Total No. of Questions : 5]

SEAT No. : ____

PB1871

[Total No. of Pages : 2

[6237]-301
S.Y. B.Sc.
COMPUTER SCIENCE
CS-231 : Data Structures and Algorithms - I
(Rev.2019) (Semester - III) (Paper - I) (23121)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***All questions are compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt any 8 of the following. **[8×1=8]**

a) What is Data structure?

b) Define sorting.

c) Define the null list.

d) State True/False-stack follows First In First out order

e) What is double ended queue.

f) Define Big Theta (θ).

g) Write any two applications of queue.

h) What is the best and worst case time complexity of sequential search?

i) Write node structure for dynamic implementation of stack.

j) List the types of Linked, List.

Q2) Attempt any four of the following: **[4×2=8]**

a) What is ADT? Write any two advantages of ADT.

b) Differentiate between Linear Search and binary search.

c) Write a note on Generalized Linked List.

d) Define stack. Write any two applications of stack.

e) Explain the need of circular Queue.

P.T.O.

Q3) Attempt any two of the following. **[2×4=8]**

a) Write a 'C' program to search an element using linear search Algorithm.

b) Write a 'C' functions for push ( ) and pop ( ) to implement static stack.

c) Write a 'C' function to delete the node from Singly Linked List. (By position)

Q4) Attempt any two of the following. **[2×4=8]**

a) Sort the following elements using selection sort: 81, 39, 79, 15, 59, 35.

b) Convert the following infix expression to postfix form using stasck:

(((A/B)/C)+(D∗E))

Also evaluate postfix expression by using the values A = 32, B = 4, C = 2, D = 5 and E = 1.

c) Compare Array and Linked List Data structure.

Q5) Attempt any one of the following. **[1×3=3]**

a) Write a note on Dequeue.

b) Differentiate between singly and Doubly Linked List.

Total No. of Questions : 5]

SEAT No. : ____

[Total No. of Pages : 2

PB-1872

[6237]-302
S.Y. B.Sc.
COMPUTER SCIENCE
CS - 232 : Software Engineering
(Rev.2019) (CBCS) (Semester - III) (23122)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn if necessary.***

Q1) **Attempt any EIGHT of the following:** **[8 × 1 = 8]**

a) Define Abstraction.

b) What is class and object?

c) What is SRS?

d) Define Agile Development.

e) State true or false: Spiral model is a combination of both iterative model and one of the SDLC model.

f) Define analysis pattern.

g) What is XP?

h) Define artifact.

i) List architectural design element.

j) List of UML diagram (any two).

Q2) **Attempt any FOUR of the following.** **[4 × 2 = 8]**

a) What is actor?

b) List types of Design pattern.

c) List any 4 names and symbols of Activity diagram.

d) Which are the three classification of UML diagram.

e) List phases of RAD model.

P.T.O

Q3) **Attempt any TWO of the following.** **[2 × 4 = 8]**

a) Explain the term validating requirement in details.

b) List the activities of spiral model in details.

c) Define the following terms:

i) Node

ii) Inheritance

iii) Polymorphism

iv) Collaboration

Q4) **Attempt any TWO of the following.** **[2 × 4 = 8]**

a) Explain relationship in UML.

b) Write short notes on Umbrella activities.

c) Draw component diagram for online shopping.

Q5) **Attempt any ONE.** **[1 × 3 = 3]**

a) Explain waterfall model with diagram.

b) Draw sequence diagram for telephone (Landline) dialing and explain all possible states.

Total No. of Questions : 3]

SEAT No. :

PB-1873

[Total No. of Pages : 2

[6237]-303

S.Y. B.Sc. (Computer Science)

MATHEMATICS

MTC - 231 : Groups and Coding Theory

(Rev.2019) (Semester - III) (23221) (Paper - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Non-programmable, scientific calculator is allowed.***

Q1) **Attempt any five of the following :** **[5 × 2 = 10]**

a) Prepare Cayley table for U(8).

b) Find the Hamming distance between X = 110110 and Y = 000101.

c) Check whether the permutation (1, 2) (1, 3, 4), (1, 5, 2) is even or odd.

d) Find any two generators of Z_{12}.

e) State whether the following statement is true or false, Justify 'Intersection of two subgroups is a subgroup'.

f) If a / b then show that a / bx, for any $x \in Z$.

g) Let $G = (Z_4, +_4)$ be a group and $H = \{0, 2\}$ be a subgroup of G. Find all right cosets of H in G.

Q2) **Attempt any three of the following :** **[3 × 5 = 15]**

a) The set of integers Z under the binary operation $*$ defined by $a * b = a + b - 2$, for $a, b \in Z$. Show that $(Z, *)$ is a group.

b) Let $a, b, x, y \in Z$. If $a \equiv b \pmod{n}$ then prove that

i) $ax \equiv bx \pmod{n}$

ii) $(a + x) \equiv (b + x) \pmod{n}$

c) Let $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix}$ and $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 3 \end{pmatrix}$ in S_4 show that $\beta\alpha = \alpha^{-1}\beta$.

P.T.O.

d) Find the number of code words generated by the following pairity check matrix H. Also find code words generated by

$$H = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

e) Let a, b, c, d be integers then prove that

i) If a / b and a / c then $a / (b + c)$

ii) If a / b and c / d then ac / bd

Q3) **Attempt any one of the following :** **[1 × 10 = 10]**

a) Find $g.c.d$ of 3587 and 1819. Find integers m and n such that $(3587, 1819) = (3587)\, m + (1819)\, n$.

b) i) Using RSA method with $p = 11$, $q = 5$ $e = 7$ encrypt message 'GOOD'.

ii) State and prove Euclid's lemma.

▽▽▽▽

Total No. of Questions : 3]

SEAT No. : ____

PB-1874

[Total No. of Pages : 2

[6237]-304

S.Y. B.Sc. (Computer Science)

MATHEMATICS

MTC 232 : Numerical Techniques

(Rev.2019) (Semester - III) (Paper - II) (23222)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Non - programable scientific calculator is allowed.***

Q1) Attempt any five of the following : **[5 × 2 = 10]**

a) Find relative error of the number 1.53364.

b) Write formula for regula falsi method to obtain real root of any equation.

c) State Newton - Gregory formula for forward interpolation.

d) State Simpson's $(3/8)^{th}$ rule for numerical integration.

e) If $f(0) = 1$, $f(0.6) = 0.625$, $f(1.2) = 0.4545$, Find $\int_0^{1.2} f(x)\,dx$ using Trapezoidal rule.

f) Find $y(0.2)$, $\frac{dy}{dx} = -y, y(0) = 1$ using Euler method. Take $h = 0.2$.

g) Prove that : $(1+\Delta)(1-\nabla) = 1$ by usual notation.

P.T.O.

