12
FBCS054	JANGAM SIDDHI SANDEEP	3245	<u>Sangam</u>	6	<u>Sangam</u>	12	12
FBCS055	JARANDE TEJAS SURYAKANT	3246	<u>T.J</u>	6	<u>T.J</u>	12	12
FBCS051	JOSHI OMKAR ANIRUDDHA	3247	<u>Ataghi</u>	6	<u>Ataghi</u>	4	6
FBCS063	KADAM SOURAV SACHIN	3248	<u>Savals</u>	6	<u>Savals</u>	13	13
FBCS064	KALBHOR RADHIKA SACHIN	3249	<u>Prakabhor</u>	6	<u>Prakabhor</u>	12	12
FBCS067	KAMBLE TANUJA RAJU	3250	<u>PANUJA</u>	6	<u>PANUJA</u>	11	11
FBCS068	KAMBLE VISHWAS MARUTI	3251	<u>DK</u>	6	<u>DK</u>	10	10
FBCS069	KARANDE PRATIK BABURAO	3252	<u>Pravati</u>	6	<u>Pravati</u>	10	10
FBCS070	KARBHARI PARTHIV VINAYAK	3253	<u>P.V.V</u>	6	<u>P.V.V</u>	11	11
FBCS072	KATE YOGESH MAHADEO	3254	<u>Kate</u>	6	<u>Kate</u>	13	13
FBCS073	KEDARI SAKSHI SANTOSH	3255	<u>Sakshi</u>	6	<u>Sakshi</u>	11	11
FBCS075	KHADKE SAKSHI PRAKASH	3256	<u>SK</u>	6	<u>SK</u>	13	13
FBCS077	KHAROTE SAHIL RAJESH	3257	<u>S.Kharote</u>	6	<u>S.Kharote</u>	12	12



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FBCS049	INGOLE PRATHMESH RAIU	3284	<i>Prathmesh</i>	6	<i>Prathmesh</i>	12	12	<i>Prathmesh</i>
FBCS163	VEER PRATIKSHA SAGAR	3285	<i>Pratiksha</i>	6	<i>Pratiksha</i>	11	11	<i>Pratiksha</i>
FBCS059	JOSHI PUSHPAK PURUSHOTTAM	3286	<i>Pushtak</i>	6	<i>Pushtak</i>	12	12	<i>Pushtak</i>
FBCS128	RAIGURU MIHIR PRAKASH	3287	<i>Mihir</i>	6	<i>Mihir</i>	7	7	<i>Mihir</i>
FBCS129	REPALE NEHA SUHAS	3288	<i>Repa</i>	6	<i>Repa</i>	11	11	<i>Repa</i>
FBCS164	VEER RUTVIK PARSHURAM	3289	<i>Rutvik</i>	6	<i>Rutvik</i>	12	12	<i>Rutvik</i>
FBCS131	SAHANI HARSHAVARDHAN D.	3290	<i>Harsh</i>	6	<i>Harsh</i>	12	12	<i>Harsh</i>
FBCS056	SATYAL SUNIL KAWADE SAMAL ISHWAR AMAR	3291	<i>Kawade</i>	6	<i>Kawade</i>	14	14	<i>Kawade</i>
FBCS133	SALUNKE SWARAJ SURYAKANT	3292	<i>Salunke</i>	6	<i>Salunke</i>	13	13	<i>Salunke</i>
FBCS082	SAMAL ISHWAR	3293	<i>Ishwar</i>	6	<i>Ishwar</i>	11	11	<i>Ishwar</i>
FBCS135	SATILKAR DASIM MURAD	3294	<i>Murad</i>	6	<i>Murad</i>	12	12	<i>Murad</i>
FBCS136	SAWANT ADITYA ANAND	3295	<i>Anand</i>	6	<i>Anand</i>	14	14	<i>Anand</i>
FBCS137	SAWANT SAHIL NITIN	3296	<i>Sahil</i>	6	<i>Sahil</i>	14	14	<i>Sahil</i>
FBCS139	SAYYAD SARFAAZ SALIM	3297	<i>Salim</i>	6	<i>Salim</i>	12	12	<i>Salim</i>
FBCS140	SHAIKH NOORJAHAN. N.	3298	<i>Noor</i>	6	<i>Noor</i>	13	13	<i>Noor</i>
FBCS141	SHELAR SUJAL SHAILESH	3299	<i>Sujal</i>	6	<i>Sujal</i>	8	8	<i>Sujal</i>
FBCS143	SHINDE ADITYA DHANAJI	3300	<i>Shinde</i>	6	<i>Shinde</i>	10	10	<i>Shinde</i>
FBCS101	NALAWADE SHRAVAN RAMESH	3301	<i>Nalawade</i>	6	<i>Nalawade</i>	12	12	<i>Nalawade</i>
FBCS038	SHRAVANI NARENDRA DAYAL	3302	<i>Shravani</i>	6	<i>Shravani</i>	13	13	<i>Shravani</i>
FBCS107	PADHYE SHRIMAY HARISH	3303	<i>Shrimay</i>	6	<i>Shrimay</i>	6	6	<i>Shrimay</i>
FBCS151	SUPEKAR SUMIT PAVAN	3304	<i>Sumit</i>	6	<i>Sumit</i>	11	11	<i>Sumit</i>
FBCS155	TAGADE SOHAM MANOJ	3305	<i>Soham</i>	6	<i>Soham</i>	12	12	<i>Soham</i>
FBCS156	TASKAR AKSHAT NISHANT	3306	<i>Akshat</i>	6	<i>Akshat</i>	8	8	<i>Akshat</i>
FBCS159	UGHADE ADITYA NITIN	3307	<i>Aditya</i>	6	<i>Aditya</i>	11	11	<i>Aditya</i>
FBCS116	PATIL VEDKUMAR PRASHANT	3308	<i>Ved</i>	6	<i>Ved</i>	14	14	<i>Ved</i>
FBCS165	VEYWHARE SANSKRUTI VINOD	3309	<i>Sanskruti</i>	6	<i>Sanskruti</i>	13	13	<i>Sanskruti</i>



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FBCS044	GHULE VINAYAK SANJAY	3336	<i>[Signature]</i>	6	<i>[Signature]</i>	9	9	<i>[Signature]</i>
FBCS046	HOLKAR SHRAVANI SANTOSH	3337	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS048	HONRAO RUDRESH LALIT	3338	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS050	JADHAV RUTUJA AJIT	3339	<i>[Signature]</i>	6	<i>[Signature]</i>	12	12	<i>[Signature]</i>
FBCS053	JAGTAP SANKHA SUNIL	3340	<i>[Signature]</i>	6	<i>[Signature]</i>	13	13	<i>[Signature]</i>
FBCS057	JOSHI JANHAVI PRADIP	3341	<i>[Signature]</i>	6	<i>[Signature]</i>	15	15	<i>[Signature]</i>
FBCS058	JOSHI KARAN JHUMBERLAL JI JOSHI	3342	<i>[Signature]</i>	6	<i>[Signature]</i>	12	12	<i>[Signature]</i>
FBCS061	KADAM KAJAL KISHOR	3343	<i>[Signature]</i>	6	<i>[Signature]</i>	13	13	<i>[Signature]</i>
FBCS062	KADAM KARAN JALINDAR	3344	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS071	KARPE ATHARVA DEEPAK	3345	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS074	KHADE TANUJA SATISH	3346	<i>[Signature]</i>	6	<i>[Signature]</i>	13	13	<i>[Signature]</i>
FBCS081	KONDHALKAR SAEED MADHUKAR	3347	<i>[Signature]</i>	6	<i>[Signature]</i>	12	12	<i>[Signature]</i>
FBCS086	KUMBHAR DIKSHA KISHOR	3348	<i>[Signature]</i>	6	<i>[Signature]</i>	13	13	<i>[Signature]</i>
FBCS088	KUTE ADITYA MANOJ NIVRUTTI KUTE	3349	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS089	LOLE SOHAM PRAKASH	3350	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS109	MANDEKAR SIDDHI SAMEER	3351	<i>[Signature]</i>	6	<i>[Signature]</i>	13	13	<i>[Signature]</i>
FBCS094	MANE VIDHI SUNIL	3352	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS100	NAIR ABHINAV ACHUTHAN	3353	<i>[Signature]</i>	6	<i>[Signature]</i>	12	12	<i>[Signature]</i>
FBCS102	NALAWADE TANMAY TATYASO	3354	<i>[Signature]</i>	6	<i>[Signature]</i>	12	12	<i>[Signature]</i>
FBCS170	WAGHMARE NEHA SHANKAR	3355	<i>[Signature]</i>	6	<i>[Signature]</i>	13	13	<i>[Signature]</i>
FBCS104	NIBANDHE PRATHAMESH PRADIP	3356	<i>[Signature]</i>	6	<i>[Signature]</i>	15	15	<i>[Signature]</i>
FBCS105	NIKAM SAKSHI VASUDEO	3357	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS106	NIMBALKAR OMKAR VIJAY	3358	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>
FBCS154	PAIGUDE NEEL MILIND	3359	<i>[Signature]</i>	6	<i>[Signature]</i>	13	13	<i>[Signature]</i>
FBCS108	PANCHAL RUTUJA DATTATRAY	3360	<i>[Signature]</i>	6	<i>[Signature]</i>	13	13	<i>[Signature]</i>
FBCS115	PATIL PRANALI RAVINDRA	3361	<i>[Signature]</i>	6	<i>[Signature]</i>	14	14	<i>[Signature]</i>



