Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

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MCA (Sem.–1)

TECHNICAL COMMUNICATION

Subject Code : PGCA-1905

M.Code. : 79039

Date Examination : 23-06-2025

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write short notes on :**

   a) Email

   b) Communication

   c) Listening

   d) Workshop

   e) Presentation

   f) Précis'

   g) Newsletter

   h) Report writing

   i) Non-Verbal Communication

   j) Hearing

SECTION - B

2. What is a communication process? What is the role of feedback in this process?

3. What are the essentials of communication?

4. Write a Paragraph on 'Online resources and E-learning'.

5. Write a letter to a dealer complimenting about the product you purchased from him.

SECTION – C

6. What is an interview? What should be done in order to project a positive image for an Interview?

7. What are the Research Papers, Dissertation, Thesis and Technical Reports?

8. What are the important presentation techniques to be followed while undertaking a presentation?

9. What do you understand by Resume writing? Draft a sample resume of a fresh graduate.

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Total No. of Questions : 09

MCA (Sem.–1)

PROGRAMMING IN PYTHON

Subject Code : PGCA-1951

M. Code : 79036

Date of Examination : 16-06-2025

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C, have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write short notes on/Fill in the blank :**

   a) What is the difference between immediate and script mode in Python?

   b) What is the difference between Generator function and Normal function?

   c) What are lambda functions in Python?

   d) Define implicit conversion.

   e) Mention the types of arguments in Python.

   f) Explain input command in Python with example.

   g) What is the need of learning Python and its importance?

   h) How to make a Python class member variable hidden from outside the class?

   i) Explain the use of break and continue statements with examples.

   j) List any four file operations.

SECTION - B

2. Describe shift and logical operators used in Python.

3. Write a Python program to print sum of first 60 non-prime numbers.

4. Explain the following: (i) Tuple assignment (ii) comments (iii) Statements in Python.

5. Write the syntax of while loop and use the same to classify whether a given number is Prime or not.

SECTION - C

6. Explain about fruitful functions with suitable examples.

7. What is the object oriented features supported by Python? Explain in detail.

8. What type of parameter passing is used in Python? Justify your answer with sample programs.

9. Write a python program to read line by line from a given files-file1 & file2 and write into file3.

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MCA (Sem.–1)

ADVANCED DATA STRUCTURES

Subject Code : PGCA-1952

M.Code : 79037

Date of Examination : 18-06-2025

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Answer the following :**

   a) Why is probabilistic analysis important?

   b) What is the worst case time complexity of quick sort?

   c) What is hashing?

   d) What are the properties of a good hash function?

   e) What is the worst case time complexity of bucket sort algorithm?

   f) List the properties of AVL tree.

   g) What do you mean by minimum spanning tree?

   h) What is maximum flow? Explain.

   i) How do you compute string length?

   j) What is string concatenation?

SECTION-B

2. a. The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. What is the resultant hash table?

   b. What is perfect hashing? Explain.

3. a) Show the red-black trees that result after successively inserting the keys 4,3,11,12,18,9 into an initially empty red-black tree.

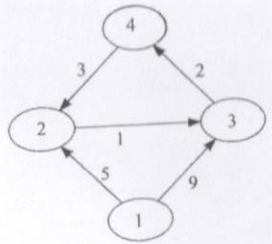
   b) Explain the importance of disjoint sets data structure.

4. What is a heap? Differentiate between min-heap and max-heap? How are they created? Explain with the help of examples.

5. What is amortized analysis? What are the different types of amortized analysis? Explain in detail.

SECTION-C

6. Calculate all pairs shortest path using Floyd Warshall algorithm for the following problems.



7. What is the basic principle of Rabin-Karp algorithm? Explain in detail with the help of an example.

8. Write an algorithm for Boyer-Moore algorithm. Also perform detailed analysis of this algorithm.

9. What is prefix function in Knuth-Morris-Pratt algorithm? Explain in detail. Also explain the time complexity of Knuth Morris Pratt algorithm.

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MCA (Sem.–1)

ADVANCED DATABASE MANAGEMENT SYSTEM

Subject Code : PGCA-1953

M. Code : 79038

Date of Examination : 20-06-2025

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write short notes on:**

   a. Define Database.

   b. Data Models

   c. Cardinality of Relation

   d. Referential Integrity Constraints.

   e. Week Entity

   f. Projection Operation

   g. Distributed Database Storage

   h. NoSQL Databases

   i. Temporal Databases

   j. Distributed DBMS Commit Protocols.

(5)

SECTION - B

2. What is the purpose of database management system and its applications? Discuss in detail.

3. What is ER data model? Explain ER diagram with suitable example and their terminology.

4. What is the process of normalization? Explain first three normal forms.

5. What is the use of relational algebra also discussing different operator?

SECTION - C

6. Discuss the architecture of a DBMS and differentiate between centralized and client-server architectures.

7. What are the concepts and use of multidimensional databases in data analytics?

8. What are spatial databases and their data structure and method of storage?

9. What are the types of XML databases? What is an XML schema type?

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M.C.A. (Sem.–2)

WEB TECHNOLOGIES

Subject Code : PGCA1909

M.Code : 79615

Date of Examination : 19-05-2025

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write briefly :**

   a) HTML

   b) Footer tag

   c) Table tag

   d) Color coding

   e) Ordered list

   f) Align attributes

   g) BGCOLOR

   h) COLSPAN

   i) Frame

   J) Testing and Debugging

SECTION-B

2. Write a note on Internet Domains and Internet Server Identities.

3. Explain with example any 5 text formatting tags.

4. Define list. Differentiate between ordered and unordered lists.

5. Discuss the use of alt, width, height and border attributes.

SECTION-C

6. Explain in detail various ways of linking a document.

7. What is JavaScript? List its advantages. How it is used in web pages?

8. Explain the use of JavaScript in platform independence, testing and debugging.

9. Discuss with example the select and option element and multi choice list element in a form.

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MCA (Sem.–2)