Q2) Attempt any three of the following : **[3 × 5 = 15]**

a) Find real root of the equation $x^3 + x^2 + 3x + 4 = 0$ by Newton - Raphson method, correct upto 4 decimal. (Take $x_0 = -1.1$).

b) From the following data, find the value of $\log_{10}(308)$ by Backward interpolation.

x	300	302	304	306
$y = \log_{10} x$	2.47712	2.48001	2.48287	2.48572

c) Find the cubic polynomial by lagrange's interpolation which takes the following data.

x	0	1	2	3
f(x)	1	0	1	10

d) Evaluate $\int_0^1 \frac{1}{1+x} dx$ using Simpson's $(1/3)^{rd}$ rule. (Take h = 0.1)

e) Determine the value of $y(0.1)$ upto 4 decimal places by using Euler's modified method Given : $y(0) = 1, \frac{dy}{dx} = x + y$ (Take h = 0.1)

Q3) Attempt any one of the following : **[1 × 10 = 10]**

a) Use Runge - kutta fourth order method to solve $\frac{dy}{dx} = y - x$. Where $y(0) = 2$ obtain $y(0.1)$ and $y(0.2)$. (take $h = 0.1$).

b) i) Derive General Quadrature formula for numerical integration.

ii) Using Newton Divided Difference formula to calculate the value of $f(5)$.

x	1	2	7	8
$f(x)$	1	5	5	4

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Total No. of Questions : 5]

SEAT No. :

PB-1875

[Total No. of Pages : 2

[6237]-305

S.Y. B.Sc. (Computer Science)

ELECTRONIC SCIENCE

ELC 231 : Microcontroller Architecture & Programming

(Rev. 2019 Pattern) (Semester - III) (Paper - I) (23321)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is Compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of calculator is allowed.***

Q1) Attempt any five **[5 × 1 = 5]**

a) Define assembler directives.

b) What is the value of program counter after power on reset?

c) Write function of Auxillary carry flag (AF).

d) Which timer mode of 8051 microcontroller is 8 bit autoreload mode.

e) What is the step size of 8 bit ADC, if Vref = 2.56v.

f) Which is the lowest priority interrupt in 8051?

Q2) Answer the following : **[2 × 5 = 10]**

a) With the help of neat block diagram explain 8051 microcontroller. **[5]**

b) i) Write ALP program to send values ooHto FFH to port 1. **[3]**

ii) Draw block diagram to interface 7-segment display with 8051. **[2]**

P.T.O.

Q3) Answer the following : **[2 × 5 = 10]**

a) Differentiate between Asynchronous and synchronous serial communication.

b) Write the operation of following 8051 instruction

i) Mov A, # 40H

ii) MUL AB

iii) SETB 074

iv) INC RO

v) CPL A

Q4) Answer the following : **[2 × 5 = 10]**

a) Write 8051 c program to generate sawtooth wave also draw block diagram for interfacing DAC 0808 with 8051?

b) Draw bit format of IE register and explain function of each bit.

Q5) Write a short note on any four of the following : **[4 × 2½ = 10]**

a) Addressing modes of 8051 microcontroller (Any 3)

b) Features of 8051 microcontroller

c) Stepper motor

d) RAM organization

e) SCON register

f) TMOD register

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Total No. of Questions : 5]

SEAT No. :

PB-1876

[Total No. of Pages : 2

[6237]-306
S.Y. B.Sc.(Computer Science)
ELECTRONIC SCIENCE
ELC - 232 : Digital Communication and Networking
(Rev 2019 Pattern) (Semester - III) (Paper - II) (23322)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be brawn wherever necessary.***
5) ***Use of calculator is allowed.***

Q1) **Answer any five :** **[5]**

a) What is mean by bandwidth?

b) Define signal to noise ratio.

c) What is the need of modulation?

d) What is MAC?

e) Define guard time in TDMA?

f) What is mean by Ethernet?

Q2) **Answer the following.** **[2 × 5 = 10]**

a) Differentiate between FDM and TDM.

b) Describe electronic communication system with the help of block diagram.

Q3) **Answer the following.** **[2 × 5 = 10]**

a) Describe in brief MAN and WAN.

b) List any five features of FDMA.

P.T.O

Q4) **Answer the following.** **[2 × 5 = 10]**

a) Compare asynchronous and synchronous communication.

b) Explain OSI model in brief.

Q5) Write a short note on any four of the following. **[4 × 2.5 = 10]**

a) Quantization process in PCM.

b) Star topology.

c) Switch networking device.

d) Synchronous TDM.

e) CSMA/CD.

f) Half duplex and full duplex.

Total No. of Questions : 5]

SEAT No. : ____

PB1877

[Total No. of Pages : 2

[6237]-401
S.Y. B.Sc.
COMPUTER SCIENCE
CS-241 : Data Structures and Algorithms - II
(Revised 2019 Pattern) (CBCS) (Semester - IV) (24121)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***All questions are compulsory.***
3) ***Your answers will be values as a whole.***
4) ***Neat diagrams must be drawn whenever necessary.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) What is Binary Search Tree?

b) What is childnode?

c) What is ancestors?

d) What is directed graph?

e) Define indegree of a node.

f) Define cycle.

g) What are valid possible values for balance factor?

h) Define multi way search tree.

i) What is hash address?

j) Define overflow in hashing.

Q2) Attempt any four of the following. **[4×2=8]**

a) Define following terms:

   i) internal node

   ii) max heap

b) Write a note on graph.

c) Give any two applications of Lexical Search Tree.

d) Write a note on hash function.

e) Explain min heap with suitable example.

P.T.O.

Q3) Attempt any two of the following. **[2×4=8]**

a) Write a 'C' function to find out mirror tree.

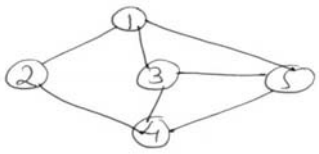
b) Write a 'C' program to accept adjacency matrix and traverse using Depth First Search (DFS) algorithm.

c) Write a 'C' function to insert element in hash table.

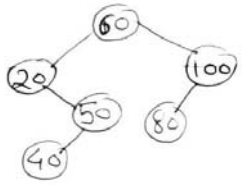
Q4) Attempt any Two of the following. **[2×4=8]**

a) Construct Red Black Tree for 75, 37, 52, 110, 130, 90.

b) Give adjacency matrix and adjacency list for?

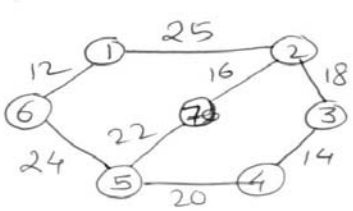


c) Give the inorder, preorder & postorder for:



Q5) Attempt any one of the following. **[1×3=3]**

a) Construct the minimum spanning tree for the given graph using prim's algorithm.



b) Construct AVL tree for 5, 4, 22, 17, 20, 22, 30.

