# [6346]-1001

### F.Y. M.Sc.

### **COMPUTER SCIENCE**

### CS - 501 - MJ : Advanced Operating System

### (2023 Pattern) (Semester - I)

*Time : 3 Hours]* 

Instructions to the candidates:

- Question 1 is compulsory. 1)
- Solve any five questions from question 2 to 7. 2)
- 3) Question 2 to 7 carry equal marks.

#### Q1) Attempt any Five of the following :

- What are the contents of Buffer Header? a)
- Explain link() and unlink() function. b)
- Explain sticky bit. c)
- Justify : In Linux the files are usually accessed via file names. d)
- Explain any two Operating Services. e)
- Explain exec() system call. f)

#### **Q2**) Attempt the following :

a)	i)	Explain deadlock scenario for link() system call.			
	ii)	What is Process? Draw and explain state transition diagram process.	of a [ <b>3</b> ]		

b) Explain steps involved in file creation. [5]

*P.T.O.* 

**SEAT No. :** 

[Total No. of Pages : 3

 $[5 \times 2 = 10]$ 

[Max. Marks : 70]

### **Q3**) Attempt the following :

a)	i)	Explain algorithm for Wakeup.	[4]
	ii)	Explain the behavior of following C program.	[3]
		<pre>char string{ }="hello";</pre>	
		main()	
		{	
		char buf[1024];	
		char *cpl, *cp2;	
		int fds[2];	
		cp1=string;	
		cp2=buf;	
		while(*cp1)	
		*cp2++=*cp1++;	
		pipe(fds);	
		for(;;)	
		{	
		write(fds[1], buf,6);	
		read(fds[0], buf,6);	
		}	
		}	

b) Explain alloc() and memcmp() with syntax and example. [5]

### *Q4*) Attempt the following :

	a) i) Explain the concept of blocking the signal and retrieving					
			signals.	[4]		
		ii)	Write a short note on wait() waitpid() system call.	[3]		
	b) Write a C program which takes multiple files as command –line ar and print their mode numbers.					
Q5)	Attempt the following :					
	a)	i)	Explain nice(), getpriority() and setpriority() system calls.	[4]		
		ii)	Explain different ways in which process reacts to a signal.	[3]		

ii) Explain different ways in which process reacts to a signal. [3]b) Write a C program to demonstrate race condition in catching signals.[5]

```
[6346]-1001
```

### *Q6*) Attempt the following :

	a) i) Explain chdir, fchdir, getcwd, rmdir Functions.			[4]		
	ii) Explain symbolic link.					
	b) Write a C program illustrate use of vfork() function.					
<b>07</b> )	Wri	ite sh	ort notes on any two of the following.			
2.7	a) Discuss the architecture of Unix.					
	b) Layout of the kernel.					
	b)	Lay	out of the kernel.	[6]		
	b) c)	Lay Exp	out of the kernel. lain Algorithms for Sleep.	[6] [6]		

### $\nabla\,\nabla\,\nabla\,\nabla$

[Total No. of Pages : 2

**SEAT No. :** 

### [6346]-1002

# M.Sc. (Computer Science) CS-502-MJ : ARTIFICIAL INTELLIGENCE (2023Pattern) (CBCS) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

 $[6 \times 2 = 12]$ 

 $[4 \times 3 = 12]$ 

Instructions to the candidates :

- 1) All questions are compulsory.
- 2) Figure to the right indicates full marks.
- 3) Draw a neat diagram wherever necessary.

#### Q1) Attempt the following (Any 6) :

- a) Define Artificial Intelligence (AI) and explain its importance in modern society.
- b) What are the primary goals of AI?
- c) Define heuristic search and explain its role in problem-solving.
- d) Distinguish between knowledge & data.
- e) What is Natural Language Processing (NLP), and what are its primary goals?
- f) Write a note on: categories and objects.
- g) Explain Unification with suitable example.

#### **Q2**) Attempt the following (Any 4) :

- a) Describe how the use of a heuristic function impacts the performance of heuristic search algorithms.
- b) Explain the forward chaining process and backward chaining with example.
- c) What is Best-First Search (BFS), and how does it differ from other search algorithms like DFS and Breath First Search?
- d) Explain the MINIMAX procedure.
- e) Define Constraint Satisfaction Problem (CSP) and explain the role of constraints in CSPs.

*P.T.O.* 

#### *Q3*) Attempt the following (Any 3) :

- a) Explain Knowledge-Based Agent and explain the Operations performed by KBA.
- b) What are the different types of Agent? Explain the advantages and disadvantages of Al.
- c) Analyze various planning approaches in detail.
- d) Compare and contrast BFS with other informed search algorithms like A\* search.

#### *Q4*) Attempt the following (Any 3) :

- a) Discuss the role of logic in KR, including propositional logic and firstorder logic.
- b) What is classical planning in artificial intelligence?
- c) Define Information Retrieval (IR) and explain its significance in managing and accessing large volumes of information.
- d) Give an example of a real-world problem that can be solved using MEA, including the initial state, goal state, and intermediate steps.