ADVANCED JAVA

Subject Code : PGCA-1918

M.Code : 79617

Date of Examination : 22-05-2025

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Define Briefly :**

   a. Servlet

   b. JDK

   c. Cookies

   d. Applet

   e. Struts

   f. Hibernate

   g. Entity Bean

   h. JAR files

   i. RMI

   j. Deployment

SECTION - B

2. Explain the process of reading the servlet parameters.

3. Define JSP. Explain its life cycle.

4. Write a note on implicit objects, object scope and session management.

5. Describe the struts framework in detail.

SECTION - C

6. Explain in detail the basic architecture model of Hibernate.

7. Discuss in detail the Java Beans API and use of JAR files.

8. Write a note on compiling and executing server and the client in RMI.

9. Explain the architecture of CORBA and its services.

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MCA (Sem–2)

DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : PGCA-1920

M.Code : 79616

Date of Examination : 05-05-2025

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write briefly :**

   a. Are the sub solutions overlapping in dynamic programming approach?

   b. What is asymptotic analysis? Why are asymptotic notations important?

   c. Draw a graph with a cycle but with no Hamiltonian cycle.

   d. What are P and NP problems?

   e. What is the basic principle of divide-and-conquer?

   f. State the general principle of greedy algorithm.

   g. What are the two classes of non-polynomial algorithms?

   h. What do you mean by the running time of an algorithm?

   i. What are the deterministic algorithms?

   j. How is the time complexity measured?

SECTION - B

2. Order the following functions by growth rate: N, $N^{1.5}$, N^{2}, N log log N, N $\log^2$ N, N log (N^{2}), 2/N, 2^{N}, $2^{N/2}$, 37, N^2 log N, N^3. Indicate which functions grow at the same rate.

3. Prove that $f(n) = a_m n^m + a_{m-1} n^{m-1} + \ldots + a_1 n + a_0$ then $f(n) = O(n^m)$.

4. Consider 5 items along with their respective values and weights: I = <I1,12,13,14,15> , w = <5,10,20,30,40> , v= <30,20,100,90,160>

   The capacity of the knapsack W = 60. Find the solution for the fractional knapsack problem.

5. Explain the Big -Oh computation for each of the following control structures:

   a) Sequencing b) If-then-else c) "for" loop

   d) "While" loop e) Recursion.

SECTION - C

6. What is the working principle of Quicksort? What is the significance of the Pivot element? Explain the implementation of the Quicksort algorithm step-by-step using a suitable illustrative example.

7. What is NP Completeness? Is P = NP? Explain.

8. If we are given a directed graph G with n vertices. Explain how you will find out the length of the shortest path between any pair of vertices in G? Justify your answer with an example.

9. Define depth-first search. Write algorithm for DFS, discussing its time complexity. Also, illustrate with some example.

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MCA (Sem–2)

INFORMATION SECURITY AND CYBER LAW

Subject Code :PGCA1932

M.Code : 79619

Date of Examination :29-05-2025

Time : 3 Hrs. Max. Marks :70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B &C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B& C carrying TEN marks each.
4. Select atleastTWO questions from SECTION - B &C.

SECTION-A

1. **Write short notes on :**

   a) What is information system availability?

   b) Define computer worm.

   c) What is a cryptographic algorithm?

   d) Explain token authentication.

   e) What is a zombie?

   f) What is a firewall?

   g) Define E-Governance.

   h) What is network-based IDS?

   i) What is phishing?

   j) Significance of cyber laws.

SECTION-B

2. Analyze the structure and strategic importance of Information Systems.
3. Evaluate the user authentication techniques and their security implications.
4. Examine access control models and their role in information security.
5. Investigate database security challenges and malware protection strategies.

SECTION-C

6. Describe the functioning of Intrusion Detection Systems in cybersecurity.
7. Discuss firewall technologies and their network defense capabilities.
8. Explore cryptographic algorithms and their practical applications.
9. Analyze internet security protocols and the framework of cyber laws.

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Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] Total No. of Pages :03

Total No. of Questions : 09

MCA (Sem.–02)

LINUX ADMINISTRATION

Subject Code : PGCA-1956

M.Code :79618

Date of Examination: 26-05-2025

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying ~~EIGHT~~ Ten marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on:

   a. How do you create and edit files using the 'vi' editor in Linux?

   b. What are the common file permissions in Linux and how do you set them?

   c. Explain the role of the bootloader in the Linux boot process.

   d. What is the primary purpose of the BIND database file in DNS configuration?

   e. Describe the main configuration steps for setting up an Apache web server.

   f. Why is SMTP important in email communication, and how does it work?

   g. Differentiate between POP and IMAP in email protocols.

   h. How can you install and configure the Dovecot IMAP and POP3 server in Linux?

   i. Discuss the basics of the Samba server and its administration.

   j. What tasks are involved in creating a share using Samba?

SECTION - B

2. Describe the process of managing packages and users in a Linux system. Explain the steps involved in getting, unpacking, configuring, compiling and installing a package. Discuss the challenges and best practices in package management.

3. Discuss the role of user and group commands in Linux. Explain how to create, modify and manage users and groups. Provide examples of common user and group management tasks and the associated command-line tools.

4. Explore the vi text editor in-depth. Explain its various modes, common commands, and advantages in text editing. Provide practical examples of using vi for file editing and manipulation and discuss how it compares to other text editors.

5. Explain the process of file permissions management and manipulation in Linux. Discuss the various permission types (read, write, execute) and how they are assigned to files and directories. Provide practical examples of changing and managing file permissions for different scenarios.

SECTION - C

6. Describe the process of setting up a DNS server, including the installation, configuration, and use of the BIND database file. Explain the importance of DNS in internet communication and the role it plays in resolving domain names. Provide practical examples of DNS configuration.

7. Discuss the fundamentals of the HTTP protocol in web communication. Explain the key concepts behind HTTP requests and responses. Provide insights into how the Apache HTTP server works, along with detailed steps for its installation, startup and shutdown.

8. What are the mechanics of SMB and how does it facilitate file and print sharing between computers?

9. Explore the basics of POP and IMAP in email protocols. Explain their differences and how they affect email retrieval. Describe the installation and configuration of the UWIMAP and POP3 servers in a Linux environment. Discuss the importance of email servers in managing messages.