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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

F.Y.B.Sc(CS) 2022-23

CS-202- RELATIONAL DATABASE MANAGEMENT SYSTEM

Course Outcomes

Course Outcomes On completion of the course, student will be able to–

- Design E-R Model for given requirements and convert the same into database tables.
- Use database techniques such as SQL & PL/SQL.
- Explain transaction Management in relational database System.
- Use advanced database Programming concepts


Programme Objectives:

Programme Outcomes

- To develop problem solving abilities using a computer.
- To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
- To train students in professional skills related to Software Industry.
- To prepare necessary knowledge base for research and development in Computer Science.
- To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.

1. List the error levels used in raise (CO2,PO1) statement.
2. Define term Cursor.(CO2,PO1)
3. Define term Trigger.(CO2, PO1,PO2)
4. Define term Serial Schedule.(CO3, PO1)
5. What is time stamp?(CO3, PO1)
6. What are shared and exclusive locks?(CO3, PO1)
7. List the actions of transaction recovered(CO3,PO1) from deadlock.
8. What are shared and exclusive locks?(CO3,PO1)
9. Give Thomas write rule.(CO3,PO2)
10. List the ACID properties(CO3,PO5)
11. State the different levels of security.(CO4,PO3,PO4)
12. Write a short note on Mandatory Access(CO4, PO3,PO4) Control method
13. What referential integrity.(CO1,PO2,PO5)
14. What is database security?(CO4, PO3)
15. Define simple security property.(CO4, PO3,PO5)

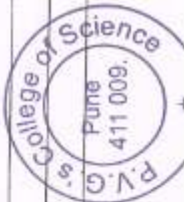



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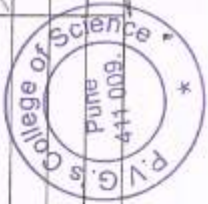
Class : F.Y.B.Sc. (Computer Science) Sem:IV	Academic Year: 2022-23
Subject: CS122-Relational Database Management System	Internal Evaluation Record

Seat No.	Roll No.	Name	assignment submitted	Internal Marks (out of 15)		
				Assignment (15)	Internal attendance (15)	Best of 2 (15)
3214	FBCS114	PATASKAR ANISH NILESH	Patil	12	14	14
3215	FBCS124	PHALKE NAYAN DHANANJAY	Patil	14	15	15
3216	FBCS111	PANGUL ABHIJEET TUKARAM	Patil	14	15	15
3217	FBCS003	ANAWALIKAR NILAJA ANANDRAJ	Nilaja	14	15	15
3218	FBCS065	KALE ATHARVA AVINASH	Patil	13	15	15
3219	FBCS004	BADHE RACHANA YASHWANT	Rachana	12	14	14
3220	FBCS005	BADODKAR GAYATRI SACHIN	GSB	12	9	12
3221	FBCS007	BARGE ABHISHEK MILIND	Patil	14	13	14
3222	FBCS008	BARGE SWATI AJAY	Patil	14	13	14
3223	FBCS009	BET ADITYA VINOD	Patil	13	14	14
3224	FBCS019	BHOJ ADITYA GANESH	Patil	12	13	13
3225	FBCS013	BORA RONAK SACHIN	Patil	12	15	15
3226	FBCS016	CHAVARE SOUMITRA SAMEER	Patil	13	14	14
3227	FBCS018	CHOUDHARY INDRAJEET RATARAM	Patil	14	13	14
3228	FBCS021	DATIR DEVANG GOPINATH	Patil	14	14	14
3229	FBCS022	DEO NIKHIL GIRISH	Patil	12	13	13
3230	FBCS023	DEO PRADYUMNA ASHUTOSH	Patil	14	15	15
3231	FBCS024	DEO SWARADA SUHAS	Patil	13	15	15
3232	FBCS025	DESHMUKH ATHARVA MANGESH	Patil	12	11	12
3233	FBCS027	DESHPANDE DHRUV MANOJ	Patil	15	15	15
3234	FBCS076	KHANEKAR DEVDAS GORAKSHNATH	Patil	13	13	13
3235	FBCS084	KULKARNI DEVEN MAHESH	Patil	14	11	14
3236	FBCS029	DHAMAL VEDANT SANTOSH DHAMAL	Patil	13	13	13
3237	FBCS032	DHEBE SAMEER SITARAM	Patil	12	15	15
3238	FBCS037	GAIKWAD OMKAR MILIND	Patil	12	15	15
3239	FBCS040	GAVAND SHRAVANI ANIL	Patil	12	15	15
3240	FBCS041	GHALME SUJIT VIJAY	Patil	13	14	14



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3241	FBCS043	GHOHARE ANKITA ANKUSH	Handwritten	13	Handwritten	15	15	Handwritten
3242	FBCS045	GOTAD ATHARVA NILESH	Handwritten	12	Handwritten	12	12	Handwritten
3243	FBCS047	HOMKAR PRATIK MAHADEV	Handwritten	14	Handwritten	15	15	Handwritten
3244	FBCS052	JAGTAP NANDINI DEEPAK	Handwritten	12	Handwritten	13	13	Handwritten
3245	FBCS054	JANGAM SIDOHI SANDEEP	Handwritten	14	Handwritten	14	14	Handwritten
3246	FBCS055	JARANDE TEJAS SURYAKANT	Handwritten	12	Handwritten	14	14	Handwritten
3247	FBCS051	JOSHI OMKAR ANIRUDDHA	Handwritten	12	Handwritten	10	12	Handwritten
3248	FBCS063	KADAM SOURAV SACHIN	Handwritten	13	Handwritten	13	13	Handwritten
3249	FBCS064	KALBHOR RADHIKA SACHIN	Handwritten	14	Handwritten	14	14	Handwritten
3250	FBCS067	KAMBLE TANUJA RAJU	Handwritten	14	Handwritten	15	15	Handwritten
3251	FBCS068	KAMBLE VISHWAS MARUTI	Handwritten	13	Handwritten	14	14	Handwritten
3252	FBCS069	KARANDE PRATIK BABURAO	Handwritten	13	Handwritten	14	14	Handwritten
3253	FBCS070	KARBHARI PARTHIV VINAYAK	Handwritten	12	Handwritten	13	13	Handwritten
3254	FBCS072	KATE YOGESH MAHADEV	Handwritten	13	Handwritten	14	14	Handwritten
3255	FBCS073	KEDARI SAKSHI SANTOSH	Handwritten	14	Handwritten	15	15	Handwritten
3256	FBCS075	KHADKE SAKSHI PRAKASH	Handwritten	14	Handwritten	14	14	Handwritten
3257	FBCS077	KHAROTE SAHIL RAJESH	Handwritten	14	Handwritten	13	14	Handwritten
3258	FBCS078	KHATPE ANUJ SANTOSH	Handwritten	13	Handwritten	12	13	Handwritten
3259	FBCS079	KHOPADE OMKAR DNYANESHWAR	Handwritten	14	Handwritten	13	14	Handwritten
3260	FBCS080	KHOSE AKANKSHA CHANDRAKANT	Handwritten	12	Handwritten	14	14	Handwritten
3261	FBCS086	KOLAGE SUPRIYA HANUMANT	Handwritten	14	Handwritten	15	15	Handwritten
3262	FBCS083	KUDALE YASH DATTATRAY	Handwritten	12	Handwritten	13	13	Handwritten
3263	FBCS085	KULKARNI MEGHANA ANIL	Handwritten	13	Handwritten	15	15	Handwritten
3264	FBCS087	KUSUMALE SHRIKANT BHARAT	Handwritten	12	Handwritten	8	12	Handwritten
3265	FBCS098	LANGHI LOUKIK DATTATRAYA	Handwritten	13	Handwritten	15	15	Handwritten
3266	FBCS090	MAHTO ABHILASHA ARIJUN	Handwritten	13	Handwritten	14	14	Handwritten
3267	FBCS092	MANE AISHWARYA ANIL	Handwritten	13	Handwritten	15	15	Handwritten
3268	FBCS093	MANE ARYAN SANTOSH	Handwritten	14	Handwritten	14	14	Handwritten
3269	FBCS097	MESHRAM SMIT BHUPENDRA	Handwritten	14	Handwritten	14	14	Handwritten
3270	FBCS134	NAIK ADITI MILIND	Handwritten	11	Handwritten	9	11	Handwritten
3271	FBCS147	NALWADE ARNAV GOPI	Handwritten	13	Handwritten	14	14	Handwritten
3272	FBCS103	NANAWARE SURAJ DIPAK	Handwritten	13	Handwritten	15	15	Handwritten
3273	FBCS110	PANGARE VISHWAJA VIJAY	Handwritten	13	Handwritten	15	15	Handwritten
3274	FBCS112	PANSARE AMIR HARUN	Handwritten	14	Handwritten	15	15	Handwritten
3275	FBCS113	PARDESHI TANISHA KAMLESH	Handwritten	13	Handwritten	15	15	Handwritten