#### **Q5**) Attempt the following :

- a) Solve any two (Any 2) :
  - i) What is the significance of the "cutoff" in Alpha-Beta Pruning?
  - ii) Describe a scenario where the A\* algorithm might expand more nodes than necessary and what is the difference between uniform cost search and A\* search?
  - iii) What is hill climbing? Write algorithm for it. What will be the problems in Hill Climbing Algorithm?
- b) Describe the potential impact of Information Extraction (IE) on industries such as healthcare, finance, or e-commerce.  $[1 \times 2 = 2]$

#### Q6) Attempt the following. (Any 2) :

- a) AO\*Algorithm
- b) AI Architecture
- c) Regression

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## [6346]-1002

 $[3 \times 4 = 12]$ 

 $[3 \times 4 = 12]$ 

 $[2 \times 5 = 10]$ 

 $[2 \times 5 = 10]$ 

Total No. of Questions : 5]

**PC-4347** 

[6346]-1003

# M.Sc. (Computer Science) CS-503-MJ: PRINCIPLE OF PROGRAMMING LANGUAGES

### (2023 Pattern) (Semester - I)

#### Time : 2 Hours]

Instructions to the candidates:

- 1) Q.1 is compulsory.
- 2) Solve any THREE questions from Q.2 to Q.5.

#### Q1) Attempt any Five of the following

- a) What is a side effect?
- b) What distinguishes rectangular arrays from jagged arrays?
- c) Define user-defined ordinal types.
- d) What is a local .referencing environment?
- e) What are generic subroutines?
- f) What is a key design issue for character string types?
- g) Which allocation method is typically faster: stack-based or heap-based? Why?

### **Q2**) Attempt the following:

- a) What is short-circuit boolean evaluation? Explain its advantages.
- b) Explain garbage collection mechanism.
- c) What will be the output of the following code? Justify void fianc()

```
{
static mt count = 0;
count++; -
printf("%d\n", count);
}
int main()
{
```

#### [4 + 4 + 2 = 10]

SEAT No. :

[Total No. of Pages : 2

 $[5 \times 1 = 5]$ 

[Max. Marks : 35]

return 0; } *Q3*) Attempt the following: Explain implementation of Single Inheritance with suitable example.

- a) What are the different parameter pasing methods? Explain any 2 in detail. b)
- Define Applicative order evaluation and Normal order evaluation. c)

#### *Q4*) Attempt the following:

- Explain the Discriminated versus free unions. a)
- b) Write a short note on
  - Encapsulation ii) Polymorphism i)
- c) Differentiate between Iteration and Recursion.

#### *Q5*) Attempt the following:

- Explain various parameter passing modes with suitable examples. a)
- What are the concepts of "tombstone" and "lock and key" in memory b) management, and how do they help prevent issues like dangling pointers and memory leaks?



2

### [4 + 4 + 2 = 10]

[4 + 4 + 2 = 10]

$$[5 + 5 = 10]$$

Total No. of Questions : 5]

**PC-4348** 

### [6346]-1004

### M.Sc.

### **COMPUTER SCIENCE**

## CS-510-MJ : Advance Databases & Web Technologies (2023 Pattern) (Semester - 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.

#### Q1) Solve any Five:

- a) Difference between RDBMS and NOSQL?
- b) What is image thumbnail in bootstrap?
- c) What is polyglot programming?
- d) Name the property for controlling the image repetition of the background?
- e) What is boatstrap well?
- f) Difference between datalist tag and select tag in html?

#### **Q2**) Attempt each of the following: **[10]** NOSQL database are schemaless-comment. a) i) [2] Explain responsive website using boatstrap. [4] ii) Explain the transition properties in CSS with example. [4] b) Q3) Attempt each of the following: [10] i) Define replication factor. [2] a) Explain in details semantie tags in html. [4] ii) b) Explain different types of button classes in boatstrap. [4]

*P.T.O.* 

SEAT No. :

[Total No. of Pages : 2

 $[5 \times 1 = 5]$ 

#### LJ [Max Maul-a

#### *Q4*) Attempt each of the following:

- a) i) Define text shadow in CSS. [2]
  - ii) Explain column family database & its feature. [4]
- b) A man dairy manufactures various types of dairy products milk, butter and curd. The product can be categorized into law fat, medium fat and high fat content type. Their popularity various across different states in India. The popularity is measured as %, with a high popularity defined as > = 90%, medium popularity between 50 to 90% and low popularity below 50. [4]
  - i) Identify different lables, nodes, relationships and respective properties.
  - ii) Draw a graph model using same.

#### *Q5*) Attempt any two:

[10]

**[10]** 

- a) Write a short on carousel & scrollspy in boatstrap. [5]
- b) Explain document data model in details with example. [5]
- c) Model the following world cup information system as a document database.

Consider a set of player, game and event. A player can participate in one or more events of a world cup game.

Assume appropirate attributes and collections as per the query requirements. [5]

- i) List the details of world cups help during 2020.
- ii) Count number of players having more than 50 runs.