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Total No. of Pages : 02

Total No. of Questions : 09

MCA (Sem.–3)

E-COMMERCE AND DIGITAL MARKETING

Subject Code : PGCA-1921

M.Code : 90807

Date of Examination: 30-06-2025

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write short notes on:**

   a) Define the Viral marketing.

   b) What is keyword search?

   c) Describe the importance of SMM.

   d) Explain the Email marketing.

   e) What is Mobile marketing?

   f) Name the privacy issues in E-marketing.

   g) Define the Hypertext publishing.

   h) What is the role of smart cards for e-commerce?

   i) What is affiliate marketing?

   j) What is On-page SEO?

SECTION-A

2. What is the framework of E-commerce? What are the technical aspects of e-commerce?

3. Define the e-business and describe the application parts of e-commerce for the business organisations.

4. What is the process of online payment system? Discuss the types of traditional methods of payment. What are the barriers for e-payment system?

5. Describe the concept and applications of EDI. What are the limitations of EDI? What is the role of EDI for e-commerce?

SECTION-B

6. What is digital marketing and what are the different components of online marketing?

7. What is the role of online marketing? Discuss the role of web analytics for digital marketing.

8. Describe the search engine optimization and how its different from SEM? What are the strategies of SEO?

9. Discuss the content marketing strategy. What is the role of content marketing for website planning?

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MCA (Sem.–3)

ADVANCED COMPUTER NETWORKING

Subject Code : PGCA1925

M.Code : 90798

Date of Examination : 03-07-2025

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION -B & C carrying EIGHT marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION - A

I. **Write short notes on :**

a) Define Bandwidth.

b) Write about Fiber optics.

c) Discuss Hamming code.

d) Name any two routing algorithms.

e) Write about DNS.

f) Define Mobility.

g) What is the use of WLAN?

h) Compare Adhoc vs. cellular networks.

i) Discuss CDMA.

j) What is system capacity?

SECTION - B

2. Discuss in detail the Reference model used in computer networks.

3. **Define the following :**

a) Data Flow testing

b) Sliding window protocol.

4. Write in detail about Medium Access Sub-Layer. Why ALOHA is used?

5. Explain the elements of transport layer. What is crash recovery in networks?

SECTION - C

6. Explain the steps of wireless system design for cellular systems.

7. Discuss in detail the cellular and mobile networks.

8. a) Write a note on advantages of Adhoc Network.

b) Give the introduction of Routing Protocols.

9. Discuss the network architecture of Adhoc networks.

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MCA (Sem.–3)

THEORY OF COMPUTATION

Subject Code : PGCA1927

M.Code : 90800

Date of Examination : 16-06-2025

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION - A

I. **Write short notes on :**

a) GNF

b) Right context

c) NDFA

d) Grammar

e) TM

f) Transition Table

g) Null Productions

h) Yield

i) Type-1 grammar

j) Mealy

SECTION - B

2. **Construct a Moore machine equivalent to the Mealy machine M defined as follows :**

Present State	Next State			
	a = 0		a = 1	
	state	output	state	output
→ q_1	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	1

3. Describe pumping lemma for regular set with the help of an example.

4. Prove that P + PQ*Q = a*bQ* where P = b + aa*b and Q is any regular expression.

5. Explain the concept of ambiguity with the help of example.

SECTION - C

6. Design PDA for $\{wcw^T \mid w = \{a,b\}^*\}$.

7. Write a note on halting problems and tractable and intractable problems.

8. Design Turing Machine of $\{0^n1^n \mid n >= 1\}$

9. Discuss the procedure how to covert parse tree into PDA.

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MCA (Sem.–3)

SOFTWARE PROJECT MANAGEMENT

Subject Code : PGCA1930

M.Code : 90801

Date of Examination : 23-06-2025

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION - A

1. **Write short notes on :**

   a) Justify the role of Software Engineering in software industry.

   b) What do you understand by Stakeholder management as a phase in Software Project Management?

   c) Pictorially represent the working of spiral model as evolutionary process model.

   d) Write down the working principle of extreme programming used in Software Project Management.

   e) Why SRS is called as the 'Only Legal Document' in whole software cycle?

   f) Draw a state transition diagram while considering any illustration of your choice.

   g) Define the term Work Breakdown Structures (WBS) in planning phase.

   h) List down any four risks that can cause the software crisis.

   i) Brief out any one approach that can be used to schedule the project with relevant example.

   j) Elaborate how risks can be evaluated.

SECTION - B

2. a) What are the various activities in software project management? Explain.

   b) Discuss in detail about team structure.

3. Elaborate how detailed COCOMO works differently than intermediate COCOMO.

4. Differentiate the working of iterative and incremental models to perform Software Project management.

5. Explain different types of software requirements collected at SRS phase with apt examples.

SECTION - C

6. What are various software quality parameters? Explain the role of quality metrics and IS09126 standard in software quality management.

7. a) What is the difference between an SCM audit and a technical review? Can their function be folded into one review? What are the pros and cons?

   b) Explain Oldman Hackman job characteristic model. Elaborate with example.

8. What are the various contracts? Discuss various stages in any contract placement. Also discuss various aspects of contract management with the help of suitable example.

9. a) You are an engineer involved in the development of a financial system. During installation, you discover that this system will make a significant number of people redundant. The people in the environment deny you access to essential information to complete the system installation. To what extent should you, as a systems engineer, become involved in this? Is it your professional responsibility to complete the installation as contracted? Should you simply abandon the work until the procuring organization has sorted out the problem?

   b) A formal technical review is effective only if everyone has prepared in advance. How do you recognize a review participant who has not prepared? What do you do if you're the review leader?

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MCA (Sem.–4)

ADVANCED WEB TECHNOLOGIES

Subject Code : PGCA1958

M.Code : 91856

Date of Examination : 20-05-2025

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write short notes on :**

   a) PHP

   b) Scripting

   c) Strings

   d) Regular expression

   e) Sessions

   f) CMS

   g) Attributes

   h) Node.js

   i) ReactJS

   j) Component API

SECTION - B

2. Explain server side and client side web scripting.
3. Describe the functions of PHP/MySQL.
4. Discuss the OOP concepts used in PHP.
5. Write a note on content management system in detail.