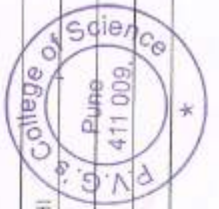
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3276	FBCS171	PAREEK KHUSHI KAMAL	Khushi	10	Khushi	11	11	Khushi
3277	FBCS117	PATIL VIVEK DATTATRAY	Patil	14	Patil	15	15	Patil
3278	FBCS119	PAWAR ADESH SOMNATH	Pawar	12	Pawar	15	15	Pawar
3279	FBCS121	PAWAR SAKSHI JAYWANT	Pawar	14	Pawar	14	14	Pawar
3280	FBCS122	PAWAR SANGHARSHA BHAJANDAS	Pawar	12	Pawar	15	15	Pawar
3281	FBCS123	PAYGLUDE SARTHAK SOMNATH	Sarthak	13	Sarthak	15	15	Sarthak
3282	FBCS125	PISAL PRANAV MHASKU	P. M. P. S.	14	P. M. P. S.	15	15	P. M. P. S.
3283	FBCS126	PISE AAKASH PRAVIN	Pise	12	Pise	15	15	Pise
3284	FBCS049	INGOLE PRATHMESH RAJU	Prathmesh	13	Prathmesh	15	15	Prathmesh
3285	FBCS163	VEER PRATIKSHA SAGAR	Veer	14	Veer	15	15	Veer
3286	FBCS059	JOSHI PUSHKAR PURUSHOTTAM	Joshi	13	Joshi	14	14	Joshi
3287	FBCS128	RAJGURU MIHIR PRAKASH	Mihir	13	Mihir	14	14	Mihir
3288	FBCS129	REPALE NEHA SUHAS	Repale	13	Repale	13	13	Repale
3289	FBCS164	VEER RUTVIK PARSHURAM	Veer	13	Veer	15	15	Veer
3290	FBCS131	SAHANI HARSHAVAROHAN D.	Sahani	13	Sahani	14	14	Sahani
3291	FBCS056	SAMAL ISHWAR ANAND	Sawal	13	Sawal	15	15	Sawal
3292	FBCS133	SALUNKE SWARAJ SURYAKANT	Salunke	11	Salunke	7	11	Salunke
3293	FBCS082	SAMAL ISHWAR	Samal	14	Samal	15	15	Samal
3294	FBCS135	SATVILKAR DASIM MURAD	Satvilkar	12	Satvilkar	10	12	Satvilkar
3295	FBCS136	SAWANT ADITYA ANAND	Sawant	14	Sawant	14	14	Sawant
3296	FBCS137	SAWANT SAHIL NITIN	Sawant	13	Sawant	14	14	Sawant
3297	FBCS139	SAYYAD SARFARAZ SALIM	Sayyad	14	Sayyad	15	15	Sayyad
3298	FBCS140	SHAIKH NOORJAHAN. N.	Shaiikh	13	Shaiikh	14	14	Shaiikh
3299	FBCS141	SHELAR SUJAL SHAILESH	Shelar	12	Shelar	13	13	Shelar
3300	FBCS143	SHINDE ADITYA DHANAJI	Shinde	12	Shinde	14	14	Shinde
3301	FBCS101	NALWADE SHRAVAN RAMESH	Nalwaade	13	Nalwaade	12	13	Nalwaade
3302	FBCS038	SHRAVANI NARENDRA DAYAL	Shravani	14	Shravani	14	14	Shravani
3303	FBCS107	PADHYE SHRIMAY HARISH	Padhye	12	Padhye	12	12	Padhye
3304	FBCS151	SUPEKAR SUMIT PAVAN	Sumit	14	Sumit	15	15	Sumit
3305	FBCS155	TAGADE SOHAM MANOJ	Tagade	14	Tagade	14	14	Tagade
3306	FBCS156	TASKAR AKSHAT NISHANT	Taskar	13	Taskar	14	14	Taskar
3307	FBCS159	UGHADE ADITYA NITIN	Ughade	15	Ughade	15	15	Ughade
3308	FBCS116	PATIL VEDKUMAR PRASHANT	Patil	13	Patil	15	15	Patil
3309	FBCS165	VEYWHARE SANSKRUTI VINOD	Veywhare	10	Veywhare	15	15	Veywhare
3310	FBCS167	VIBHUTE ASHUTOSH SANJAY	Vibhute	11	Vibhute	15	15	Vibhute



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3311	FBCS173	YEDE VISHAL ANKUSH	Yedde	12	14	14	14
3312	FBCS168	WABLE ROHAN SANDIP		12	9	12	
3313	FBCS176	YADAV SHLOK DNYANESHWAR	Yadav	13	15	15	
3314	FBCS175	ZAMBRE HARSHVARDHAN T.	Harsh	13	15	15	
3315	FBCS001	AGATKAR SWAPNIL SUNIL	Agatkar	13	15	15	
3316	FBCS002	ANANDE SNEHA SATISH	Sneha	13	15	15	
3317	FBCS006	BANSOD AKSHATA ANAND	Bansod	13	14	14	
3318	FBCS130	RUTUJA BHADIRGE RAJENDRA	Rutuja	14	14	14	
3319	FBCS010	BHISE VIVEK YASHWANT	Bhise	12	14	14	
3320	FBCS011	BHORDE KOMAL CHANDRAKANT	Bhorde	13	14	14	
3321	FBCS012	BONGALE PURVA DHANVAKUMAR	Bongale	14	15	15	
3322	FBCS014	CHAVAN SHREYA PRITHVIRAJ	Chavan	14	15	15	
3323	FBCS015	CHAVAN VISHWADEEPTI AJAY	Chavan	13	14	14	
3324	FBCS017	CHOUDHARUY MRUNAL VITTHAL	Choudhary	12	14	14	
3325	FBCS026	DESHMUKH SRUSHTI VINAYAK	Deshmukh	14	13	14	
3326	FBCS028	DEWALE SNEHAL MANOHAR	Dewale	14	15	15	
3327	FBCS030	DHANDE NARAYAN RAJABHAU	Dhande	12	13	13	
3328	FBCS031	DHAVADE SUDIKA DEEPAK	Dhavad	14	15	15	
3329	FBCS033	DHIWAR MUGDHA SUNIL	Dhiwar	13	15	15	
3330	FBCS039	DHOTRE SAKSHI SANTOSH	Dhotre	11	12	12	
3331	FBCS034	DUDHAL ISHITA KISHOR	Dudhal	12	14	14	
3332	FBCS035	GADEKAR PRATIKSHA ANIL	Gadekar	14	14	14	
3333	FBCS036	GAIKWAD NAMRATA NITIN	Gaikwad	13	14	14	
3334	FBCS099	NAGTILAK GANESH KALIDAS	Nagtlik	14	14	14	
3335	FBCS042	GHODEKAR OM BALASAHEB	Ghodekar	12	14	14	
3336	FBCS044	GHULE VINAYAK SANJAY	Ghule	14	10	14	
3337	FBCS046	HOLKAR SHRAVANI SANTOSH	Holkar	13	15	15	
3338	FBCS048	HONRAO RUDRESH LALIT	Honrao	12	14	14	
3339	FBCS050	JADHAV RUTUJA AJIT	Jadhav	14	15	15	
3340	FBCS053	JAGTAP SANIKA SUNIL	Jagtap	13	12	13	
3341	FBCS057	JOSHI JANHAVI PRADIP	Joshi	14	15	15	
3342	FBCS058	JOSHI KARAN JHUMBERLAL JI JOSHI	Joshi	12	13	13	
3343	FBCS061	KADAM KAJAL KISHOR	Kadam	12	13	13	
3344	FBCS062	KADAM KARAN JALINDAR	Kadam	14	15	15	
3345	FBCS071	KARPE ATHARVA DEEPAK	Karpe	14	14	14	