Total No. of Questions : 5]

SEAT No. :

PC-4349

[Total No. of Pages : 2

## [6346] - 1005

# M.Sc.(Computer Science) CS-512 – MJ: Cloud Computing (2023 Pattern) (Semester - I)

<i>Time</i> : 2	[Max. Marks : 35				
Instruct	Instructions to the candidates:				
1)	Q. 1 is compulsory.				
2)	Solve any three questions from Q. 2 to Q. 5.				
3)	Questions 2 to 5 carry equal marks.				
<i>Q1</i> ) So	lve any five of the following :	[5]			
a)	What is Grid computing?				
b)	What do you mean by Hypervisor?				
c)	List any 2 benefits of cloud computing?				
d)	Why cloud security is more important?				
e)	What is scalability in cloud computing?				
f)	What is AMI? List the types of AMI?				
<i>Q2</i> ) Att	empt the following :				
a)	i) What is Hypervisor? List out its types?	[2]			
	ii) What is cloud provisioning? Explain its types?	[4]			
b)	What are the cloud security challenges?	[4]			

*P.T.O.* 

### **Q3**) Attempt the following :

	a)	i)	i) Write any 2 characteristics of cloud computing?		
		ii)	Write a short note on cloud enabling technology?	[4]	
	b)	Writ	e a short note on amazon simple storage services (S3).	[4]	
<b>Q4</b> ) Attempt the following :					
	a)	i)	Explain Hybrid cloud in brief?	[2]	
		ii)	Write a short note on AWS?	[4]	
	b)	Give	e any four difference between cloud and grid computing.	[4]	
Q5)	Atte	empt	any 2 of the following :		
	a)	Expl	ain Inshort Identity Access Management (IAM).	[5]	

- b) Define physical and virtual cluster? Explain the concept of virtual cluster with diagram? [5]
- c) Write a short note on virtual machine migration? [5]

#### **b4 b4 b4**

### [6346]-1005

Total No. of Questions : 6]

PC-4350

### [6346]-1006

### M.Sc.

### **COMPUTER SCIENCE**

### CS-514-MJ: C#. Net Programming

### (2023 Pattern) (Semester - I)

*Time : 2 Hours]* 

Instructions to the candidates:

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

#### *Q1*) Solve any six of the following:

- a) What is difference between Read() and ReadLine().
- b) Is overriding of a function possible in the same class in C#?
- c) What is DataAdapter?
- d) What is CTS?
- e) What will be the output of the following C# code? using System;

class Program;

static void Main(string[] args) {.

Console.WriteLine(true && false);

}

- }
- f) What is namespace?
- g) How to load picture during runtime.

#### **Q2**) Attempt any <u>three</u>:

- a) Explain boxing and unboxing with example.
- b) List the properties of checkBox and explain any one with example.
- c) What are 'Anchor' and 'Dock' properties?
- d) Write a string data type with example in C#.

[Total No. of Pages : 2

[Max. Marks : 35

SEAT No. :

[6]

[6]

#### *Q3*) Attempt any <u>two</u>:

- a) Explain Features of. Net.
- b) Write a program of creating file by using File Stream class.
- c) Write a string. data type with example in C#.

# Q4) Attempt any two: [6]

- a) What is assembly? Explain types of assembly.
- b) Explain features of Dot Net.
- c) Explain flow control statements in C# with example.

#### **Q5**) Attempt the following: [6] [4] Solve any <u>one</u>: a) Explain polymorphism in C# Dot Net. i) How connected data architecture is implemented in ADO.NET. ii) Explain with sample C# code. Explain array in detail with example. [2] b) *Q6*) Attempt any <u>one</u>: [5] Write a program to print multiplication table of a given number. a)

- b) Write a C# program to list files in a directory.



SEAT No. :

[Total No. of Pages : 2

### [6346]-1007

# M.Sc. (Computer Science) CS 531- RM : RESEARCH METHODOLOGY (2023 Pattern) (Semester - I)

Time : 3 Hours]			[Max. Marks : 70	
Inst	ructio	ons to the candidates:		
	1)	All questions are compulsory.		
	2)	Figures to the right indicate full marks.		
	3)	Neat diagrams must be drawn wherever necessary.		
Q1)	Solv	ve any six of the following :	[12]	
	a)	Define Research Methodology.		
	b)	State the term Hypothesis.		
	c)	Define plagiarism.		
	d)	What is descriptive research design?		
	e)	State publication misconduct.		
	f)	List the Indian e-resources used for research.		
	g)	What do you mean by dispersion?		
Q2)	Ans	wer any four of the following :	[12]	
	a)	Explain features of research design.		
	b)	Write a note on measure of central tendency.		
	c)	Explain research process with suitable diagram.		
	d)	Describe the precautions need to be take in an Interpr	retation.	

e) Write objectives of research.

#### b) Describe in detail primary and secondary literature resources. c) Explain different types of plagirisms. Write a note on exploratory research design. d) Q4) Answer any three of the following : [12] Describe the questionnaire data collection method. a) b) Compare research methods vs research methodology. c) Explain the publication misconduct. d) Write a note on probability sampling method. Q5) Attempt the following : [10] Solve any two of the following : a) What are ways in which internet can aid in literature review? i) ii) Write a short note on case study research design. List types of hypothesis and explain sources of hypothesis. iii) What is conflict of interest? [2] b) [10] Q6) Write a note on the following (any two) : **Open Access Initiatives.** a) **Research Integrity.** b) c) Journal Finder / suggester tools.