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Total No. of Questions : 5]

SEAT No. : ____

PB-1878

[Total No. of Pages : 2

[6237]-402
S.Y. B.Sc.
COMPUTER SCIENCE
CS-242 : Computer Networks - I
(Rev.2019) (Semester - IV) (24122)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are Compulsory.***
2) ***Neat diagram must be drawn if necessary.***

Q1) Attempt any EIGHT of the following (out of Ten) : **[8 × 1 = 8]**

a) What are the different layers of OSI reference model?

b) Define routing algorithm.

c) What is subnet?

d) Which is a 32-bits IP address?

e) Define Port number.

f) Find the network id of IP address : 145.25.10.100.

g) What is pushing?

h) What is congestion control?

i) Write the transport layer protocols.

j) What is the window size of TCP segment?

Q2) Attempt any FOUR of the following (out of Five) : **[4 × 2 = 8]**

a) Write the Nyquist bit rate formula for noiseless channel.

b) A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minute with each frame carrying an average of 10,000 bits. What is the throughput of this network?

c) Find the class of each address :

i) 00000001 00001011 00001011 11101111

ii) 10100111 11011011 10001011 01101111

d) Define the terms HA and FA in MIP

e) List any two features of TCP.

P.T.O.

Q3) Attempt any two of the following (out of Three) : **[2 × 4 = 8]**

a) Explain Mesh topology in details.

b) What is framing? Explain any two framing methods.

c) Describe the functions performed by Data Link layer.

Q4) Attempt any two of the following (out of Three) : **[2 × 4 = 8]**

a) Write the notations for IP address.

b) Find out class, netid, hostid & network address of IP address 126.25.21.1

c) Explain encapsulation and decapsulation process at transport layer.

Q5) Attempt any ONE of the following (out of two) : **[1 × 3 = 3]**

a) Describe three types of stations in a wireless LAN.

b) Draw and explain UDP datagram.

Total No. of Questions : 3]

SEAT No. : ____

PB-1879

[Total No. of Pages : 2

[6237]-403

S.Y. B.Sc. (Computer Science)

MATHEMATICS

MTC - 241 : Computational Geometry

(Revised 2019) (Semester - IV) (24221) (Paper - I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Non-programmable, scientific calculator is allowed.***

Q1) **Attempt any five of the following :** **[5 × 2 = 10]**

a) If the transformation matrix $[T] = \begin{bmatrix} 3 & 1 \\ -2 & 2 \end{bmatrix}$ is used to transform circle of radius 10 cm then find area of transformed circle.

b) Is $[T] = \begin{bmatrix} 1/2 & \sqrt{3/2} \\ -\sqrt{3/2} & 1/2 \end{bmatrix}$ a pure rotation? Justify?

c) Write transformation matrix for shearing in Y-co-ordinate proportional to X and Z co-ordinates by factors 3 and 5 units respectively.

d) Give any two examples of parallel projection.

e) Find angle of rotation about origin so that the line $y = 2x$, coincides with x-axis.

f) Determine the principle forshortening factors f_x and f_y of the matrix for axonometric projection. $[T] = \begin{bmatrix} 0.87 & 0.05 & 0 & 0 \\ 0 & -0.69 & 0 & 0 \\ 0.08 & -0.74 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

g) Write transformation matrix for translation so that the plane $Z = 2$ coincide with XY - plane.

P.T.O.

Q2) **Attempt any three of the following :** **[3 × 5 = 15]**

a) Find combine transformation matrix for the following sequence of transformations.

i) Rotation about origin by 50º

ii) Shearing in Y - direction by -2.1 units

iii) Uniform scaling by factor 2

Apply it on triangle with vertices O[0,0], A[1,2] and [3, –1]

b) Rotate the line segment between the points A[1,1] and B[3, 3] about point [1, 2] by an angle 90°.

c) If a 2 × 2 transformation matrix [T] is applied on a pair of parallel lines then prove that they are transformed to a pair of parallel lines.

d) Develop cavalier and cabinet projection for $\alpha = 120^{o}$ of the object

$$[x] = \begin{bmatrix} 1 & 2 & 2 & 1 \\ 0 & 1 & 2 & 1 \end{bmatrix}$$

e) Develop the right view of the object whose position vector matrix is given by

$$[x] = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Q3) **Attempt any one of the following :** **[1 × 10 = 10]**

a) If $B_0[2,1]$, $B_1[4,4]$, $B_2[5,3]$ and $B_3[5,1]$ are vertices of Be'zier polygon. Find parametric equation of Be'zier curve also find p(t) at t = 0.2, t = 0.4 and t = 0.6.

b) i) Rotate the line segment AB where A [1,2,4] and B [2,2,1] about local X - axis passes through the point [2,3,4] by an angle 65º.

ii) Generate uniformly spaced three points in first quadrant of circle $x^2 + y^2 = 49$.

Total No. of Questions : 3]

SEAT No. : ____

PB-1880

[Total No. of Pages : 4

[6237]-404

S.Y. B.Sc. (Computer Science)

MATHEMATICS

MTC - 242 : Operations Research

(Rev.2019) (Semester - IV) (24222) (Paper - II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Non-programmable, scientific calculator is allowed.***

Q1) **Attempt any five of the following :** **[5 × 2 = 10]**

a) Write the dual of the following linear programming problem.

Minimize $Z = x_1 - 2x_2$

Subject to,

$$2x_1 + 3x_2 \geq 5$$

$$x_1 - 4x_2 \geq 6$$

$$x_1, x_2 \geq 0$$

b) Find feasible region for the following linear programming problem.

Maximize $Z = x + y$

Subject to,

$$x \leq 5$$

$$y \leq 10$$

$$x, y \geq 0$$

c) Write any two applications of operations research.

d) Find initial basic feasible solution for the following Transportation problem by North-West corner method.

1	0	2	4
3	5	4	6
1	2	3	10
3	5	12	

P.T.O.

e) Maximize $Z = x_1 + 2x_2 + x_3$

Subject to, $x_1 + x_2 + x_3 = 1$

$x_1 - x_2 + x_3 = 2$

$x_1, x_2, x_3 \geq 0$

obtain initial basic feasible solution of above linear programming problem.

f) Solve the following assignment problem for minimizing total time for doing all Jobs

Jobs

Operators	I	II	III
A	6	4	5
B	2	11	4
C	13	8	3

g) What is rim condition for Transportation problem.

Q2) **Attempt any three of the following :** **[3 × 5 = 15]**

a) Solve the following assignment problem for maximization.

	Z_1	Z_2	Z_3	Z_4
S_1	100	140	280	70
S_2	130	160	200	60
S_3	80	130	300	90
S_4	150	110	250	50

b) Solve the following linear programming problem by graphical method.

Maximize $Z = 6x_1 + 11x_2$

Subject to $2x_1 + x_2 \leq 104$

$x_1 + 2x_2 \leq 76$

$x_1, x_2 \geq 0$

c) Find the initial basic feasible solution for the following

Transportation problem by using Least cost entry method.