3346	FBCS074	KHADE TANUJA SATISH	Pravati	12	Pravati	15	15	Pravati
3347	FBCS081	KONDHALKAR SAEED MADHUKAR	Pravati	13	Pravati	15	15	Pravati
3348	FBCS086	KUMBHAR DIKSHA KISHOR	Pravati	14	Pravati	14	14	Pravati
3349	FBCS088	KUTE ADITYA MANOJ NIVRUTTI KUTE	Pravati	14	Pravati	14	14	Pravati
3350	FBCS089	LOLE SOHAM PRAKASH	Pravati	13	Pravati	14	14	Pravati
3351	FBCS109	MANDEKAR SIDDHI SAMEER	Pravati	13	Pravati	15	15	Pravati
3352	FBCS094	MANE VIDHI SUNIL	Pravati	12	Pravati	13	13	Pravati
3353	FBCS100	NAIR ABHINAV ACHUTHAN	Pravati	12	Pravati	12	12	Pravati
3354	FBCS102	NALWADE TANMAY TATYASO	Pravati	14	Pravati	15	15	Pravati
3355	FBCS170	WAGHMARE NEHA SHANKAR	Pravati	12	Pravati	14	14	Pravati
3356	FBCS104	NIBANDHE PRATHAMESH PRADIP	Pravati	14	Pravati	14	14	Pravati
3357	FBCS105	NIKAM SAKSHI VASUDEO	Pravati	12	Pravati	14	14	Pravati
3358	FBCS106	NIMBALKAR OMKAR VIJAY	Pravati	14	Pravati	14	14	Pravati
3359	FBCS154	PAIGUDE NEEL MILIND	Pravati	13	Pravati	15	15	Pravati
3360	FBCS108	PANCHAL RUTUJA DATTATRAY	Pravati	14	Pravati	14	14	Pravati
3361	FBCS115	PATIL PRANALI RAVINDRA	Pravati	12	Pravati	15	15	Pravati
3362	FBCS118	PATIL YASH SACHIN	Pravati	14	Pravati	14	14	Pravati
3363	FBCS120	PAWAR APURVA RAJENDRA	Pravati	14	Pravati	14	14	Pravati
3364	FBCS152	SURYAWANSHI PRITAM PRABHAKAR	Pravati	12	Pravati	15	15	Pravati
3365	FBCS132	SAKPAL SNEHA ANIL	Pravati	15	Pravati	15	15	Pravati
3366	FBCS138	SAWANT TEJAS SATISH	Pravati	14	Pravati	14	14	Pravati
3367	FBCS142	SHETE SARTHAK SHIVAJI	Pravati	14	Pravati	14	14	Pravati
3368	FBCS144	SHINDE PRAGATI MANOJ	Pravati	14	Pravati	15	15	Pravati
3369	FBCS145	SHINDE PRANAV DHANAJI	Pravati	13	Pravati	15	15	Pravati
3370	FBCS146	SHINDE RIYA MANOJ	Pravati	14	Pravati	14	14	Pravati
3371	FBCS148	SHIRURE KAUSHIK KONDIBA	Pravati	12	Pravati	14	14	Pravati
3372	FBCS149	SONAWANE RIYA PANDHARINATH	Pravati	14	Pravati	8	8	Pravati
3373	FBCS150	SONAWANE SOHAM MANGESH	Pravati	13	Pravati	8	8	Pravati
3374	FBCS153	SUVARNA DHANUSH PADMANABHA	Pravati	14	Pravati	15	15	Pravati
3375	FBCS157	THOPATE SANIKA SANJAY	Pravati	14	Pravati	14	14	Pravati
3376	FBCS158	TIWARI MANSI RAJESH	Pravati	13	Pravati	15	15	Pravati
3377	FBCS160	UJGAONKAR ADITYA SURESH	Pravati	15	Pravati	14	14	Pravati
3378	FBCS161	VAIDYA SIDDHESH SHASHANK	Pravati	11	Pravati	13	13	Pravati
3379	FBCS096	MATE VAISHNAVI BALASAHEB	Pravati	14	Pravati	14	14	Pravati
3380	FBCS162	VATTURKAR ARYAN HARSHAL	Pravati	13	Pravati	14	14	Pravati



P.V.G.'s College of Science
Pune - 411 009.

3381	FBCS166	VHARKAT BHAVANA MAHESH	13	14	14	14
3382	FBCS172	WALAMBE SHREYAS SACHIN	11	13	13	13
3383	FBCS174	YELWANDE HARSHADA SHIVAJI	11	13	13	13




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 Vidyanagari, S. No. 44, Shivajinagar, Pune - 411 009.

PVG College of science & commerce
FY. B.Sc. Animation AY 2022-2023
Subject - ANM101 FOUNDATION OF ART
SEM - I

Course Outcomes:-

Student will be able to:-

1. **CO1:** Could you please summarize the fundamental principles of drawing and handling
2. **CO2:** Materials, emphasizing the significance of design elements? Additionally, could you
3. **CO3:** Provide an example of how to apply one to two-point perspective in drawing.
4. **CO4:** Discuss the principles of colour theory and colour harmony in drawing and sketching.
5. **CO5:** Demonstrate rendering techniques with suitable styles and proportions.

Program Outcomes:-

- 1 **PO1:** Product Development: Analyse, design and develop novel products and Solutions for emerging new media opportunities.
- 2 **PO2:** Skill Competency: Demonstrate globally accepted competent skills in passive and interactive content space.
- 3 **PO3:** Problem Analysis: Identify, formulate and solve complex media design challenges using fundamental principles involved in technology, design and storytelling.
- 4 **PO4:** Modern Tool / Techniques usage: Select, adapt, and apply appropriate tools, techniques, resources to various activities, with an understanding of their boundaries...
- 5 **PO5:** Professional Ethics: Understand and commit to professional ethics and IP regulations, responsibilities, and norms of professional publishing practices based on Criteria.

Sketching (15 hrs.):

1. Assignment for Drawing Basic Shapes (Two and Three Dimensional)- **CO3, PO3**
2. Drawing and Developing five objects using Basic shapes. - **CO3, PO1, PO4**
3. (E.g. Car, Cup and Saucer)- **CO1, PO4**
4. Practicing Technique of Pencil Shading. – **CO4, PO4**
5. Making 10 point Grayscale using two of the Shading techniques. - **CO4, PO4**
6. Types of Colours (Primary, Secondary, Tertiary), demonstration and assignment- **CO4, PO4**
7. Sketching Eyes, Ear, Nose and lips. - **CO1, PO1, PO3**
8. Sketching Hand and Feet. – **CO1, PO1, PO3**
9. Sketching Human Face.- **CO1, PO1, PO3**
10. Foreshortening of hand and legs. - **CO2, CO3, PO3, PO4**
11. Assignment for Muscle Drawing. - **CO1, PO3**
12. Drawing Basic Human figure (Male, Female, and Child) - **CO1, PO1,**

Flipbook

1. Drawing different mannequin poses. - **CO3, PO1**
2. Sequential drawing for figures (E.g. - Walking, Running, Jumping) – **CO1, PO2**
3. Sequential drawing for objects (E.g. - Grain Sack, Cube with tail.) – **CO3, PO3**
4. Making a Flipbook for a "Ball with Tail" and colouring it - **CO3, PO3**
5. Making a Flipbook for "Growing Flower" or any other subject (of your choice) and colouring it - **CO4, PO4**

PVG College of science & commerce
FY. B.Sc. Animation AY 2022-2023
Subject – ANM102 BASICS OF ANIMATION
SEM - I

Course Outcomes:-

1. **CO1:** Identify and apply the 12 Animation Principles through Digital Animation.
2. **CO2:** Understand timing and motion through key-frames, holds and in-betweens
3. **CO3:** Demonstrate skills in the use of industry standard tools

Program Outcomes:-

1. **PO1:** Product Development: Analyse, design and develop novel products and
2. Solutions for emerging new media opportunities.
3. **PO2:** Skill Competency: Demonstrate globally accepted competent skills in passive and interactive content space.
4. **PO3:** Problem Analysis: Identify, formulate and solve complex media design challenges using fundamental principles involved in technology, design and storytelling.
5. **PO4:** Modern Tool / Techniques usage: Select, adapt, and apply appropriate tools, techniques, resources to various activities, with an understanding of their boundaries...
6. **PO5:** Professional Ethics: Understand and commit to professional ethics and IP regulations, responsibilities, and norms of professional publishing practices based on Criteria.