SECTION - C

6. Define XML. Explain its syntax and editors.
7. Explain the use of AJAX in websites with example.
8. What is bootstrap? Explain its components and use.
9. Write a note on component life cycle in react, forms and events.

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Roll No. | | | | | | | | | | | | | Total No. of Pages :02

Total No. of Questions : 09

MCA (Sem.–04)

IOT & BLOCKCHAIN TECHNOLOGY

Subject Code : PGCA 1967

M.Code : 91862

Dtae of Examination: 27-05-2025

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write short notes on:**

   a. Define IoT briefly.

   b. What are communications APIs?

   c. Name two IoT hardware components.

   d. Explain MQTT protocol.

   e. One IoT application in agriculture.

   f. Define blockchain.

   g. What is distributed consensus?

   h. Public vs. private blockchain.

   i. Define smart contract.

   j. One blockchain enterprise application.

SECTION - B

2. Explain the physical design of IoT with emphasis on the "Things" in IoT. Describe various communication models used in IoT architecture.

3. Discuss cloud computing and big data analytics as enabling technologies for IoT.

4. Compare and contrast MQTT and CoAP, ZigBee and Bluetooth communication protocols used in IoT.

5. Explain the solution framework for IoT applications with a case study of smart cities implementation.

SECTION - C

6. Describe the structure of a block in a blockchain and explain the concept of transactions.

7. Explain the process of block mining in Bitcoin and how the P2P network ensures transaction integrity.

8. Discuss the concept of permissioned blockchain model and how it differs from public blockchain.

9. Elaborate on blockchain applications in Supply Chain Financing and Identity Management.

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Total No. of Pages : 02

Total No. of Questions : 09

MCA (Sem.–4)

MACHINE LEARNING AND DATA ANALYTICS USING PYTHON

Subject Code : PGCA-1976

M.Code : 91855

Date of Examination : 06-05-2025

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :

   a. What is the cost function used in logistic regression? Discuss how it is optimized.

   b. Describe the process of selecting the number of clusters in K nearest neighbours algorithm.

   c. Define any two criteria used for node splitting in decision tree.

   d. Briefly discuss the principle of classification using Naïve Bayes.

   e. Differentiate between classification and clustering in machine learning.

   f. Write a brief note on NumPy arrays.

   g. What is the difference between a list and a tuple in Python?

   h. How do you create a pie chart using Matplotlib?

   i. What is the purpose of plt.grid() in Matplotlib?

   j. Demonstrate how to handle missing data in DataFrames.

SECTION - B

2. What is a well posed learning problem in machine learning? Give examples. Discuss the steps of designing a machine learning system. Explain the three main types of machine learning.

3. Describe the mathematical principles behind linear regression. Explain how it differs from logistic regression and when each is appropriate.

4. Describe the Random Forest algorithm, including how it works, what ensemble learning is and its advantages over a single decision tree.

5. Discuss the need for dimensionality reduction. Describe how Principal Component Analysis is used for this task. List the characteristics of principal components.

SECTION - C

6. Explain Python's core data types. Provide examples of how to use control structures and define functions.

7. Explain the concepts of Pandas Series and DataFrames. Demonstrate how to create, manipulate and analyze data using these data structures.

8. Explain the use of the groupby() function in Pandas. Demonstrate how to read and write data from/to CSV and Excel files.

9. Demonstrate how to create line plots, scatter plots and bar charts using Matplotlib. Explain how to customize plots with labels, titles and legends.

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Roll No. | | | | | | | | | | | | | Total No. of Pages: 02

Total No. of Questions: 09

MCA, Semester- 1st

DISCRETE STRUCTURES AND OPTIMIZATION

Subject Code: 25C2CAP-101

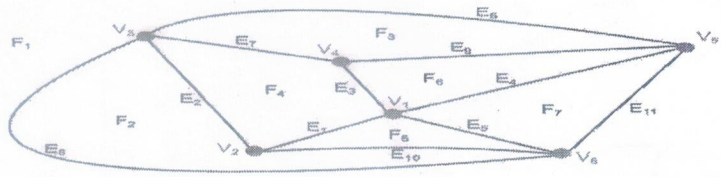
M.Code:

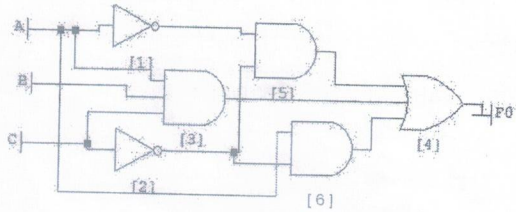
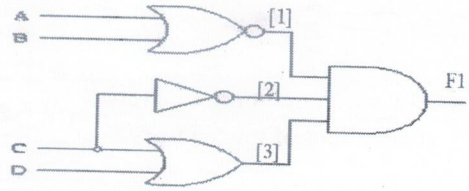
Date of Examination: 15-12-2025

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION B & C have FOUR questions each.**
3. **Attempt any FIVE question of SECTION B & C carrying TEN marks each.**
4. **Select at least TWO questions from SECTION B & C.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define Inclusion-Exclusion Principle.	CO1	L1
b.	Differentiate proper subset and improper subset.	CO1	L2
c.	State any four elementary law of Boolean algebra.	CO2	L1
d.	Interpret the following sets in roaster form. (i) $C = \left\{x: \frac{x-2}{x-3} = 3, x \in R\right\}$ (ii) $B = \{x \in Z: \lvert x \rvert < 4\}$	CO2	L2
e.	State fundamental theorem of group homomorphism.	CO2	L1
f.	Show there exist a real number n such that P(9,5)+5P(9,4)=P(10,n) where P(.,.) is permutation.	CO3	L2
g.	Define permutation and combination.	CO3	L1
h.	Explain whether for the following graph satisfies the Euler's formula or not? 	CO4	L2
i.	Define homomorphic graph and draw two homomorphic graphs.	CO4	L1
j.	Show that the set G= $\{1, \omega, \omega^2\}$ of cube root of unity forms a group under multiplication.	CO2	L2
	SECTION-B		
2.	Identify the truthiness of De Morgan's Law for $(A \cup B)^c$ and $(A \cap B)^c$sets.	CO1	L3
3.	Examine the following statement: The subset S of all matrices of the form $\begin{bmatrix} x & 0 \\ 0 & y \end{bmatrix}$ with x and y integers forms a subring of 2*2 matrices with integer elements and further the S is neither a right ideal nor left ideal.	CO2	L4