Explain necessity of formulating research problem.

[12]

Q3) Answer any three of the following :

a)

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### [6346]-2001

### F.Y. M.Sc.

### **COMPUTER SCIENCE**

### CS - 551 - MJ : Design and Analysis of Algorithms (2023 Pattern) (Semester - II)

Time : 3 Hours]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Use of single memory non programmable scientific calculator is allowed.

#### Q1) Attempt any FIVE of the following.

- a) List all asymptotic notations.
- b) Give control abstraction for Divide and Conquer Strategy.
- c) Define feasible solution and optimal solution.
- d) What is Principle of Optimality?
- e) What do you mean by Live Node and Dead Node?
- f) Define Non-deterministic Algorithm.

#### **Q2**) Attempt any TWO of the following. $[2 \times 6 = 12]$

- a) Write an algorithm for insertion sort and apply it one the following data 15, 7, 30, 5, 12
- b) Sort the following numbers using Quick Sort., Derive it's Best ease time complexity.

18, 25, 34, 28, 9, 10, 7

c) Consider the following instance for job sequencing with deadline problem where n = 5,  $(p_1, p_2, p_3, p_4, p_5) = (10, 8, 15, 5, 7)$ 

 $(d_1, d_2, d_3, d_4, d_5) = (4, 1, 3, 2, 3)$ . Obtain optimal solution using Greedy method.

*P.T.O.* 

[Total No. of Pages : 3

**SEAT No. :** 

 $[5 \times 2 = 10]$ 

[Max. Marks : 70

ithms

#### Q3) Attempt any TWO of the following.

- a) Write an algorithm to find maximum number using divide and conquer algorithm and apply it on data set with values 12, 3, 45, 6.
- b) Find minimum Spanning Tree for the following graph using Kruskal's Algorithm.



c) A string X can be transformed to Y by applying a sequence of edit operations such as insert, delete and interchange with associated costs of 1, 1 and 2 respectively. Find the cost of string editing using Dynamic Programming Method.

X = AABABA

Y = BAABA

#### Q4) Attempt any TWO of the following.

 $[2 \times 6 = 12]$ 

a) Find the LCS for the following sequences using Dynamic Programming method.

 $X = \langle A, C, D, A, C, D \rangle$ 

 $Y = \langle C, B, C, D, C \rangle$ 

b) Explain in detail Strongly connected component? Find all possible strongly connected components.



c) What is m-colouring problem? Find all possible solutions when the following graph is coloured with exactly 3 colours.



#### Q5) Attempt any TWO of the following.

- a) What is the best way to multiply a chain of matrices A1, A2, A3, A4 with dimensions 10X4, 4X7, 7X5, 5X6 respectively using Dynamic Programming Method?
- b) Find all possible solutions for 4-queen's Problem.
- c) Define Travelling Salesperson Problem. Solve the following instance of TSP using LCBB method.

d) 
$$A = \begin{bmatrix} \infty & 10 & 8 & 14 \\ 22 & \infty & 7 & 6 \\ 9 & 10 & \infty & 4 \\ 5 & 6 & 2 & \infty \end{bmatrix}.$$

#### *Q6*) Attempt any THREE of the following.

 $[3 \times 4 = 12]$ 

- a) Define Knapsack problem. Explain three methods to find feasibility solutions.
- b) What is Bellman Ford Algorithm? Give the algorithm.
- c) Define : Tree Edge, Back Edge, Forward Edge, Cross Edge.
- d) Differentiate between P class and NP class.

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SEAT No. :

[Total No. of Pages : 2

### [6346]-2002

### M.Sc.

### **COMPUTER SCIENCE**

## CS - 552 MJ : Mobile App Development Technologies (2023 Pattern) (Semester - II) (4 Credit) (CBCS)

Instructions to the candidates:

*Time : 3 Hours ]* 

- 1) All Questions are compulsory.
- 2) Figures to the right indicate full marks.

#### Q1) Solve any Six of the following :

- a) List any six android UI controls.
- b) List any four gesture mehtods used in touch events.
- c) What is Dalvik Virtual Machine?
- d) Name the types of view groups.
- e) Which are the various types of mobile applications?
- f) State the data types in android SQLite.
- g) Which method is used to display zoom controls on Google maps?

#### **Q2**) Attempt any Four of the following :

- a) List any five factors in developing Mobile Application?
- b) What is Linear layout in android? Explain with example.
- c) What is Toast? Explain with suitable example.
- d) What is parsing? Explain JSON parsing.
- e) What is Android virtual device?

 $[6 \times 2 = 12]$ 

[Max. Marks : 70]

 $[4 \times 3 = 12]$ 

#### Q3)Attempt any Three of the following :

- a) What are the features of Android?
- b) Explain android activity life cycle.
- c) Explain content providers with example.
- d) Write any 4 features of Location Manager class.