Assignment:-

- 1) Bouncing ball - **CO1, PO2**
- 2) Bouncing ball with different type of ball – **CO1, CO2, PO3**
- 3) Single Pendulum – **CO1, CO2, PO3**
- 4) Double Pendulum – **CO1 CO2, CO3,**
- 5) Cartoon Character - **CO1 CO2, CO3, PO4**
- 6) Character jump -**CO1, CO2, CO3,**
- 7) Arc - **CO1, CO2, CO3,**
- 8) Walk cycle – male - **CO1, CO2, CO3, PO3**
- 9) Walk cycle – female - **CO1, CO2, CO3, PO3**
- 10) Run cycle – male - **CO1, CO2, CO3, PO3**
- 11) Run cycle – female - **CO1, CO2, CO3, PO3**
- 12) Character acting with dialog – **CO1, CO2, PO1, PO3**
- 13) Masking - - **CO1, CO2, PO3**
- 14) Character Expression – **CO1, PO3**
- 15) Character animation with 12 principles - **CO1, CO2, CO3, PO3**

P.V.G's College of Science, Pune 9
Department of Animation
Internal Examination (Theory) Academic Year (2022 - 23)
Internal Mark List
Class : F.Y. B.Sc. (Animation) Semester : I

Subject Code: ANM 101

Subject : FOUNDATION OF ART

Seat No	Student Name	Internal 30 marks	Sign
1	ADAGALE HARSHAD BHIMRAO	12	
2	ADAGLE GANESH EKNATH	15	
3	ADITYA RAMPRAKASH GUPTA	12	
4	AJAY GUDDU CHUAHAN	12	
5	BAGAL RIDDHI AMAR	21	
6	BAWANWADE DEV CHANDU	15	
7	BILE AKSHAY BALASAHEB	12	
8	DEVER KARTHIKA ESAKKI	21	
9	DEVTALE SALVIN SHARAD	22	
10	DHADE CHETAN GANESH	25	
11	DISA OM PARAMANAND	12	
12	EKATPURE NIKHIL DEEPAK	12	
13	GAIKWAD ADITYA RAMDAS	19	
14	GAIKWAD DEVENDRA VISHWANATH	12	
15	GAIKWAD PRADIP MADHUKAR	AB ✓	
16	GANDHI ARYA AMOL	17	
17	GARDAS KAUSTUBH SHANKAR	12	
18	GHORALE PIYUSH SARANGDHAR	12	
19	GHUGE OMKAR SACHIN	16	
20	JAGTAP ROHAN DEVRAM	19	
21	JAMDAR ADITYA AJIT	28	
22	JAYDEEP PRADIP RANJANE	13	
23	JOSHI SHRAVANI BHASKAR	13	
24	KASBEKAR NIDHISH DEVDATTA	25	
25	KIRVE GAURAV SOMNATH	13	
26	KONDE PRATIK PRASHANT	27	
27	KULKARNI KETAKI GIRISH	26	
28	MALVE ASHISH RAVINDRA	12	
29	MISHRA KHUSHI MANIBHUSHAN	19	
30	OM PANDURANG KOLI	12	
31	OZA RUTURAJ ABHAY	12	
32	RAMTEKE NIMISH VILAS	12	
33	RASANE PURNA NILESH	12	
34	RASKAR ROHIT RAMKRUSHNAHARI	12	
35	ROHAN SHAM PATIL	15	
36	SAMRUDDHI RAJENDRA NAVGIRE	12	
37	SHAH KRINA ASHISH	12	
38	SHAMBHAVI PRASHANT WAKODKAR	12	
39	TANMAY MANOJ VANDKAR	14	
40	TIKHE ATHARV NITIN	14	
41	TUSHAR SUKALAL JADHAV	21	
42	WAGHE OM VIJAY	26	

P.V.G's College of Science, Pune 9
Department of Animation
Internal Examination (Theory) Academic Year (2022 - 23)
Internal Mark List
Class : F.Y. B.Sc. (Animation) Semester : I

Subject Code: ANM 102

Subject : BASICS OF ANIMATION

Seat No	Student Name	Internal 30 marks	Sign
1	ADAGALE HARSHAD BHIMRAO	12	<i>Harshad</i>
2	ADAGLE GANESH EKNATH	24	<i>Adagle</i>
3	ADITYA RAMPRAKASH GUPTA	15	<i>Aditya</i>
4	AJAY GUDDU CHUAHAN	13	<i>Ajay</i>
5	BAGAL RIDDHI AMAR	21	<i>Bagal</i>
6	BAWANWADE DEV CHANDU	12	<i>Dev</i>
7	BILE AKSHAY BALASAHEB	12	<i>Bile</i>
8	DEVER KARTHIKA ESAKKI	22	<i>Dever</i>
9	DEVTALE SALVIN SHARAD	12	<i>Devtales</i>
10	DHADE CHETAN GANESH	21	<i>Dhade</i>
11	DISA OM PARAMANAND	13	<i>Disa</i>
12	EKATPURE NIKHIL DEEPAK	12	<i>Nikhil</i>
13	GAIKWAD ADITYA RAMDAS	27	<i>Gaikwad</i>
14	GAIKWAD DEVENDRA VISHWANATH	16	<i>Gaikwad</i>
15	GAIKWAD PRADIP MADHUKAR	AB —	<i>AO</i>
16	GANDHI ARYA AMOL	20	<i>Gandhi</i>
17	GARDAS KAUSTUBH SHANKAR	12	<i>K. Gardas</i>
18	GHORALE PIYUSH SARANGDHAR	12	<i>Ghorale</i>
19	GHUGE OMKAR SACHIN	22	<i>Omkar</i>
20	JAGTAP ROHAN DEVRAM	24	<i>Rohan</i>
21	JAMDAR ADITYA AJIT	26	<i>Jamdar</i>
22	JAYDEEP PRADIP RANJANE	14	<i>Jaydeep</i>
23	JOSHI SHRAVANI BHASKAR	26	<i>Joshi</i>
24	KASBEKAR NIDHISH DEVDATTA	24	<i>Kasbekar</i>
25	KIRVE GAURAV SOMNATH	25	<i>Kirve</i>
26	KONDE PRATIK PRASHANT	14	<i>Konde</i>
27	KULKARNI KETAKI GIRISH	26	<i>Kulkarni</i>
28	MALVE ASHISH RAVINDRA	12	<i>Malve</i>
29	MISHRA KHUSHI MANIBHUSHAN	26	<i>Mishra</i>
30	OM PANDURANG KOLI	15	<i>Om Koli</i>
31	OZA RUTURAJ ABHAY	18	<i>Oza</i>
32	RAMTEKE NIMISH VILAS	12	<i>Ramteke</i>
33	RASANE PURNA NILESH	18	<i>Rasane</i>
34	RASKAR ROHIT RAMKRUSHNAHARI	12	<i>Raskar</i>
35	ROHAN SHAM PATIL	19	<i>Rohit</i>
36	SAMRUDDHI RAJENDRA NAVGIRE	22	<i>Samruddhi</i>
37	SHAH KRINA ASHISH	14	<i>Shah</i>
38	SHAMBHAVI PRASHANT WAKODKAR	12	<i>Shambhavi</i>
39	TANMAY MANOJ VANDKAR	12	<i>Tanmay</i>
40	TIKHE ATHARV NITIN	14	<i>Tikhe</i>
41	TUSHAR SUKALAL JADHAV	24	<i>Tushar</i>
42	WAGHE OM VIJAY	26	<i>Waghe</i>

Pune Vidyarthi Griha's College of Science & Commerce, Pune-02

2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

F.Y.B.Sc(CS) 2021-22

CS-202- RELATIONAL DATABASE MANAGEMENT SYSTEM

Course Outcomes

Course Outcomes On completion of the course, student will be able to–

- Design E-R Model for given requirements and convert the same into database tables.
- Use database techniques such as SQL & PL/SQL.
- Explain transaction Management in relational database System.
- Use advanced database Programming concepts Programme Objectives:

Programme Outcomes

- To develop problem solving abilities using a computer.
- To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
- To train students in professional skills related to Software Industry.
- To prepare necessary knowledge base for research and development in Computer Science.
- To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.