Destinations

		D_1	D_2	D_3	Supply
Origin	O_1	40	70	90	300
	O_2	12	80	30	400
	O_3	60	90	45	200
	Demand	300	300	300	

d) Solve the following linear programming problem by simplex method

Maximize $Z = 2x + y$

Subject to $x - y - z \leq 1$

$x - 2y + z \leq 2$

$x \geq 0, y \geq 0, z \geq 0$

e) Find initial basic feasible solution by Vogel's Approximation method for the following transportation problem.

	D_1	D_2	D_3	D_4	Supply
O_1	23	27	16	18	30
O_2	12	17	20	51	40
O_3	22	28	12	32	53
Demand	22	35	25	41	

Q3) **Attempt any one of the following :** **[1 × 10 = 10]**

a) Solve the following linear programming problem by simplex method

Maximize $Z = 30x + 20y$

Subject to $6x + 8y \leq 480$

$-3x + 3y \leq -240$

$x \geq 0, y \geq 0$

b) Obtain optimal solution of the following transportation problem by MODI method

	D_1	D_2	D_3	D_4	
O_1	2	3 (6)	4	5	6
O_2	5	4	3 (2)	1 (6)	8
O_3	1 (4)	3	3 (6)	2	10
	4	6	8	6	

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Total No. of Questions : 5]

SEAT No. : ____

PB-1881

[Total No. of Pages : 2

[6237]-405

S.Y. B.Sc. (Computer Science)

ELECTRONICS SCIENCE

ELC - 241 : Embedded System Design

(Revised 2019) (Semester - IV) (24321) (Paper - I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn whenever necessary.***
5) ***Use of calculator is allowed.***

Q1) **Attempt any five :** **[5 × 1 = 5]**

a) What is SBC?

b) What is the significance of DMA in SoCs?

c) What does the term flexibility related to SoCs?

d) What is the use of 'print tuple' instruction in python?

e) List any two standard datatypes in python.

f) What is significance of GPIO. Pins in Raspberry Pi?

Q2) **Answer the following :** **[2 × 5 = 10]**

a) Differentiate between microcontroller and single board computers?

b) Draw the proper circuit diagram for interfacing of LED to GPIO23 pin of Raspberry Pi & Write program for blinking of LED.

Q3) **Answer the following :** **[2 × 5 = 10]**

a) With neat diagram explain functional blocks of SOC.

b) List any four bitwise operators in python. Write a python program to subtract two numbers.

P.T.O.

Q4) **Answer the following :** **[2 × 5 = 10]**

a) What is the Library Function? State the use of

i) GPIO. cleanup ( )

ii) Ord (x)

iii) Frozenset (s)

b) Explain basic working principle of a fingerprint sensor. State any three features of fingerprint sensor.

Q5) **Write a short note on Any Four of the following :** **[4 × 2½ = 10]**

a) Embedded system.

b) Network Access Devices of SBC's.

c) DMA controller.

d) Digital signal processor.

e) Time function in python.

f) Bluetooth module.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. :

PB-1882

[Total No. of Pages : 2

[6237]-406
S.Y.B.Sc.(Computer Science)
ELECTRONICS
ELC - 242 : Wireless Communication and Internet of Things (Rev.2019) (Semester - IV) (Paper - II) (24322)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***

Q1) **Answer the following in one or two sentence each (any five).[5 × 1 = 5]**

a) What is full form of MQTT?

b) How many number of layer used in IOT architecture?

c) Write the IEEE specification used in zigbee?

d) What do you mean by IMEI?

e) Write any two challenges in implementation of IOT?

f) State any two application of RFID system.

Q2) **Answer the following.** **[2 × 5 = 10]**

a) Draw and explain smart irrigation system in agriculture field.

b) Compare active and passive RFID Tags.

Q3) **Answer the following.** **[2 × 5 = 10]**

a) What is GSM. Explain BSS and NMS of GSM.

b) Draw and explain block diagram of GPS receiver.

P.T.O

Q4) **Answer the following.** **[2 × 5 = 10]**

a) List different types of handover in GSM and explain any one of them.

b) Compare Sigfox and NBIOT.

Q5) **Write a short notes (Any four).** **[4 × 2.5 = 10]**

a) Hybrid cloud.

b) Secure data storage in IOT.

c) Write advantages of Zigbee Technologies.

d) Write classification of GPRS device and explain function of any one device.

e) Scatternet.

f) Frequency Reuse concept.

Total No. of Questions : 5]

SEAT No. :

PB1883

[Total No. of Pages : 2

[6237]-501
T.Y.B.Sc.
COMPUTER SCIENCE
CS-351 : Operating Systems - I
(Revised 2019 Pattern) (New CBCS) (Semester-V) (Paper-I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams most be drawn wherever necessary.***
4) ***Assume suitable data if necessary.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) List types of Senaphore.

b) Define segmentation.

c) Which schedular controls the degree of multiprogramming.

d) What do you mean by system call?

e) Define system booting.

f) What do you mean by thread?

g) List the purpose of synchronization.

h) Define the term Dispatcher.

i) Define CPU bound process.

j) Define Virtual Memory.

Q2) Attempt any four of the following. **[4×2=8]**

a) List the benefits of thread.

b) List advantages of pre-emptive and non-premptive scheduling algorithm.

c) Define operating system. Write any two tasks of O.S.

d) Consider refference string 1, 3, 3, 2, 5, 4, 5, 4, 1, 4, 2, 2, 5 and number of frames are three. Calculate total no. of page faults using optimal page replacement Algorithm.

e) A counting semaphore S is initialized to 10. Then 6p operations and 4v operations are performed on S. What is the final value of 8?

P.T.O.

Q3) Attempt any Two of the following. **[2×4=8]**

a) What is process? Explain the different types of process states.

b) Consider the following snapshot of a system.

Process	CPU Burst time	Arrival time
P_1	5	3
P_2	2	0
P_3	2	4
P_4	3	5

Draw the Gratt chart and calculate average wairting and average turn around time for the follwing scheduling algorithms.

i) Preemptive SJF.

ii) Round Robin (Time Quantum = 2)

c) Compare MFT and MVT of memory partation.

Q4) Attempt any two of the following. **[2×4=8]**

a) What is critical section problem? Give peterson's solution to solve critical section problem.

b) Consider the following segment table

Segment	Base	Length
0	600	120
1	1200	350
2	75	85
3	1760	90

What are the physical addresses for the following logical addresses.

i) 0,125

ii) 1,310

iii) 3,88

iv) 2,77

c) Explain multilevel queue scheduling Algorithm.

Q5) Attempt any one of the following. **[1×3=3]**

a) Define swaping. Write advantages & disadvantages of swapping.

b) Explain different types of services provided by an operating system.