#### *Q4*)Attempt any Three of the following : $[3 \times 4 = 12]$

- a) Explain the components of android architecture.
- b) Describe android fragment lifecycle.
- c) What is Android broadcast receiver?
- d) Explain Threads in android.

#### **Q5**) Attempt the following :

- a) Solve any two of the following :  $[2 \times 5 = 10]$ 
  - i) Create an android application to display the subject list by using spinner and buttons. (xml and java class)
  - ii) Explain Android Notification with an example.
  - iii) Write a java android program to registration form with validation.
- b) Write a short note on mobile operating system.  $[1 \times 2 = 2]$
- *Q6*) Write short notes on any two of the following :  $[2 \times 5 = 10]$ 
  - a) Manifest File
  - b) PhoneGap plugins
  - c) Types of Intent in android

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#### [6346]-2002

#### $[3 \times 4 = 12]$

SEAT No. :

[Total No. of Pages : 2

### [6346]-2003

### F.Y.M.Sc.

# COMPUTER SCIENCE CS-553-MJ : Software Project Management (2023Pattern) (Semester - II)

*Time : 2 Hours]* 

[Max. Marks : 35

[5]

Instructions to the candidates :

- 1) Question. 1 is compulsory.
- 2) Solve any Three questions from Q 2 to Q 5.
- 3) Question Nos. 2 to 5 carry equal marks.

**Q1**) Attempt any Five of the following.

- a) Define project Charter.
- b) What are types of power?
- c) What are contents of Risk Register?
- d) Define CPI and SPI.
- e) How to calculate Communication channels?
- f) What is Milestone? What symbol on Gantt chart represents a slipped milestone?

Q2) Attempt the following.

a)	What are th	ne proccess	involved in	Project	Intergration	Management?[4]

- b) Explain organizational structure in project Management. [4]
- c) State type of Risks. [2]

*P.T.O.* 

*Q3*) Attempt the following.

a)	what is Work Breakdown Structure? Explain with an example.	[4]
b)	Explain maslow's theory of need of hierarchy.	[4]

c) What are main types of contract? [2]

Q4) Attempt the following.

a)	What are tools for activity sequencing ? Explain each one in brief.	[4]
b)	What are tools techniques used in quality control?	[4]
c)	Define fault and failure in software Metrics.	[2]

### Q5) Attempt the following :

a)	What is CMM? Explain five levels of CMM Model.	[5]
b)	What are qualities of project Manager?	[5]

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[6346]-2004

# M.Sc. (Computer Science) CS-560-MJ: FULL STACK DEVELOPMENT - I (2023 Pattern) (Semester - II)

Time : 2 Hours] Instructions to the candidates: [Max. Marks : 35

 $[5 \times 1 = 5]$ 

[Total No. of Pages : 2

**SEAT No. :** 

- 1) Question 1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Question 2 to 5 carry equal marks.

#### *Q1*) Solve Any <u>Five</u> of the following:

- a) Define MEAN Stack.
- b) What are template literals?
- c) List two advantages of using Typescript over plain JavaScript.
- d) What is AngularJS?
- e) How to install packages in locally?
- f) What is Express JS?

#### **Q2**) Attempt the following:

- a) i) Discuss different technologies that make up MEAN stack. [2]
  - ii) What are arrow functions in ES6, and how do they differ from regular functions. [4]
- b) What are filters in AngularJS? Explain different types of filters with example. [4]

#### *Q3*) Attempt the following:

a)	i)	Demonstrate the destructuring assignment for an object and an array.	[2]
	ii)	What is Core module? Explain with example.	[4]
b)	Exp	lain Middleware in Express JS.	[4]

#### *Q4*) Attempt the following:

- a) i) What is type narrowing, and how does it work in TypeScript? [2]
  - ii) Explain Streams in Node JS. Explain any two types of streams. [4]
- b) Explain routing with example in Express JS. [4]

### *Q5)* Attempt Any <u>Two</u> of the following:

- a) Explain the concept of the event loop in Node.js and discuss its role in managing asynchronous operations. [5]
- b) Discuss decorators in TypeScript. Provide an example of applying a decorator to a class. [5]
- c) How does Express JS facilitate the implementation of MVC pattern? [5]



Total No. of Questions : 6]

**PC-4356** 

SEAT No. :

[Total No. of Pages : 2

[Max. Marks : 35]

[5]

### [6346] - 2005

### M.Sc.(Computer Science) CS-562-MJ :Web Services (2023 Pattern) (Semester - II)

*Time : 2 Hours] Instructions to the candidates:* 

- 1) All questions are compulsory.
- 2) Questions 2 to 6 carry equal marks.

#### *Q1*) Solve any five of the following:

- a) What is Web Service?
- b) What is Full form of UDDI and WSDL?
- c) Write any two advantages of Web Services.
- d) List any two advantages of RESTful web service.
- e) List any two APIs of UDDI Registry.
- f) What is the purpose of <types> element of WSDL File.

#### **Q2**) Attempt any Two of the following : $[2 \times 3 = 6]$

- a) Explain Web Services Development Lifecycle.
- b) Explain any two Publishing APIs of UDDI Registry.
- c) Explain Architecture of Web Services in detail.