4.	In a town of 10,000 families it was found that 40% of families buy newspaper A. 20% buy newspaper B and 10% buy newspaper C. 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the newspaper, find the number of families which buy (i) A only (ii) B only (iii) none of A, B and C.	CO1	L5
5.	Evaluate the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these (i) Four cards of the same suit (ii) Four cards belong to different suits (iii) Are face cards (iv) Two are red cards and two are black cards (v) Cards are of the same colour	CO3	L5
	SECTION-C		
6.	Apply the concept of permutation to find the number of different signals that can be made by arranging at least three flags in order on a vertical pole if 6 different flags are available.	CO3	L3
7.	Analyse the following algebraic expressions to construct the tree (i) $3-\left(x+\left(6\times\left(4+(2-3)\right)\right)\right)$ (ii) $\left(2-(3\times x)\right)+\left((x-3)-(2+x)\right)$	CO4	L4
8.	A salesman wants to visit cities E, F, G and H. He does not want to visit any city twice before completing the tour of all the cities and wishes to return to his home city cost of going from one city to another in rupees is given. Find the least cost route. $\begin{array}{c} \\ E \\ F \\ G \\ H \end{array}\begin{array}{c} \begin{array}{cccc} E & F & G & H \end{array} \\ \begin{bmatrix} 0 & 3 & 8 & 5 \\ 4 & 0 & 14 & 3 \\ 4 & 5 & 0 & 2 \\ 7 & 8 & 13 & 0 \end{bmatrix} \end{array}$	CO4	L5
9.	Construct the Boolean expression of output with systematic progress at each step. (i)  (ii) 	CO2	L3

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Total No. of Pages: 01

Total No. of Questions: 09

MCA, Semester-1st

PROGRAMMING IN PYTHON

Subject Code: 25C2CAP-102

M.Code:

Date of Examination: 19-12-2025

Max. Marks: 70

Time: 3 Hrs.

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION B & C have FOUR questions each.**
3. **Attempt any FIVE question of SECTION B & C carrying TEN marks each.**
4. **Select at least TWO questions from SECTION B & C.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What is a Python interpreter?	CO1	L1
b.	Contrast between arithmetic and comparison operators with examples in python.	CO1	L2
c.	List any two differences between static typing and dynamic typing with reference to Python.	CO2	L1
d.	Summarize how we can check the type of a variable in Python?	CO2	L2
e.	Name the three types of control structures in Python.	CO3	L1
f.	Explain how an if-else statement works in Python?	CO3	L2
g.	Why we use "def" keyword in python? Explain with suitable example.	CO4	L1
h.	Show how to create and use a custom exception class?	CO4	L2
i.	Define the "__init()__" function in Python.	CO5	L1
j.	Illustrate how to check if a file exists using Python.	CO5	L2
	SECTION-B		
2.	Apply arithmetic operators to perform addition, subtraction, multiplication and division in python.	CO1	L3
3.	Compare Python, C, C++ and Java in terms of syntax, memory management and library support.	CO2	L4
4.	Assess the usage of nested loops and Conditional statements in python.	CO3	L5
5.	Evaluate the advantages and disadvantages of Python's dynamic typing compared to statically typed languages.	CO1	L5
	SECTION-C		
6.	Develop a Python program that imports a custom module and calls one of its functions.	CO4	L3
7.	Examine the concept of exception handing in python with suitable examples.	CO5	L4
8.	Judge how we can use Default, Keyword (named), Positional and Arbitrary arguments In python functions.	CO4	L5
9.	Identify how polymorphism achieve in python ,also explain its types with suitable examples.	CO5	L3

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Roll No. | | | | | | | | | | | | | | Total No. of Pages: 01

Total No. of Questions: 09

MCA, Semester- 1st

ADVANCED DATA STRUCTURES

Subject Code: 25C2CAP-103

M.Code:

Date of Examination: 17-12-2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE question of SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	How to Differentiate between best case and worst case analysis.	CO1	L1
b.	Classify the Heap Sort.	CO1	L2
c.	What is an algorithm?	CO2	L1
d.	Demonstrate the Hash Table.	CO2	L2
e.	Define the types of rotations in AVL Trees.	CO3	L1
f.	Explain the collision in Hashing.	CO3	L2
g.	What is a Binomial Heap?	CO4	L1
h.	Outline the Minimum Spanning Tree.	CO4	L2
i.	What is the difference between directed and undirected graphs?	CO5	L1
j.	Explain the string in data structures.	CO5	L2
	SECTION-B		
2.	Identify the linear and non-linear data structures with appropriate diagrams and explain their key characteristics.	CO2	L3
3.	Classify the limitations of Direct Address Tables and how Hash Tables overcome them.	CO1	L4
4.	Examine and analyse the algorithm for quick sort and apply the same on following sequence : 8 5 7 3 2 1 6 4 9	CO2	L5
5.	Explain the Splay Tree and splaying operation and rotations with examples.	CO3	L5
	SECTION-C		
6.	Compare Binomial Heaps and Fibonacci Heaps in detail with example.	CO4	L4
7.	Classify a graph in the context of data structures and explain the key characteristics that differentiate various terminology of graphs.	CO5	L5
8.	Analyse the minimum spanning tree. Explain the Kruskal's algorithm used to find out the minimum spanning tree of a graph with the help of a suitable example.	CO4	L4
9.	Compare the KMP with Brute Force and Rabin–Karp algorithms in terms of time complexity and practical usage.	CO5	L5