Total No. of Questions : 5]

SEAT No. :

PB1884

[Total No. of Pages : 2

[6237]-502

T.Y.B.Sc. (Computer Science)

CS - 352 : COMPUTER NETWORKS - II

(Revised 2019 Pattern) (Semester - V) (CBCS)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labelled diagrams wherever necessary.***
3) ***Use of calculators is not allowed.***

Q1) Attempt any EIGHT of the following (out of ten) : **[8×1=8]**

a) List SSL/TSL four protocols.

b) List the types of MPEG frames.

c) What is frequency masking?

d) What is the difference between plaintext and cipher text?

e) What do you mean by cryptography and cryptoanalysis.

f) List the PGP services.

g) State the need of VPN.

h) List the services of user agent.

i) What is Hierarchical name space.

j) What do you mean by Voice over IP.

P.T.O.

Q2) Attempt any FOUR of the following (out of five) : **[4×2=8]**

a) Write a short note on Message confidentiality - With Symmetric key cryptography.

b) Distinguish between message integrity and message authentication.

c) List the types of Email architecture. Explain in short any one.

d) What are RTCP - message types?

e) Compare and contrast FTP and HTTP.

Q3) Attempt any TWO of the following (out of three) : **[2×4=8]**

a) Write a short note on SSL services.

b) Explain the header format of the authentication header in transport mode.

c) Write a short note on Message Access Agent : POP and IMAP.

Q4) Attempt any TWO of the following (out of three) : **[2×4=8]**

a) Compare streaming stored, streaming live and interactive live audio/video.

b) Explain transposition cipher with example.

c) Write a short note on Proxy firewall.

Q5) Attempt any ONE of the following (out of two) : **[1×3=3]**

a) Explain various security services.

b) Explain any two fundamental cryptographic principles.

Total No. of Questions : 5]

SEAT No. : ____

PB1885

[Total No. of Pages : 2

[6237]-503

T.Y.B.Sc.

COMPUTER SCIENCE

CS-353: Web Technologies-I

(Revised 2019 Pattern) (CBCS) (Semester-V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following. **[8×1=8]**

a) In PHP which protocols used to send an email?
b) Which tag is used to set the text in Superscript format?
c) In PHP which function is used to create connection to the database?
d) What is a frameset?
e) Which tag specifies additional details that the user can view or hide on demand?
f) How will you find number of elements in Array?
g) Define SMTP.
h) What is a PEAR?
i) What is HTTP stands for?
j) Which tag is used to add images to the HTML document?

Q2) Attempt any FOUR of the following. **[4×2=8]**

a) What is role of web server and web browser?
b) Explain Anonymous function concept in PHP.
c) Write the Output for following code:-

```
<?php

$file=fopen("pragati.txt", "w");
echo fwrite($file, "Hello World. Testing!");
fclose($file);

?>
```

P.T.O.

d) Write the Output for following code:-

```
<?php

$n = array("a"->10, "b"=>35, "c"->12);
extract($n);
echo $a. " " . $b. " " . $c;

?>
```

e) Write the functions of decompose string with suitable example.

Q3) Attempt any TWO of the following. **[2×4=8]**

a) Discuss the Scope of a Variable in PHP with an example.

b) What is Form? How to create a Form?

c) Explain the concept of missing parameters to a function with suitable example.

Q4) Attempt any TWO of the following. **[2×4=8]**

a) Write a complete PHP script to accept three strings str1, str2, str3 from user. Search str2 is str1 and replace all occurrences of str2 by str3. Also display total number of occurrence.

b) Write PHP Script to accept file name from user and print total number of words.

c) Write a PHP program to accept associative array of five expenses (electricity bill, Phone bill, petrol bill, property tax, college fees) and their respective amount of two persons. Print the total expenditure of each person.

Q5) Attempt any ONE of the following. **[1×3=3]**

a) Explain the execution of PHP script with help of diagram.

b) Define file. How to create it? Explian with example.

Total No. of Questions : 5]

SEAT No. : ____

PB1886

[Total No. of Pages : 2

[6237]-504
T.Y. B.Sc.
COMPUTER SCIENCE
CS-354 : Foundation of Data Science
(Revised 2019 Pattern) (CBCS) (Semester - V) (Theory)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) What is word cloud?

b) Why data cleaning is important operation of data preprocessing?

c) Define Statistical data analysis?

d) What is the purpose of data Visualization?

e) List any two applications of data Science.

f) What do you mean by data transformation?

g) What is Visual encoding?

h) Define Bubble plot?

i) What is CSV format?

j) Define Standard derivation?

Q2) Attempt any four of the following. **[4×2=8]**

a) What is 3V's?

b) What are the uses of XML files?

c) Calculate mean, mode, median and range:

22, 24, 35, 47, 23, 23, 31, 25

d) Why data preprocessing is important before data analysis?

e) List different types of data attributes with example.

P.T.O.

Q3) Attempt any two of the following. **[2×4=8]**

a) What do you mean by Data Reduction? Explain any two Data Reduction strategies.

b) What do you mean by hypothesis testing? Explain null and alternate hypothesis.

c) How to visualize geospatial data? Explain in detail.

Q4) Attempt any Two of the following: **[2×4=8]**

a) What are the components of data scientist tool box? Explain two of them in detail.

b) What is Outlier? Explain types of outlieas.

c) What are the various types of data? Explain in detail.

Q5) Attempt any One of the following. **[1×3=3]**

a) What do you mean by data discretization? Explain discretization by Histogram analysis.

b) Write short note on different methods fer measuring data simillarity and Dissimilarity.

Total No. of Questions : 5]

SEAT No. : ____

PB1887

[Total No. of Pages : 2

[6237]-505
T.Y. B.Sc.
COMPUTER SCIENCE
CS-355 : Object Oriented Programming Using Java - I
(Revised 2019 Pattern) (CBCS) (Semester - V) (Paper - V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following. **[8×1=8]**

a) What is the purpose of Javap?

b) List any two datatypes in java.

c) Write the purpose of this keyword.

d) What is the use of tostring ( )?

e) Write the use of abstract keyword.

f) Define interface.

g) List any two Reader Classes.

h) How to check end of file?

i) What is panel?

j) Give the names of any two Layout Managers.

Q2) Attempt any FOUR of the following. **[4×2=8]**

a) Differentiate between method overloading and method overriding.

b) State any four access specifiers in Java.

c) What is Marker interface?

d) What is Exception? List its any two types.

e) What is Swing? How it is differ from AWT?

P.T.O.

Q3) Attempt any TWO of the following. **[2×4=8]**

a) Write a java program to display contents of file in reverse order.

b) Write a java program using swing to accept student details (rno, name, percentage) and display it by clicking on a button.

c) Define abstract class shape with abstract method area ( ). Write a java program to calculate area of rectangle.