#### Q3) Attempt any Two of the following :

- a) Explain the structure of SOAP Message.
- b) Differentiate between SOAP and Restful Web Services.
- c) Explain any Five key elements of Restful Web Services.

#### *Q4*) Attempt any one of the following : $[1 \times 6 = 6]$

- a) Write a web method to check whether an input number is prime number or not.
- b) Write a Web Method to accept contact number and validate it as per following rules.

#### **Q5**) Attempt the following :

- a) Limitations of UDDI [2]
- b) Explain core architectural elements of a RESTful system. [4]

#### *Q6*) Attempt the following :

|--|

b) Explain Description and Discovery of RESTful Web Services. [4]

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### [6346]-2005

2

Total No. of Questions : 5]

PC-4357

[6346]-2006

# M.Sc. (Computer Science) CS-564-MJ: ASP.NET PROGRAMMING (2023 Pattern) (Semester - II)

Time : 2 Hours]

Instructions to the candidates:

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

#### *Q1)* Solve any <u>Eight</u> of the following:

- a) Define CLR
- b) What is ASR.NET
- c) Define Private Assembly
- d) Write any two events of Textbox
- e) What is namespace?
- f) What is meant by MVCs?
- g) List out any two properties of Checkbox
- h) Define View State
- i) What is the use of label control
- j) Define Application State

*P.T.O.* 

[Total No. of Pages : 2

[Max. Marks : 35]

 $[8 \times 1 = 8]$ 

# SEAT No. :

#### *Q2*) Attempt any Four:

Explain Compare Validator a) List the properties of the Calendar control b) What is ADO.NET c) d) Explain the Form View control What is error handling e) **Q3**) Attempt any Four: [8] **Explain Unit Testing** a) Where the ViewState is stored after the page: post back b) c) What is caching List the events in the page life cycle d) What is the good practice to implement validations in aspx page e) Q4) Attempt any Two: **[8]** How to publish ASP.NET website a) Explain ASP.NET Architecture b) Write the Advantages of ASP.NET MVC c) **Q5)** Attempt any One of the following: [3] Distinguish between Webform and MVC a) Explain Database Connectivity b)

[8]



[6346]-3001

### Second Year M.Sc. COMPUTER SCIENCE

# CS-601 : Software Architecture and Design Pattern (2023 Credit Pattern) (Semester - III)

*Time : 3Hours]* 

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figure to the right indicate full marks.

#### *Q1*) Solve any Six of the following :

- a) Define UML.
- b) "Software Architecture is a design plan" Comment.
- c) What do you mean by architectural style?
- d) Give any one example of design pattern.
- e) When to you abstract factory design pattern?
- f) What do you mean by GOF?
- g) Write the meaning of framework.

#### **Q2)** Attempt any Four of the following :

- a) Explain the role of Software Architect.
- b) Which points should be considered while selecting specific architectural styles?
- c) What does the pattern consists of ?
- d) Write down various properties of design patterns.
- e) State various benefits of high cohesion GRASP.

[Total No. of Pages : 2

**SEAT No. :** 

[Max. Marks : 70

 $[6 \times 2 = 12]$ 

 $[4 \times 3 = 12]$ 

#### [6346]-3001

### Q3) Attempt any three of the following :

- a) What are different types of design patterns?
- b) Explain with example adaptor design pattern.
- c) Draw a neat diagram of the lifecycle of the framework.
- d) "frameworks acts as reusable chunks of architecture" comment.

#### *Q4*) Attempt any Three of the following : $[3 \times 4 = 12]$

- a) State and explain various critical UP Practices.
- b) Give the reason why software Architecture is important.
- c) Give example of Strategy design pattern.
- d) Explain observer design pattern with suitable example.

#### **Q5**) Attempt any three of the following : $[3 \times 4 = 12]$

- a) Draw a neat diagram and explain pipes and filters.
- b) Explain singeton design pattern with suitable example.
- c) State the meaning of polymer phism and how it will be used in programming.
- d) What do you mean by layered systems?

#### *Q6*) Attempt any two of the following : $[2 \times 5 = 10]$

- a) Illustrate interpreter model of software architecture.
- b) Write a short note on Low Coupling in GRASP.
- c) Write a short note on Abstract factory design pattern.

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#### $[3 \times 4 = 12]$

Total No. of Questions : 6]

SEAT No. :

**PC-4359** 

[Total No. of Pages : 3

### [6346] - 3002

# Second Year M.Sc. (COMPUTER SCIENCE) CS-602 – MJ :Machine Learning (2023 Pattern) (Semester - III)

Time Instr	Time : 3 Hours] Instructions to the candidates:		[Max. Marks : 70
	1)	All the Question are compulsory.	
	2)	Figures to the rightside indicate full marks.	
<b>Q1</b> )	Solv	ve any six of the following: :	[12]
	a)	What is semi - supervised learning?	
	b)	What is overfitting?	
	c)	Define multiple regression models.	
	d)	What is residual error?	
	e)	Write any two applications of association rule.	
	f)	State the term backpropogation	
	g)	List the types of Neural Network.	
Q2)	Atte	mpt any four of the following :	[12]
	a)	Write a short note on boosting.	
	b)	What do you understand by Anomaly detection?	
	c)	Write applications of reinforcement learning.	
	d)	Define precision and recall	

e) Write any two differences between classification and regression.