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Roll No. | | | | | | | | | | | | | | Total No. of Pages: 02

Total No. of Questions: 09

MCA, Semester- 1st

TECHNICAL COMMUNICATION

Subject Code: 25C2CAP-105

M.Code:

Date of Examination: 23-12-2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE question of SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	List the main elements involved in effective communication.	CO1	L1
b.	Interpret the process of email etiquette in brief.	CO1	L2
c.	Define technical proposals briefly.	CO2	L1
d.	Illustrate the importance of letters in professional communication.	CO2	L2
e.	Recall notice and its uses in an organization.	CO3	L1
f.	Explain the importance of tone in verbal communication.	CO3	L2
g.	Define resume briefly.	CO4	L1
h.	Explain the importance of feedback in communication process.	CO4	L2
i.	Recall the differences between intrapersonal and interpersonal communication.	CO5	L1
j.	Illustrate the importance of technical communication in professional journey.	CO5	L2
	SECTION-B		
2.	Appraise a flowchart to explain Shannon–Weaver's model.	CO1	L5
3.	Analyze how communication impacts customer satisfaction.	CO3	L4
4.	Identify the uses of 7C's of communication in effective communication. Give appropriate example for each of them.	CO4	L3
5.	Criticize various types of barriers to communication and infer how to handle them.	CO5	L5
	SECTION-C		
6.	Explain the steps of report writing to draft a technical report.	CO4	L5
7.	Compare between APA and MLA styles of references. Give appropriate example, and also infer the importance of referencing in research work.	CO5	L4

8	Classify the steps of formal letter writing with an example.	CO2	L4
9.	Identify effective non-verbal communication during an interview.	CO3	L3

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Total No. of Pages: 01

Total No. of Questions: 09

MCA, Semester- 1st

TECHNICAL COMMUNICATION

Subject Code: PGCA1905

M. Code: 79039

Date of Examination: 6-12-2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE questions of SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Identify any two benefits of intra-communication.	CO2	L1
b.	Explain the value of Minutes of Meeting /MOM in an office.	CO2	L2
c.	What is group communication? Give example.	CO1	L1
d.	Recall the structure of a formal report.	CO1	L1
e.	Differentiate between solicited and unsolicited proposal.	CO3	L2
f.	Define the 'process of communication'.	CO3	L1
g.	Name any two qualities of effective communication.	CO2	L1
h.	Classify different types of letters.	CO3	L2
i.	Compare circular and memorandum.	CO3	L2
j.	Infer the social communication.	CO5	L2
	SECTION-B		
2.	Justify documentation in academic research.	CO2	L5
3.	Apply letter-writing skills in a leave application.	CO3	L3
4.	Develop a flowchart to explain Shannon–Weaver's model.	CO5	L3
5.	Compare formal letter with informal letter.	CO3	L4
	SECTION-C		
6.	Evaluate the role of resume in your selection process.	CO4	L5
7.	Examine the value of formal etiquette in global businesses.	CO4	L4
8.	Develop a letter for the CEO of your company to request him for free medical service for your family as you are an old employee of the company.	CO5	L3
9.	Explain the process for professional meeting in an office.	CO1	L5

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Total No. of Questions: 09

MCA,Semester- 1st

ADVANCED DATA STRUCTURES

Subject Code: PGCA1952

M.Code: 79037

Date of Examination:11-12-2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE question of SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	List two examples of primitive data structures.	CO1	L-1
b.	What is Big-O notation?	CO1	L-1
c.	Illustrate the pivot element and its importance.	CO2	L-2
d.	Explain the collision in Hashing.	CO2	L-2
e.	Name any types of rotations in AVL Trees.	CO3	L-1
f.	Where are B-Trees commonly used?	CO3	L-1
g.	Interpret the Disjoint Set.	CO4	L-2
h.	Compare the directed and undirected graphs.	CO4	L-2
i.	Define the one real-world application of string operations.	CO5	L-1
j.	Classify the main idea of the Rabin-Karp algorithm.	CO5	L-2
	SECTION-B		
2.	Make use of best case,worst case,average case and amortized time complexity of an algorithm.	CO1	L-3
3.	Analyze the Max heap from the following sequence of nodes and apply heap sort.Show all the intermediate steps. 3, 5, 9, 6, 8, 20, 10, 12, 18, 9	CO2	L-4

4.	Identify the Hash Function. Explain the properties of a good Hash Function.	CO2	L-3
5.	Discover the Red -black trees?Construct a red black tree for the following list with proper rotations and coloring . 7 , 5 , 6 , 3 , 9 , 14 , 15	CO3	L-4
	SECTION-C		
6.	Classify how graphs are represented in memory? Explain in detail.	CO4	L-4
7.	Analyze the maximum flow problem. Explain the Ford–Fulkerson method with an example.	CO4	L-4
8.	Evaluate the different applications of string operations in real-world scenarios such as text editors, search engines, and bioinformatics.	CO5	L-5
9.	Construct the average-case and worst-case complexities of Brute Force and Rabin–Karp algorithms.	CO5	L-5

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Total No. of Questions: 09

MCA, Semester- 1st

ADVANCED DATABASE MANAGEMENT SYSTEM

Subject Code: PGCA 1953

M.Code: 79038

Date of Examination: 13-12-2025

Time: 3 Hrs. Max. Marks:70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE question of SECTION B & C carryingTEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What is the need for database administration?	CO-2	L-1
b.	List any two limitations of traditional file storage systems.	CO-1	L-1
c.	Recall the query optimization?	CO-5	L-1
d.	Show the transaction in DBMS?	CO-3	L-1
e.	Compare hierarchical and relational models.	CO-3	L-2
f.	Illustrate the heuristic optimization?	CO-4	L-2
g.	Classify the difference between data independence and data redundancy.	CO-1	L-2
h.	Explain the impact of concurrency control on system performance.	CO-4	L-2
i.	Compare inter-query and intra-query parallelism.	CO-5	L-2
j.	List types of integrity constraints and explain any one briefly.	CO-2	L-1
	SECTION-B		
2.	Justify that backup and recovery strategies for a large-scale enterprise database is eseential.	CO-3	L-5
3.	Explain Relational Algebra as a procedural query language. Describe the following operators with suitable examples: i) Selection (σ) ii) Projection (π) iii) Join ($\boxdot$)	CO-3	L-5
4.	Identify the different types of architecture of a DBMS with a neat diagram.	CO-1	L-3
5.	Examine the normalization and its forms with example.	CO-2	L-4