Q4) Attempt any TWO of the following: **[2×4=8]**

a) Write a java program to accept employee name from user, if it is not valid then throw user defined exception "InvalidName" otherwise display a name.

b) What is Layout Manager? Explain it with example.

c) Explain the uses of final keyword with example.

Q5) Attempt any ONE of the following: **[1×3=3]**

a) Explain the features of Java.

b) Explain event delegation model in Java.

Total No. of Questions : 5]

SEAT No. : ____

PB1888

[Total No. of Pages : 2

[6237]-506

T.Y.B.Sc.

COMPUTER SCIENCE

CS-356 : Theoretical Computer Science

(Revised 2019 Pattern) (Semester-V) (CBCS)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***All questions are compulsory.***

Q1) Attempt any Eight of the following (Out of TEN) **[8×1=8]**

a) Give the meaning of 'δ' function of NFA

b) State pumping lemma of regular set.

c) Define suffix of a string. Give one example.

d) If A={ε}. Find the value of A.

e) Define context sensitive grammar.

f) Compare 'λ' function of Melay and Moore Machine.

g) Name the type of language accepted by Pushdown Automata.

h) "PDA is more powerful than FA". Justify.

i) Define tuples of turing Machine.

j) State two differences between NFA and DFA.

Q2) Attempt any four of the following (Out of Five) **[4×2=8]**

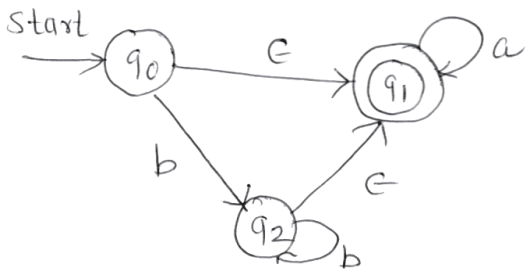
a) Explain types of Regular grammar.

b) Construct NFA for regular expression.(1*+0)*

c) Differentiate between Moore and Mealy machine.

P.T.O.

d) Write down the $\in$-closure of each state from the following FA.



e) Write a regular expression for language contains set of all strings of a's and b's ending in bb..

Q3) Attempt any two of the following (Out of Three) **[2×4=8]**

a) Construct a NFA for a language to accept strings which contains substring 'abbc' over the set of alphabets {a,b,c}

b) Convert the following CFG into Chomsky Normal Form (CNF)

S->ABA

A->aA|$\in$

B->bB|$\in$

c) Design TM for language which accept regular language a *b*

Q4) Attempt any Two of the following (out of Three) **[2×4=8]**

a) Construct a PDA for the language

$L=\{WW^R|W \text{ is in } (a+b)^*\}$

b) Construct a Moore machine to generate 1's complement of binary number.

c) Write short note on Chomsky hierarchy.

Q5) Attempt any One of the following (Out of Two) **[1×3=3]**

a) Construct a Mealy machine to convert each occurrence of substring 101 by 100 over alphabet {0,1}

b) Show that $L=\{0^n1^n \mid n>=1\}$ is not regular.

● ● ●

Total No. of Questions : 5]

SEAT No. : ____

PB1889

[Total No. of Pages : 2

[6237]-507
T.Y. B.Sc.
COMPUTER SCIENCE
CS-3510 : Python Programming
(Revised 2019 Pattern) (CBCS) (Semester - V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Total number of questions are five.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) What in indentation?

b) List the features of Python?

c) What are break and continue statements?

d) List any two built-in exceptions?

e) What is the purpose of range ( ) function?

f) What does the following function return - clock ( ) and gmtime ( ).

g) Compare for and while loop.

h) Define text and binary files.

i) Define list and dictionary.

j) What is lambda function?

Q2) Attempt any four of the following. **[4×2=8]**

a) Explain built-in string methods with example.

b) How to list files and directories? Describe with example.

c) Explain set union and intersection with example.

d) What is recorsion? Explain with example.

e) What are the basic tuple operations? Explain with example.

P.T.O.

Q3) Attempt any two of the following. **[2×4=8]**

a) Write a phython program to find factorial of a number.

b) Write a python program to check if a given number is Armstrong.

c) Write a python program to check whether a given string is Palindrome or not.

Q4) Attempt any two of the following. **[2×4=8]**

a) Write a python program to check if a given key already exists in a dictionary.

b) Write a python program to put even and odd elements of a list into two different lists.

c) Write a python program to count vowels and consonants in a string.

Q5) Attempt any one of the following. **[1×3=3]**

a) Trace the output of the following

```
import tracebook
try:
    x =8/0
    print(x)
except:
    print ("error update")
    traceback print-exc ( )
Print ("Program Execution Successful")
```

b) Trace the output of the following

```
n = 50
i = 5
s = 0
while i < n :
    st = i
    i + = 10
Print (" i =" , i)
Print ("Sum = ", Sum)
```

Total No. of Questions : 5]

SEAT No. :

PB1890

[Total No. of Pages : 2

[6237]-508
T.Y.B.Sc.
COMPUTER SCIENCE
CS - 3511 : Block Chain Technology
(Revised 2019 Pattern) (Semester - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Neat diagrams must drawn wherever required.***

Q1) Attempt any eight of the following (out of ten). **[8×1=8]**

a) Define plain text and cipher text.

b) Which institute standardised AES algorithm?

c) What is a hash function?

d) Who proposed a white paper for Ethereum in 2013.

e) What is block height?

f) Define Nonce.

g) Which programming language is used to write a smart contract in Remix?

h) What is a time - stamp?

i) What is gas price?

j) Name any five cryptocurrencies.

Q2) Answer any four of the following (out of five). **[4×2=8]**

a) What are the benefits of immutable ledger in blockchain.

b) Explain the structure of a block in blockchain.

c) Explain merkle tree with diagram.

P.T.O.

d) List and explain value data types in solidity.

e) What is hard fork and soft fork?

Q3) Attempt any two of the following (out of three) **[2×4=8]**

a) Differentiate between blockchain and databases.

b) What are the tasks of miners?

c) Explain the widely used cryptographic algorithms.

Q4) Attempt any two of the following (out of three). **[2×4=8]**

a) Write a short note on DES.

b) List the advantages of smart contract. Explain any four.

c) Explain the working of DAO.

Q5) Attempt any one of the following (out of two) **[1×3=3]**

a) Define transaction and explain its structure.

b) Write a short note on cryptowallets.

Total No. of Questions : 5]

SEAT No. :

PB1891

[Total No. of Pages : 2

[6237]-601
T.Y.B.Sc.
COMPUTER SCIENCE
CS-361 : Operating Systems - II
(Revised 2019 Pattern) (Semester-VI)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any Eight of the following questions. **[8×1=8]**

a) What is safe sequence?

b) What is grid computing?

c) Write file access methods.

d) Define rotational Latency.

e) What are the different types of distributed system?

f) List any four file attributes.

g) List any two important features of an Android mobile OS.

h) "Hybrid cloud is a combination of the public cloud and the private cloud". Comment (True/False)

i) State all the necessary conditions for a deadlock to occur.

j) List any four special constraints of mobile operating system.