*P.T.O.* 

#### Q3) Answer any three of the following :

- a) Differentiate between logistic regression and linear regression.
- b) Explain components of ANN.
- c) Write a short note on supervised learning.
- d) Compare Agglomerative and Divisive clustering

#### Q4) Answer any three of the following :

- a) Explain Naive-Bayes theorem and how it used in classification.
- b) Consider the following dataset. Model this function using nearest neighbor classification. What will be the value of Y for the instance (X1,X2) = (4,5) and K = 3.

X1	X2	Y
2	1	4
6	3	2
2	5	2
6	7	3
10	7	3
4	4	2
7	6	3

- c) Write a short note on accuracy measure of classifier.
- d) Find the frequent itemset and association rules with minup = 2 and confidence level = 70%

TID	I tem
1	1,2,5
2	2,4,5
3	6,7
4	1,3,4
5	3,5

[6346]-3002

[12]

### Q5) Answer any three of the following :

	a) Solve any two of the following			[10]
		i)	Explain the architecture of Convolution Neural - Network (CN	N).
		ii)	Describe random - forest - trees.	
		iii)	What is machine learning? Compare it with artificial intelligence	e.
	b)	Wha	at is Euclidean - distance?	[2]
<b>Q6</b> )	) Write a note on the following (any two) :		note on the following (any two) :	[10]
	a)	Tho	mpson Sampling	
	b)	K-n	neans clustering	

c) Support Vector Machines

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[6346]-3002

Total No. of Questions : 5]

PC-4360

[Total No. of Pages : 2

SEAT No. :

# [6346] - 3003 S.Y. M.Sc. COMPUTER SCIENCE CS-603 – MJ :Internet of Things (2023 Credit Pattern) (Semester - III)

Time : 2 Hours] [M			Max. Marks : 35
Instr	uctio	ns to the candidates:	
	1)	Q. 1 is compulsory.	
	2)	Solve any three questions from Q. 2 to Q. 5.	
	3)	Questions 2 to 5 carry equal marks.	
<b>Q1</b> )	Solv	e any five of the following: :	[5]
	a)	Define Data Aggregation	
	b)	What is Zetta in IoT?	
	c)	What is the use of GPIO pins?	
	d)	What is sensor? Give an example	
	e)	List type of IoT framework.	
	f)	What smart metering?	
Q2)	Atte	mpt the following :	[10]
	a)	How sensors and actuators work? Explain each one wappropriate example.	vith giving one [4]
	b)	Explain working of Zigbee protocol.	[4]
	c)	What is data Enrichment and consolidation	[2]

Q3)	<i>Q3)</i> Attempt the following : [10]				
	a)	What are various components of RFID? Explain any two.	[4]		
	b)	What is the difference between M2M and IoT explain with exam	ples?[4]		
	c)	What are main security challenges in IoT devices?	[2]		
Q4)	Atte	empt the following :	[10]		
	a)	Write a short note on smart card application in IoT	[4]		
	b)	State the features of Raspberry Pi How authenticating and end Arduino data.	crypting [4]		
	c)	List different wireless medium access issues	[2]		
Q5)	Atte	empt the following :	[10]		
	a)	Compare Message Queueing Telemetry (MQTT) protocol with H transport protocol (HTTP)	ypertext [5]		
	b)	List and explain the libraries of Arduino and Raspberry Pi.	[5]		

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Total No. of Questions : 5]

**PC-4361** 

[Total No. of Pages : 2

[*Max. Marks : 35*]

### [6346] - 3004

# **M.Sc.** (Computer Science) **CS-610-MJ : Full Stack Development - II** (2023 Pattern) (Semester - III)

*Time : 2 Hours ]* Instructions to the candidates:

- Q. 1 is compulsory. 1)
- Solve any three questions from Q. 2 to Q. 5. 2)
- *Questions 2 to 5 carry equal marks.* 3)

#### Q1) Solve any five of the following :

- Define lazy loading in Angular. a)
- What is the role of dependency injection in Angular? b)
- How does TypeScript enforce type safety in Angular applications? c)
- d) What is Mongoose in MongoDB?
- What is MongoDB Atlas? e)
- What is body parsing in Express.js? f)

#### **Q2**) Attempt the following :

$a_{1}$ $a_{1$	[2]
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- Write a note on core concepts of RxJS. [4] ii)
- Explain the purpose of following Angular lifecycle hooks [4] b)
  - ngOnChanges i)
  - ngOnInit ii)
  - iii) ngDoCheck
  - ngAfterContentInit iv)