1. List the error levels used in raise (C02, PO1) statement.
2. Define term Cursor. (C02, PO1)
3. Define term Trigger. (C02, PO1, PO2)
4. Define term Serial Schedule. (C03, PO1)
5. What is time stamp? (C03, PO1)
6. What are shared and exclusive locks? (C03, PO1)
7. List the actions of transaction recovered (C03, PO1) from deadlock.
8. What are shared and exclusive locks? (C03, PO1)
9. Give Thomas write rule. (C03, PO2)
10. List the ACID properties (C03, PO5)
11. State the different levels of security. (C04, PO3, PO4)
12. Write a short note on Mandatory Access (C04, PO3, PO4) Control method
13. What referential integrity. (C01, PO2, PO5)
14. What is database security? (C04, PO3)
15. Define simple security property. (C04, PO3, PO5)



Principal
P.V.G.'s College of Science
Vidyanagari, S. No. 44, Pravati,
Pune - 411 009.

P.V.G's College of Science, Pune 9
SPPU Practical Examination, May / June 2022

Class : F.Y. B.Sc. (CS) Semester II

Subject : Adv.C & RDBMS.

Roll No.	Student Name	Internal 15 marks	RDBMS			Total 35 marks
			Viva (5)	Adv.C (15)	RDBMS (15)	
FB001	ADAGALE SWAPNIL RAVINDRA	08	1	5	9	15
FB002	ADMANE GAYATRI YASHODHAN	08	2	5	9	16
FB003	AINAPURE ARYA HEMANT	08	2	5	10	17
FB004	ANDE RUCHITA AVINASH	13	5	7	9	21
FB005	BADADE NEHA SUNIL	14	3	14	13	30
FB006	BANSOD ADITI BHARAT	13	2	7	14	23
FB007	BARGIR ATHARV SUNIL	08	4	12	11	27
FB008	BARVE PRACHI ANAND	08	4	07	09	20
FB009	BATHE ATHARVA RAVINDRA	08	3	07	09	19
FB010	BEKE MANAS DHANANJAY	10	2	07	09	18
FB011	BHAGAT SWARAJ SACHIN	10	3	07	08	18
FB012	BHAGWAT RUTUJA RAMKISAN	14	4	10	12	26
FB013	BHARGUDE NIKITA PARBATI	13	02	12	10	24
FB014	BHIVARE MOHIT HANUMANT	08	2	13	02	17
FB015	BHORADE VAISHNAVI VITTHAL	14	4	11	12	27
FB016	BHOSALE ATHARVA BHARAT	08	4	11	10	25
FB017	BODHANI SOHAM RAHUL	14	3	13	13	29
FB018	BORADE YASH NILESH	14	4	15	11	30
FB019	BRAMHE UTKARSH PRAKASH	14	2	15	13	30
FB020	CHAVAN OM SHAIENDRA	10	Ab	07	09	17
FB021	CHAVAN VAISHNAVI JAGANNATH	10	1	07	09	17
FB022	CHHALLARE YUGANDHARA H.	08	2	02	10	14
FB023	CHOUDHARI SUMIT SANJAY	08	3	02	09	14
FB024	DABKE SWARAJ SAMEER	10	1	07	09	17
FB025	DANGI MAHENDRA MAHAVIR	13	3	10	11	24
FB026	DANVE PRANITA ANIL	08	1	09	10	20
FB027	DESHMUKH HARSHADA V.	10	3	02	11	16
FB028	DESHMUKH RUDRAKSHA MAHESH	08	3	02	09	14
FB030	DESHPANDE ATHARVA M.	10	2	02	10	14
FB029	DESHPANDE MEGHANA UMESH	15	4	12	15	31
FB031	DEVKATE CHAITALI AABASAHEB	14	3	14	11	28
FB032	DHUMAL PRIYRAJ AJIT	10	0	04	10	14

Ab



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Pune - 411 009.

Roll No.	Student Name	Internal 15 marks				Total 35 marks
FB068	KAMBLE ATHARVA ANIL	13	07	15	02	24
FB069	KAMBLE NIKITA VIJAY	15	15	12	04	31
FB070	KAMBLE SNEHA KAILAS	14	13	11	04	28
FB071	KAMTHE ANURAG PURUSHOTTAM	10	07	09	03	19
FB072	KANDHARE AYUSH HANUMANT	08	06	06	02	14
FB073	KARALE ARYA KAILAS	15	15	15	5	35
FB074	KARALE BHAGYASHREE VITTHAL	08	03	09	03	15
FB075	KARANDE SUSHANT SANJAY	10	03	09	03	15
FB076	KASBE YASH RAJESH	13	07	15	03	23
FB077	KATARE DISHA DINESH	15	14	15	04	33
FB078	KEDARI ATHARVA AMAR	08	06	09	03	18
FB079	KOLHAPURE ASHISH SHRIDHAR	08	04	09	03	16
FB080	KUBADE SAHIL VINAYAK	13	10	08	03	21
FB083	KUDAL GAYATRI ASHOK	14	11	15	03	29
FB081	KUKKAR KHUSHI RAVINDRA	14	11	15	04	30
FB082	KULKARNI SHUBHANKAR ASHISH	15	12	15	04	31
FB084	KUSEKAR SAKSHI VIJAY	14	10	15	02	27
FB085	LOKHANDE AKANKSHA R.	08	08	14	03	25
FB086	MADANE PRASHANT SOPAN	13	08	14	02	27
FB087	MALI ADITYA DIPAK	13	07	13	03	23
FB088	MALPOTE SAKSHI SANTOSH	13	08	14	02	24
FB089	MANDAL BIPIN DEEPAK	15	15	15	04	34
FB090	MANDHARE PRATIK VIJAY	14	10	15	03	28
FB091	MANDHARE YASH POPAT	15	14	15	03	32
FB092	MARATHE SHRUTIKA VASANT	14	12	14	01	27
FB093	MORE ADITYA SATISH	14	14	14	01	29
FB094	MORE DEVYANI SANJAY	13	08	14	01	23
FB095	MUSALE NISHA EKNATH	10	02	11	01	14
FB096	NAGARKAR SHREYAS SHRINIWAS	08	08	09	01	18
FB097	NAIK ISHWARI NANDALAL	10	03	09	02	14
FB098	NAIR RITIN VIJAY	08	02	09	03	14
FB099	NANGUDE PIYUSHA PRAVIN	13	04	15	03	22
FB100	NIGADE PAVAN SANDIP	10	03	08	03	14
FB101	NIGADE SHWETA GOPAL	10	06	10	03	19
FB102	NILEE LALIT AMAR	13	08	08	03	23
FB103	NIRGUN SAKSHI PRATAP	10	08	03	03	14

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Principal
P.V.G.'s College of Science
Vidyanagari, S. No. 44, Pravati,
Pune - 411 009.

Roll No.	Student Name	Internal				Total
		15 marks				35 marks
FB140	SUKHDEVE SHREYAS ARVIND	13	08	12	01	24
FB141	SULAKHE PRATHAMESH R.	13	03	09	02	24
FB142	SUPEKAR AKSHDA KALIDAS	14	07	14	04	25
FB143	SUTAR SANIL KISAN	14	13	12	01	26
FB144	TAKAWALE SAKSHI SANJAY	13	08	13	02	23
FB145	TAWDE AKANKSHA P.	14	13	12	01	26
FB146	TEKE PARTH PRASHANT	15	15	15	04	34
FB147	THORAT SAKSHI KIRAN	10	06	10	03	19
FB148	THORAT SRUSHTI SUNIL	10	03	10	02	15
FB149	VANARASE AMOD AVINASH	13	03	14	05	22
FB150	VAWAL SIDDHI SACHIN	10	03	12	01	16
FB151	VISPUTE KAUSTUBH MOHAN	13	07	12	03	22
FB152	WAGHMARE EKTA DEEPAK	13	11	10	02	23
FB153	WAGHMARE SALOMI VISHWAS	13	12	09	02	23
FB154	WAGHRESHA KRISH DEVENDRA	15	15	15	05	35
FB155	YADAV ATHARVA VIJAY	08	13	12	04	24
FB156	YADAV YASH SANTAJI	14	14	12	02	28
FB157	YANDE SAMRUDHI SANDIP	10	07	09	04	20
FB158	YELBHAR SHRAVANI ANIL	10	08	09	02	19
FB159	ZAMBRE JANHAVI PRASHANT	14	13	10	03	26
Signature of Examiner						
Name of Examiner						
	Subject Teacher	Internal Examiner		External Examiner		

FB160 Jadhav Arnav Vitthal ¹⁴ | 13 | 12 | 01 | 26



[Signature]

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2.6.2. Attainment of Programme outcomes & Course outcomes are evaluated by the institution.