Q2) Attempt any four of the following questions. **[4×2=8]**

a) What is C-Scan and C-look? Compare them.

b) What is mobile operating system? What are it's responsibilities?

c) Explain deadlock prevention strategies.

d) Explain different methods for handling free-space list in file system.

e) Explain cloud computing.

P.T.O.

Q3) Attempt any Two of the following questions. **[2×4=8]**

a) Compare Desktop OS and Mobile OS.

b) What are the operations performed on files?

c) Consider given snapshot of system. A system has 5 processes and 3 types of resources A,B,C

Allocation			
	A	B	C
P0	2	3	2
P1	4	0	0
P2	5	0	4
P3	4	3	3
P4	2	2	4

Max		
A	B	C
9	7	5
5	2	2
11	0	4
4	4	4
6	5	5

Available		
A	B	C
3	3	2

Answer the following questions using Banker's Algorithm.

i) What are the contents of need matrix?

ii) Is the system in a safe state? If yes find safe sequence.

Q4) Attempt any two of the following. **[2×4=8]**

a) Define P_2P architecture of distributed OS.

b) Consider the following sets P, R and E

$P = [P_1, P_2, P_3]$

$P = [R_1, R_2, R_3, R_4]$

$E = [P_1 \rightarrow R_1, P_2 \rightarrow R_3, R_1 \rightarrow P_2, R_2 \rightarrow P_2, R_2 \rightarrow P_1]$

Also consider the following number of instances per resource type.

i) One instance of resource type R_1 and R_2.

ii) Two instance of resource type R_2.

iii) Three instance of resource type R_4.

Construct the resource allocation graph for the above problem. Check whether the system is in deadlock.

c) What is directory? What are it's type? Explain two of them.

Q5) Attempt any one of the following. **[1×3=3]**

a) What is total head movement for FcFs and SSTF scheduling for the disk queue with requests for I/o to blocks on cylinders. 176, 79, 34, 60, 92, 11, 41, 114 in that order. If the disk head is initially at cylinder 50.

b) What is client server system. Also state it's advantages.

Total No. of Questions : 5]

SEAT No. :

PB1892

[Total No. of Pages : 2

[6237]-602
T.Y.B.Sc.
COMPUTER SCIENCE
CS - 362 : Software Testing
(Revised 2019 Pattern) (CBCS) (Semester - VI)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data if necessary.***

Q1) Attempt any Eight of the following : **[8×1=8]**

a) "Debugging starts only after successful conduct of testing. State true or false. Justify.

b) Define regression testing.

c) Define configuration testing?

d) Define stress testing.

e) Define error.

f) List any 2 objectives of software testing.

g) What is agile methodology?

h) Define Test plan.

i) Define verification.

j) Define web application.

P.T.O.

Q2) Attempt any four of the following : **[4×2=8]**

a) Describe configuration testing with the help of example.

b) Write difference between White and Black box testing.

c) List the features of Agile Testing.

d) What is integration testing? How it works?

e) What is Agile Manifesto?

Q3) Attempt any two of the following : **[2×4=8]**

a) Explain V-model in detail.

b) Write a short note on : Dimensions of quality.

c) What is internationalization testing? Explain its phases diagrammatically.

Q4) Attempt any two of the following : **[2×4=8]**

a) What is alpha and beta testing? Differentiate between them.

b) What is unit testing? How it works? Explain with example.

c) Differentiate between system, performance, load testing.

Q5) Attempt any one of the following : **[1×3=3]**

a) What is Web application? How it works? Explain diagrammatically.

b) What is test case? How to create it? Explain with example.

Total No. of Questions : 5]

SEAT No. : ____

PB1893

[Total No. of Pages : 2

[6237]-603

T.Y.B.Sc.

COMPUTER SCIENCE

CS-363: Web Technologies-II

(Revised 2019 Pattern) (CBCS) (Semester-VI)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following. **[8×1=8]**

a) What information is stored in $_ENV?

b) Write any two applications of XML.

c) List any four parameters of the function setcookie().

d) How single line and multiline comments are given in JavaScript?

e) What is XMLHttpRequest object in AJAX?

f) Write any two features of CodeIgniter.

g) List any four mouse-related events in JavaScript.

h) Write the syntax of the setRequestHeader() method.

i) Is a root element required for an XML file? If so, how many root elements are required?

j) What is the controller in CodeIgniter?

Q2) Attempt any FOUR of the following. **[4×2=8]**

a) Explain different techniques of maintaining state in PHP.

b) What is jQuery-Element ID Selector? Explain with an example.

c) List and explain any four properties of DOM.

d) Write any two advantages and disadvantages of using AJAX.

e) Explain any two ways of creating libraries in CodeIgniter.

P.T.O.

Q3) Attempt any TWO of the following. **[2×4=8]**

a) What is the SimpleXML extension? Explain any three SimpleXML parsing functions.

b) Explain the JavaScript alert box with a suitable example.

c) With a suitable diagram, explain the architecture of the CodeIgniter framework.

Q4) Attempt any TWO of the following. **[2×4=8]**

a) Design the HTML form to accept customer name, age and mobile number. Write a PHP script to store all the details in different session variable after clicking Submit button.

b) Write a JavaScript program to accept username and password. Validate it with a username that should not be null and should not contain any numbers; the password should be at least eight characters long and should contain at least one alphabet. Give proper alert boxes to show error messages.

c) Write an Ajax program to suggest names according to the character typed in the input field. Display a list of names using an array.

Q5) Attempt any ONE of the following. **[1×3=3]**

a) What is a Window object in JavaScript? Explain any two Window object methods.

b) Write a short note on MVC development pattern used in CodeIgniter.

Total No. of Questions : 5]

SEAT No. : ____

PB1894

[Total No. of Pages : 2

[6237]-604
T.Y. B.Sc.
COMPUTER SCIENCE
CS-364 : Data Analytics
(Revised CBCS 2019 Pattern) (Semester - VI)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***All questions are compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) What is Text analytics?

b) What is Outlier?

c) Define Deep Learning.

d) What is sentiment analysis?

e) Define community detection.

f) What is the purpose of FP-growth algorithm?

g) What is classification?

h) List any two applications of Data Mining.

i) Define accuracy.

j) What is mechanistic analysis?

Q2) Attempt any FOUR of the following. **[4×2=8]**

a) Explain term n-gram with example.

b) Explain any two Artificial Intelligence (AI) applications.

c) What is POS tagging? Give example.

d) What is clustering? State types of clustering.

e) State the ways to improve efficiency of Apriori algorithm.

P.T.O.