*P.T.O.* 

 $[5 \times 1 = 5]$ 

**SEAT No. :** 

### *Q3*) Attempt the following :

	a)	i)	Define code splitting in web development.	[2]
		ii)	What are utility types in TypeScript. Explain Conditional Ty (any four)?	ype [ <b>4</b> ]
	b)	What deco	at are decorators in TypeScript? Provide an example of using a clorator.	ass [ <b>4</b> ]
<b>Q4</b> ) Attempt the following :				
	a)	i)	Explain the concept of middleware in Express.js.	[2]
		ii)	How does non-blocking I/O work in Node.js?	[4]

b) Discuss in details working of event loop in Node.js? [4]

#### **Q5**) Attempt any two of the following :

- a) What are the Testing Strategies used for AngularJS Application? [5]
- b) Write a NodeJs program that saves a document in Mongodb using mongoose. [5]
- c) Explain the Need for security in Angular and XSS, CSRF prevention.[5]

### **64 64 64**

### [6346]-3004

[6346]-3005

# M.Sc. (Computer Science) CS-612-MJ : DEVOPS FUNDAMENTALS

# (2023 Credit Pattern) (Semester - III)

Time : 2 Hours]

Instructions to the candidates :

- 1) Q.1 is compulsory.
- 2) Solve any THREE questions from Q.2 to Q.5.

#### *Q1*) Solve any five of the following :

- a) What are the objectives of DevOps?
- b) Which command is used to add an individual file or groups of files to git tracking?
- c) What is ITIL?
- d) Define the term data bags in chef.
- e) What is DevOps Configuration Management?
- f) Which are some of the most popular DevOps tools?
- g) What is bootstrapping in Chef?

#### **Q2**) Attempt the following:

- a) Describe various features and capabilities in Agile.
- b) Explain various phases of DevOps Life Cycle?
- c) Explain the working of git pull.

#### **Q3**) Attempt the following:

- a) Write differentiation between Centralized Version Control System and Distributed Version Control System.
- b) Explain the cookbook and receipes in chef.
- c) What is Cloning? Write its syntax.

**SEAT No. :** 

#### [4 + 4 + 2 = 10]

[4 + 4 + 2 = 10]

 $[5 \times 1 = 5]$ 

1) [Max. Marks : 35]

#### *Q4*) Attempt the following:

- [4 + 4 + 2 = 10]
- a) Explain Docker Architecture with diagram.
- b) Explain Servers and Nodes Chef Configuration in detail.
- c) State the configuration that can be specified in the POM?

### **Q5**) Attempt the following:

### [5 + 5 = 10]

- a) Explain in brief git work flow.
- b) Explain the phases of Maven Build Life Cycle.



Total No. of Questions : 4]

**PC-4363** 

*Time : 2 Hours]* 

[Total No. of Pages : 2

### [6346]-3006

# **M.Sc** (Computer Science) CS - 614- MJ: SOFT COMPUTING (2023 Credit Pattern) (Semester - III)

Instructions to the candidates: Figures to the right indicate full marks. 1) 2) Draw the diagram wherever necessary. Q1) Attempt any Five of the following.  $[5 \times 1 = 5]$ Define soft computing. a) Define CNN. b) What is classical set? c) d) define genes in Genetic Algorithm. What is defference between Boilogical Neuron and Artificial Neuron. e)

List the applications of Genetic Algorithm. f)

 $[2 \times 5 = 10]$ *Q2*) Attempt any TWO of the following:

- Explain Feed Forward and Feedback Neural Networks. a)
- Explain the steps of Simple Genetic Algorithm in detail. b)
- What are the features of membership function in Fuzzy Logic Explain. c)

**SEAT No. :** 

[Max. Marks :35

#### *Q3*) Attempt any TWO of the following:

$$[2 \times 5 = 10]$$

- a) Expalin th structure and working of Biological Neural Network.
- b) What is Perceptron Network ? Explain Perceptron Learning Algorithm.
- c) Solve the following

Let  $X = \{x_1, x_2\}$ ,  $Y = \{y_1, y_2\}$ , and  $Z = \{z_1, z_2, z_3\}$ Consider the following fuzzy relations :

$$R = \begin{array}{cc} y_1 & y_2 \\ x_1 \begin{bmatrix} 0.7 & 0.5 \\ x_2 \end{bmatrix}$$

and

$$S = \begin{cases} z_1 & z_2 & z_3 \\ y_1 \begin{bmatrix} 0.9 & 0.6 & 0.2 \\ 0.1 & 0.7 & 0.5 \end{bmatrix}$$

\* Find max-min composition.

\* Find max product

Q4) Attempt any TWO of the following :

- $[2 \times 5 = 10]$
- a) What are the applications of ANN? Explain
- b) Explain the Architecture of CNN.
- c) Consider the fuzzy relation matrix R

$$\underline{R}_{t} = \begin{bmatrix}
1 & 0.8 & 0 & 0.1 & 0.2 \\
0.8 & 1 & 0.4 & 0 & 0.9 \\
0 & 0.4 & 1 & 0 & 0 \\
0.1 & 0 & 0 & 1 & 0.5 \\
0.2 & 0.9 & 0 & 0.5 & 1
\end{bmatrix}$$

Perform lambda-cut operations for the values lambda = 1, 0.2, 0.4, 0.7, 0.