S.Y.B.Sc(CS) 2021-22 SEM-IV

MTC 242: Operations Research

Course Outcome:

CO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.

CO2: A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.

CO3: A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

Program Outcome:


PO1: Critical Thinking: Identify problems, analyze them, and apply knowledge of Computer Science to develop problem solving abilities to provide effective solution to cater the industrial needs

PO2: Analytical skill: Ability to build the necessary skill set to design and develops algorithms to provide software solutions using analytical abilities using computer based solutions for real life problems.

PO3: Employability Skills: In culcate skills to imbibe equality software development practices in the fields of Information Technology and its Enabled services, Government and private sectors, teaching and Research.

PO4: Ethics: In fuse ethical, human and professional values and responsibilities to make their contribution to the society.




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Assignment No.1 Linear Programming Problem

Define Operation Research (CO1,PO1,PO4)

Explain Scope of Operation Research (CO1,CO3,PO2)

Applications & Limitations Of OR (CO2,CO3,PO3)

Mathematical Model of LPP (CO1,CO2,PO2,PO3)

Draw a Feasible region for the following constraints.

(CO1,CO2,PO2,PO3)

$$x+2y \geq 10$$

$$x+y=5 \quad x,y \geq 0$$

Find feasible region for the following LPP: (CO1,CO2,PO2,PO3)

Maximize $Z = x+y$

Subject to, $2x+3y=5$

$$2x+3y=3 \quad x,y \geq 0$$

A Production manager wants to determine the quantity to be produced per month of products A & B manufactured by his firm. The raw materials required per unit of product A is 60 Kg. & that for per unit of product B is 20 Kg. The availability of the raw material is 12,00 Kg. Machine hours required per piece of product A & B is 8 & 5 respectively. The assembly of products A & B per piece required 3 man hours & 4 man hours respectively. The machine hours & man hours available to maximum of 600 & 500 respectively. The profit per unit of A is Rs.30 & B is Rs.40. Formulate the LPP & solve it by graphical method. ((CO1,CO2,PO2,PO3)

A firm manufactures headache pills in two sizes A & B. Size A contains 2 grains of aspirin, 5 grains of bicarbonate & 1 gram of codeine. Size B contains 1 grain of aspirin, 8 grains of bicarbonate & 6 grains of codeine. It is found by users that it requires at least 12 grains of aspirin, 74 grains of bicarbonate & 24 grains of codeine for providing immediate effect. It is required to determine the least number of pills a patient should take to get immediate relief. Formulate the problem as a LPP & solve it by graphically. (CO1,CO2,PO2,PO3)

Solve following LPP by graphically & find optimum solution (CO1,CO2,CO3,PO2,PO3)

a) $\text{Max } Z = 24x + 8y$

b) $\text{Min } Z = 3x + 4y$

Subject to, $2x + 3y \leq 40$

Subject to, $2x + 3y \geq 36$

(CO1,CO2,PO2,PO3) $4x + y \leq 20$

$$2x + 2y \geq 28$$

$$10x + 8y \leq 60 \quad x, y \geq 0$$

$$8x + 2y \geq 32 \quad x, y \geq 0$$

c) $\text{Max } Z = 80x + 120y$

d) $\text{Min } Z = 40x + 100y$

Subject to, $x + y \leq 9$

Subject to, $12x + 6y \leq 3000$

$$x \geq 2, \quad y \geq 3,$$

$$4x + 10y \leq 900$$

$$6x + 5y \leq 60 \quad x, y \geq 0$$

$$2x + 3y \leq 900 \quad x, y \geq 0$$



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Assignment No.2

Que.1) Find the initial basic feasible solution of the following transportation problem by North West Corner Method. Is this solution optimal? If not find an optimal solution. (CO1, PO1, PO2)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	7	3	8	6	60
O ₂	4	2	5	10	100
O ₃	2	6	5	1	40
Demand	20	50	50	80	

Que .2) Find the initial basic feasible solution of the following transportation problem by North West Corner Method. Is this solution optimal? If not find an optimal solution. (CO1, CO2, PO2, PO3)

	I	II	III	Supply
A	16	20	12	200
B	14	8	18	160
C	26	24	16	90
Demand	180	120	150	

Que.3) Find the IBFS for the following transportation problem by matrix minima Method. (CO2, CO3, PO2, PO3, PO4)

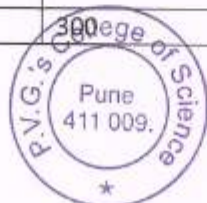
Origin	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	2	4	1	3	200
O ₂	2	2	1	4	250
Demand	150	75	200	100	


Ques.4) Find the IBFS for the following transportation problem by matrix minima Method. (CO2, CO3, PO4)

Origin	D ₁	D ₂	D ₃	D ₄	Supply
	1	2	1	4	30
	3	3	2	1	50
	4	2	5	9	20
Demand	20	40	30	10	

Que.5) Find IBFS for the following T.P. using VAM. Also find the optimal solution by MODI Method. (CO2, CO3, PO4)

Origin	D ₁	D ₂	D ₃	Supply
O ₁	40	70	90	300
O ₂	12	80	30	400
O ₃	60	90	45	200
Demand	300	300	300	




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Que.6) Find IBFS for the following T.P. using VAM. Also find the optimal solution by MODI Method. (CO2, CO3, PO4)

Profit					Supply
	5	3	6	4	30
	3	4	7	8	15
	9	6	5	8	15
Demand	10	25	18	7	

Que.7) Solve the following T.P. by VAM to maximize the profit. (CO2, CO3, PO3, PO4)

Profit					Supply
	90	90	100	100	200
	50	70	130	85	100
Demand	75	100	100	30	


Que.8) Solve the following T.P. by VAM to maximize the profit. (CO2, CO3, PO3, PO4)

Profit			Supply
	19	17	20
	8	1	30
	12	5	40
Demand	35	30	

Que.9) Explain mathematical Formulation of T.P. (CO2, CO3, PO3, PO4)

Que.10) Explain degeneracy in the T.P. How it can be resolved. (CO2, CO3, PO3, PO4)




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Assignment No.3

Que.1 Solve the following assignment problems to maximize the profit
(CO1,CO2,CO3,PO1,PO2)

1)

	A	B	C	D	E
I	30	37	40	28	40
II	40	24	27	21	36
III	40	32	33	30	35
IV	25	38	40	36	36
V	29	32	41	34	39

2)

	M ₁	M ₂	M ₃	M ₄
J ₁	5	7	11	6
J ₂	8	5	9	6
J ₃	4	7	10	7
J ₄	10	4	8	3

3)

	1	2	3	4
I	30	37	40	28
II	40	24	27	21
III	40	32	33	30
IV	25	38	40	36
V	29	32	41	34

4)

	A	B	C	D	E
1	62	78	50	101	82
2	71	84	61	73	59
3	87	92	111	71	81
4	48	64	87	77	80

Que.2) Solve the assignment problems for minimum costs. (CO3,PO2,PO3,PO4)

1)

	M ₁	M ₂	M ₃	M ₄
J ₁	10	10	-	7
J ₂	12	9	7	8
J ₃	14	8	10	-
J ₄	12	7	11	12

2)

	I	II	III	IV	V
A	3	4	10	15	8
B	4	7	15	18	8
C	8	12	20	20	12
D	5	5	8	10	6
E	10	10	15	25	10

3)

	A	B	C
J ₁	470	580	410
J ₂	385	920	740
J ₃	880	550	430



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4) Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows. Determine the optimum assignment schedule. (CO1,CO3,PO3,PO4)

		Job				
		1	2	3	4	5
Person	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

5) Solve the following assignment problem.(CO1,CO2,CO3,PO3,PO4)

		Men		
		1	2	3
Task	P	9	26	15
	Q	13	27	6
	R	35	20	15
	S	18	30	20

6) Mathematical representation of Assignment problem.(CO1,PO1,PO4)

7) Explain Hungarian Method to solve Assignment problem. (CO1,PO1,PO4)

MCQ QUESTIONS: (CO1,PO1,PO4)