Q3) Attempt any Two of the following. **[2×4=8]**

a) Explain life cycle of Data Analytics.

b) Write a short note on Trend Analytics.

c) Consider the following database and find out the frequent Itemsests using Apriori algorithm with minimum-support = 2

$T_I D$	Items-Purchased
T_1	M_1, M_2, M_5
T_2	M_2, M_4
T_3	M_2, M_3
T_4	M_1, M_2, M_4
T_5	M_1, M_3
T_6	M_2, M_3
T_7	M_1, M_3
T_8	M_1, M_2, M_3, M_5
T_9	M_1, M_2, M_3

Q4) Attempt any Two of the following: **[2×4=8]**

a) Explain any two types of data analytics.

b) What is expert findings? How to find an expert?

c) Describe Association rule metrics.

Q5) Attempt any One of the following. **[1×3=3]**

a) Write a short note on linear regression.

b) Write a short note on Natural Language Processing (NLP).

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Total No. of Questions : 5]

SEAT No. : ____

PB1895

[Total No. of Pages : 2

[6237]-605
T.Y. B.Sc.
COMPUTER SCIENCE
CS-365 : Object Oriented Programming Using Java - II
(Revised 2019 Pattern) (CBCS) (Semester - VI) (Paper - V)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following. **[8×1=8]**

a) Define List Interface.

b) What is JDBC?

c) How to start a Thread?

d) List the types of Servlets.

e) What is JSP?

f) What is Spring Framework?

g) Define Hashtable.

h) What is use of for Name ( )

i) Write the purpose of join ( )

j) How to activate Session in Servlet?

Q2) Attempt any FOUR of the following. **[4×2=8]**

a) Differentiate between Iterator and List Iterator.

b) What is Resultset Interface? List any two methods.

c) List the parameters of doPost ( ) in servlet.

d) List any two implicit objects in JSP.

e) State any two methods of inter-thread communication.

P.T.O.

Q3) Attempt any TWO of the following. **[2×4=8]**

a) Write a Java Program to accept n characters from user, store them into Linkedlist, remove duplicate characters & display in sorted order.

b) Write a Java Program to accept details of employee (eno, ename, salary), store it into database and display it.

c) Write a JSP program to accept a number from user and convert it into words (eg 123 – o/p → One Two Three).

Q4) Attempt any TWO of the following: **[2×4=8]**

a) Explain the Life Cycle of Servlet.

b) Write a program using Multi Threading to blink a text on frame.

c) Explain JDBC process with an example.

Q5) Attempt any ONE of the following: **[1×3=3]**

a) Explain any three applications of spring.

b) Differentiate between JSP & Servlet.

Total No. of Questions : 5]

SEAT No. :

PB1896

[Total No. of Pages : 2

[6237]-606
T.Y.B.Sc.
COMPUTER SCIENCE
CS - 366 : Compiler Construction
(Revised 2019 Pattern) (CBCS) (Semester - VI)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt eight of the following (out of Ten). **[8×1=8]**

a) List code optimization technique.

b) What is sentinel?

c) Define the term Handle.

d) Define Bootstrapping.

e) LEX is a scanner provided by Linux operating system. State True or False. Justify.

f) LALR is the best bottom - up parsing method. Justify.

g) Define Basic block.

h) Differentiate between synthesis & inherited attributes.

i) What is a parser?

j) List all phases of the compiler.

Q2) Attempt any four of the following (out of Five). **[4×2=8]**

a) Write a short note on s-attributed grammar.

b) Find FIRST & FOLLOW of the following grammar.

$S \rightarrow Ad|B$

$A \rightarrow aAB|b$

$B \rightarrow bBa|E$

c) Write LEX definition for identifier.

d) Construct the DAG for the following expression.

$x + x * (y - z) + (y - z) * a$

e) Differenciate between SLR and Canonical LR parser.

P.T.O.

Q3) Attempt any two of the following. **[2×4=8]**

a) Write a Recursive Descent Parser (RDP) for the following grammar.

$S \rightarrow aA|SbB$

$A \rightarrow aA|bB$

$B \rightarrow b$

b) Check whether the following grammar is SLR or not.

$S \rightarrow bAB|aA$

$A \rightarrow Ab|b$

$B \rightarrow aB|a$

c) Write a LEX program to find factorial of a given number.

Q4) Attempt any two of the following. **[2×4=8]**

a) Check whether the following grammar is LL(1) or not?

$A \rightarrow aAa|Ab|AA|b$

b) Check whether the following grammar is LALR(1) or not.

$S \rightarrow S+T|T$

$T \rightarrow T*F|F$

$F \rightarrow id$

c) Consider the following grammar.

$S \rightarrow S+S|S–S|S*S|S/S|id$

Construct the operator precedence relation table. Also find Leading & Trailing for the grammar.

Q5) Attempt any one of the following. **[1×3=3]**

a) Define SDD and SDT. State the task performed by SDT.

b) Construct DAG for the block

$a = b + c$

$b = a – d$

$c = b + c$

$d = a – d$

Total No. of Questions : 5]

SEAT No. : ____

PB1897

[Total No. of Pages : 2

[6237]-607
T.Y. B.Sc.
COMPUTER SCIENCE
CS-3610 : Software Testing and Tools
(2019 Credit Pattern) (Revised) (Semester - VI) (Paper - VII)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figurest to the right indicate full marks.***

Q1) Attempt any EIGHT of the following. (out of Ten) **[8×1=8]**

a) Define Test Automation.

b) What is Test scenario?

c) What is grey-box testing?

d) What is test incident report?

e) What is structural testing?

f) Define Acceptance testing.

g) Win Runner is an automated End-to-End testing tool.
State TRUE of FALSE.

h) What is extra coding?

i) What is a syntax defect?

j) Enlist any two characteristics of Selenium tools.

Q2) Attempt any FOUR of the following. (out of Five) **[4×2=8]**

a) What is Code Coverage? Explain.

b) Define test criteria and explain its types.

c) List any two parameters based on that testing tools classify.

d) Write any two types of errors.

e) Define priority defect and its different levels.

P.T.O.

Q3) Attempt any TWO of the following. (out of Three) **[2×4=8]**

a) How to make use of automation tools?

b) What are different types of loop testing? Explain in details.

c) Explain reasons because of bug can be arise.

Q4) Attempt any TWO of the following (Out of Three) **[2×4=8]**

a) Create case study for verify the functionality of Myntra login page.

b) Consider following code and apply decision coverage testing create use cases

```
Input (int x, int y)
    {
        Int z = ((x+y/200)*100;
        If(z > 80)
            Print("O+")
        else if (60 <z < 80)
            Print(A"+")
        else
        Print ("B")
    }
```

Test case 1 : x = 78 y = 87

Test case 2 : x = 80 y = 90

c) Explain Nested loop and unstructured loop testing.

Q5) Attempt any ONE of the following. (out of Two) **[1×3=3]**

a) Write short note on Classification of Defects.

b) Write about Sikuli and Apache JMeter testing tools.