1. If the number of rows and columns in an assignment problem are not equal than it is called problem. (a) Prohibited (b) infeasible (c) unbounded (d) unbalanced
2. The method of solution of assignment problems is called method.
(a) NWCR (b) VAM (c) LCM (d) Hungarian
3. When a maximization assignment problem is converted in minimization problem, the resulting matrix is called (a) Cost matrix (b) Profit matrix (c) Regret matrix (d) Dummy matrix
4. The extra row or column which is added to balance an assignment problem is called
(a) Regret (b) epsilon (c) dummy (d) extra
5. When a particular assignment in the given problem is not possible or restricted as a condition, it is called a problem.
(a) Infeasible (b) degenerate (c) unbalanced (d) prohibited
6. If in an assignment problem, number of rows is not equal to number of columns then
(a) Problem is degenerate (b) Problem is unbalanced (c) It is a maximization problem (d) Optimal solution is not possible



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PVG College of science & commerce
FY. B.Sc. Animation AY 2021-2022
Subject - ANM101 FOUNDATION OF ART
SEM - I

Course Outcomes:-

Student will be able to:-

1. **CO1:** Could you please summarize the fundamental principles of drawing and handling
2. **CO2:** Materials, emphasizing the significance of design elements? Additionally, could you
3. **CO3:** Provide an example of how to apply one to two-point perspective in drawing.
4. **CO4:** Discuss the principles of colour theory and colour harmony in drawing and sketching.
5. **CO5:** Demonstrate rendering techniques with suitable styles and proportions.

Program Outcomes:-

- 1 **PO1:** Product Development: Analyse, design and develop novel products and Solutions for emerging new media opportunities.
- 2 **PO2:** Skill Competency: Demonstrate globally accepted competent skills in passive and interactive content space.
- 3 **PO3:** Problem Analysis: Identify, formulate and solve complex media design challenges using fundamental principles involved in technology, design and storytelling.
- 4 **PO4:** Modern Tool / Techniques usage: Select, adapt, and apply appropriate tools, techniques, resources to various activities, with an understanding of their boundaries...
- 5 **PO5:** Professional Ethics: Understand and commit to professional ethics and IP regulations, responsibilities, and norms of professional publishing practices based on Criteria.

Sketching (15 hrs.):

1. Assignment for Drawing Basic Shapes (Two and Three Dimensional)- **CO3, PO3**
2. Drawing and Developing five objects using Basic shapes. - **CO3, PO1, PO4**
3. (E.g. Car, Cup and Saucer)- **CO1, PO4**
4. Practicing Technique of Pencil Shading. – **CO4, PO4**
5. Making 10 point Grayscale using two of the Shading techniques. - **CO4, PO4**
6. Types of Colours (Primary, Secondary, Tertiary), demonstration and assignment- **CO4, PO4**
7. Sketching Eyes, Ear, Nose and lips. - **CO1, PO1, PO3**
8. Sketching Hand and Feet. – **CO1, PO1, PO3**
9. Sketching Human Face.- **CO1, PO1, PO3**
10. Foreshortening of hand and legs. - **CO2, CO3, PO3, PO4**
11. Assignment for Muscle Drawing. - **CO1, PO3**
12. Drawing Basic Human figure (Male, Female, and Child) - **CO1, PO1,**

Flipbook

1. Drawing different mannequin poses. - **CO3, PO1**
2. Sequential drawing for figures (E.g. - Walking, Running, Jumping) – **CO1, PO2**
3. Sequential drawing for objects (E.g. - Grain Sack, Cube with tail.) – **CO3, PO3**
4. Making a Flipbook for a "Ball with Tail" and colouring it - **CO3, PO3**
5. Making a Flipbook for "Growing Flower" or any other subject (of your choice) and colouring it - **CO4, PO4**

PVG College of science & commerce
FY. B.Sc. Animation AY 2021-2022
Subject – ANM102 BASICS OF ANIMATION
SEM - I

Course Outcomes:-

1. **CO1:** Identify and apply the 12 Animation Principles through Digital Animation.
2. **CO2:** Understand timing and motion through key-frames, holds and in-betweens
3. **CO3:** Demonstrate skills in the use of industry standard tools

Program Outcomes:-

1. **PO1:** Product Development: Analyse, design and develop novel products and
2. Solutions for emerging new media opportunities.
3. **PO2:** Skill Competency: Demonstrate globally accepted competent skills in passive and interactive content space.
4. **PO3:** Problem Analysis: Identify, formulate and solve complex media design challenges using fundamental principles involved in technology, design and storytelling.
5. **PO4:** Modern Tool / Techniques usage: Select, adapt, and apply appropriate tools, techniques, resources to various activities, with an understanding of their boundaries...
6. **PO5:** Professional Ethics: Understand and commit to professional ethics and IP regulations, responsibilities, and norms of professional publishing practices based on Criteria.

Assignment:-

- 1) Bouncing ball - **CO1, PO2**
- 2) Bouncing ball with different type of ball – **CO1, CO2, PO3**
- 3) Single Pendulum – **CO1, CO2, PO3**
- 4) Double Pendulum – **CO1 CO2, CO3,**
- 5) Cartoon Character - **CO1 CO2, CO3, PO4**
- 6) Character jump -**CO1, CO2, CO3,**
- 7) Arc - **CO1, CO2, CO3,**
- 8) Walk cycle – male - **CO1, CO2, CO3, PO3**
- 9) Walk cycle – female - **CO1, CO2, CO3, PO3**
- 10) Run cycle – male - **CO1, CO2, CO3, PO3**
- 11) Run cycle – female - **CO1, CO2, CO3, PO3**
- 12) Character acting with dialog – **CO1, CO2, PO1, PO3**
- 13) Masking - - **CO1, CO2, PO3**
- 14) Character Expression – **CO1, PO3**
- 15) Character animation with 12 principles - **CO1, CO2, CO3, PO3**

P.V.G's College of Science, Pune-9

Academic Year : 2021-22

Department of Animation


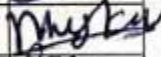
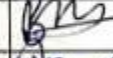
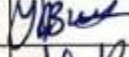
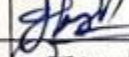

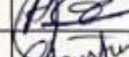
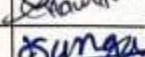
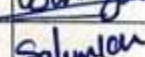
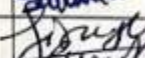
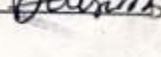
Class F.Y. B.Sc. (Animation)

First Term Internal Examination - 2021-22

SEMESTER = 01

Subject Name : ANM102 Basics of Animation

Teacher Name : Siddhant Khanolagele

Sr No	Seat Number	Student Name	Internal Exam 30 Marks	Sign
1	11001	Ajinkya Varade	25	
2	11002	Bahelim Muskan Mahummad Muzaffar	25	
3	11003	Maitreya Bhate	26	
4	11004	Yash Bhavsar	25	
5	11005	Deokule Utkarsh Pramod	27	
6	11006	Gaikwad Dnyanesh Madhukar	27	
7	11007	Atharva Ganorkar	23	
8	11008	Gitanjali Siddheshwar Lamture	27	
9	11009	Sanga omkar sanjeev	30	
10	11010	Salunke Sara Sanjay	25	
11	11011	Saurabh Ajay Vairagar	26	


HOD

P.V.G's College of Science, Pune-9

Academic Year : 2021-22

Department of Animation

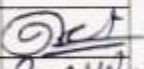
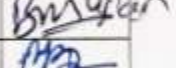
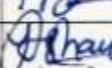
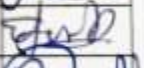
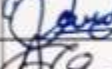
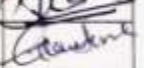
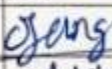
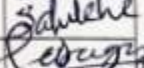
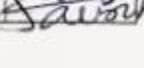


Class F.Y. B.Sc. (Animation)

First Term Internal Examination - 2021-22

SEMESTER = 1

Subject Name : ANM101 foundation of Art

Teacher Name : Ashish Thorat

Sr No	Seat Number	Student Name	Internal Exam 30 Marks	Sign
1	11001	Ajinkya Varade	25	
2	11002	Bahelim Muskan Mahummad Muzaffar	23	
3	11003	Maitreya Bhate	26	
4	11004	Yash Bhavsar	24	
5	11005	Deokule Utkarsh Pramod	24	
6	11006	Gaikwad Dnyanesh Madhukar	22	
7	11007	Atharva Ganorkar	26	
8	11008	Gitanjali Siddheshwar Lamture	25	
9	11009	Sanga omkar sanjeev	25	
10	11010	Salunke Sara Sanjay	23	
11	11011	Saurabh Ajay Vairagar	22	


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