SECTION-C			
6.	Analyze Spatial Databases by explaining spatial data types and methods of spatial data storage.	CO-5	L-4
7.	Apply SQL queries to implement constraints like primary key, foreign key, and check.	CO-5	L-3
8.	Evaluate the need for Big Data technologies, focusing on NoSQL databases.	CO-4	L-5
9.	Analyze the types of parallelism used in parallel databases.Differentiate between I/O Parallelism, Inter-query Parallelism, and Intra-query Parallelism.	CO-4	L-4

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Total No. of Questions: 09

Total No. of Pages: 01

MCA, Semester- 2nd

ADVANCED JAVA

Subject Code: PGCA1918

M.Code: 79617

Date of Examination: 23-12-2025

Time: 3 Hrs.

Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Distinguish between 'doGet()' and 'doPost()'.	CO1	L2
b.	What are Cookies?	CO1	L1
c.	Explain Session tracking in Servlet.	CO2	L2
d.	Define the JSP in detail.	CO2	L1
e.	List the various components of struts framework.	CO3	L1
f.	Explain EJB.	CO3	L2
g.	What is the role of POJO files in hibernate framework?	CO4	L2
h.	Show the MVC architecture in struts framework.	CO4	L1
i.	List the features of the object naming service in CORBA.	CO5	L1
j.	Illustrate the stubs used in RMI.	CO5	L2
	SECTION-B		
2.	Identify the various JSP tags with example.	CO2	L3
3.	Analyze the different phases involved in the life cycle of a JSP.	CO2	L4
4.	Identify the various methods of Servlet in detail with a suitable example.	CO1	L3
5.	Explain the Sturts framework with suitable example.	CO1	L5
	SECTION-C		
6.	Explain the Java Bean Class with the help of a program.	CO3	L5
7.	Examine the Session Factory, Session, and Transaction components in Hibernate work together to ensure data persistence and consistency in a database.	CO4	L4
8.	Demonstrate how CRUD (Create, Read, Update, Delete) operations are performed in Hibernate with suitable example.	CO3	L3
9.	Explain the architecture of CORBA in detail with the help of diagram.	CO5	L5

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Total No. of Pages: 01

Total No. of Questions: 09

MCA, Semester-2nd

DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code: PGCA-1920

M. Code: 79616

Date of Examination: 20-12-2025

Time: 3 Hrs.

Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION A is COMPULSORY, consisting of TEN questions carrying TWO marks each.
2. SECTIONS B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTIONS B & C, carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define an algorithm and explain its basic characteristics.	CO1	L1
b.	What is the purpose of analyzing an algorithm?	CO1	L1
c.	Explain the recursive algorithms.	CO2	L2
d.	What is Knapsack problem?	CO3	L1
e.	Illustrate Hamiltonian Circuit Problem and explain why it is NP-Complete.	CO4	L2
f.	What is a recursive algorithm? Give one example	CO2	L1
g.	What is binary search? Write its algorithm and explain its time complexity	CO3	L1
h.	Explain the sorted array.	CO3	L2
i.	Explain Big O notation with an example.	CO1	L2
j.	Illustrate any two algorithm used to solve the string matching problem.	CO4	L2
	SECTION-B		
2.	Apply the principle of Branch and Bound to solve the Traveling Salesperson Problem (TSP).	CO2	L3
3.	Simplify the principles of algorithm design and discuss their importance in solving computational problems.	CO1	L4
4.	Analyze the importance of time and space complexity in evaluating algorithm efficiency. Compare both with suitable examples.	CO1	L4
5.	Evaluate the backtracking approach using the N-Queens problem. Discuss how it differs from the greedy approach.	CO2	L5
	SECTION-C		
6.	Simplify the Breadth-First Search (BFS) and Depth-First Search (DFS) algorithms with examples. Compare their uses.	CO4	L4
7.	Evaluate how Dynamic Programming and Backtracking techniques help approximate solutions to NP-Hard problems.	CO4	L5
8.	Identify and explain the time complexity of Heap Sort.	CO3	L3
9.	Analyze the working of Radix Sort and evaluate its advantages over comparison-based sorting algorithms.	CO3	L5

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Total No. of Pages:02

Total No. of Questions: 09

MCA , Semester- 2nd

INFORMATION SECURITY & CYBER LAW

Subject Code: PGCA1932

M.Code: 79619

Date of Examination:18-12-2025

Time: 3 Hrs.

Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE question of SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define security functional requirements.	CO1	L1
b.	What is Token-Based Authentication?	CO1	L1
c.	Outline the need for Database Security.	CO2	L2
d.	Explain the denial of Service (DoS)attacks.	CO2	L2
e.	What is Hacking?	CO3	L1
f.	Define the Role-Based Access Control in Information Security.	CO3	L1
g.	Illustrate the concept of Firewall.	CO4	L2
h.	Compare symmetric and asymmetric encryption.	CO4	L2
i.	What are the ISO Standards?	CO5	L1
j.	Explain Cyberspace.	CO5	L2
	SECTION-B		
2.	Identify the concept confidentiality, integrity, and availability. How does each element contribute to the overall security of an information system.	CO1	L3
3.	Explain different access control policies adopted by organizations to protect information resources.	CO2	L5
4.	Analyze the differences between Password-Based, Token-Based, and Biometric Authentication in terms of security strength, cost, and user convenience.	CO2	L4
5.	Classify the different types of malicious software (malware) such as viruses, worms, Trojans, and spyware with suitable examples.	CO3	L4

SECTION-C			
6.	Explain the working principles of host-based intrusion detection Systems (HIDS) and network-based intrusion detection systems (NIDS). How do they differ in their approach?	CO4	L5
7.	Discuss the characteristics and functions of firewalls. Why are firewalls considered a critical part of network security infrastructure?	CO4	L6
8.	Analyze the symmetric encryption principles and discuss the working of the data encryption standard (DES) with a suitable block diagram.	CO5	L4
9.	Apply the concept of Digital Signature and its creation, verification process, and legal significance in securing electronic transactions.	CO5	L3

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Roll No. | | | | | | | | | | | | |

Total No. of Pages: 02

Total No. of Questions: 09

MCA, Semester- 2nd

LINUX ADMINISTRATION

Subject Code: PGCA-1956

M.Code: 79618

Date of Examination: 02-01-2026

Time: 3 Hrs.

Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Each question of SECTION B & C consists of TEN marks.
4. Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What is the key difference between Linux and Windows kernels?	CO1	L1
b.	Explain the role of the root directory in a Linux file system.	CO1	L2
c.	Discuss the commands used to move or rename a file in Linux.	CO2	L2
d.	Write a short note on Linux boot process.	CO2	L1
e.	Describe how the chmod command is used to change file permissions in Linux.	CO2	L2
f.	List the characteristics of a package and a folder in Windows.	CO3	L1
g.	Compare GRUB and LILO.	CO3	L2
h.	Summarize the role of SMTP in email communication.	CO3	L2
i.	Write a short note on HTTP protocol?	CO4	L1
j.	Explain the role of the Samba server.	CO4	L2
	SECTION-B		
2.	Analyze the role of the Linux root user and compare it with Windows administrator accounts.	CO1	L3
3.	Describe the Linux booting and shutting down processes in detail. Discuss the significance of the runlevels in the boot process.	CO2	L4

4.	Evaluate the Linux file structure and hierarchy, highlighting its advantages and potential limitations.	CO1	L5
5.	Examine the role of vi text editor in Linux. Explain insertion and command modes, give any 5 commands in detail.	CO2	L4
	SECTION-C		
6.	Demonstrate the process of installing and configuring a DNS server by setting up BIND database files and configuring DNS clients.	CO3	L3
7.	Explain the key concepts of the HTTP protocol and its role in web communication. Discuss how Apache is utilized for hosting websites?	CO4	L5
8.	Demonstrate the differences between POP and IMAP protocols and demonstrate how each is used in managing email accounts.	CO4	L4
9.	Explain the advantages of using Samba for remote sharing in Windows and Linux environments.	CO3	L5

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Total No. of Pages: 02

Total No. of Questions: 09

MCA, Semester- 2nd

WEB TECHNOLOGIES

Subject Code: PGCA-1909

M. Code: 79615

Date of Examination: 15-12-2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Each question of SECTION B & C consists of TEN marks.
4. Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define an IP address.	CO1	L1
b.	What is HTML and its basic structure.	CO2	L1
c.	List any two types of hyperlinks used in HTML.	CO3	L1
d.	Name any two form elements used to capture user data in HTML.	CO4	L1
e.	Recall what TCP/IP stands for.	CO5	L1
f.	Explain how the attributes cellpadding, cellspacing, and border enhance the readability and appearance of an HTML table.	CO1	L2
g.	Differentiate between a programming language and a markup language with examples.	CO3	L2
h.	Interpret the difference between internal links and external links in HTML.	CO2	L2
i.	Describe how JavaScript captures user input from form elements.	CO2	L2
j.	Relate how front-end HTML forms are connected to back-end servers for data processing.	CO2	L2
	SECTION-B		
2.	Apply your understanding of IP addressing to explain how unique IPs are assigned to systems and how they enable Internet communication.	CO1	L3

3.	Develop an HTML code snippet that creates a table with merged cells using `COLSPAN` and `ROWSPAN`. Explain the purpose of each attribute.	CO3	L4
4.	Analyze how the `<img>` tag contributes to webpage design. Write HTML code to insert an image with alternate text and defined dimensions.	CO2	L4
5.	Evaluate the role of fundamental Internet concepts such as domain names, and client-server architecture in ensuring efficient and secure digital communication. Which concept do you consider most critical, and why?	CO2	L5
	SECTION-C		
6.	Evaluate how platform independence supports modern web application deployment. Provide a relevant example.	CO5	L5
7.	Analyze how different types of hyperlinks (external document references, internal document references, and image-based hyperlinks) can be used together to design a fully connected multipage website.	CO3	L4
8.	a. Create an HTML Program using `<FRAMESET>` and `<FRAME>` tags to divide a web page into multiple sections. b. Demonstrate how different webpages can be displayed within each frame through practical implementation.	CO4	L6
9.	Demonstrate the use of Checkbox and Radio elements.	CO4	L5

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Total No. of Questions: 09 **Total No. of Pages: 02**

MCA, Semester- 3rd

E-COMMERCE AND DIGITAL MARKETING

Subject Code: PGCA1921

M.Code: 90807

Date of Examination: 26.11.2025

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION B & C have FOUR questions each.**
3. **Attempt any FIVE questions from SECTION B & C carrying TEN marks each.**
4. **Select at least TWO questions from SECTION B & C.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define e-business.	CO1	L1
b.	Explain how customers benefit from e-commerce.	CO1	L2
c.	What is a digital signature?	CO2	L1
d.	Describe the working of UPI in India.	CO2	L2
e.	Define web analytics.	CO3	L1
f.	Illustrate a successful viral marketing campaign with an example.	CO3	L2
g.	List three popular social media platforms used in marketing.	CO4	L1
h.	Explain the importance of off-page optimization.	CO4	L2
i.	What is remarketing in digital advertising?	CO5	L1
j.	Compare mobile ads with desktop ads.	CO5	L2
	SECTION-B		
2.	Illustrate how hypertext publishing can enhance e-commerce applications with examples.	CO1	L3
3.	Analyze the differences between traditional and electronic payment systems.	CO2	L4
4.	Evaluate the efficiency of PayPal or UPI as electronic payment systems.	CO2	L5
5.	Evaluate the role of web presence and content creation in digital marketing success.	CO3	L5
	SECTION-C		
6.	Apply digital display advertising strategies to improve product awareness for a new mobile app.	CO4	L3
7.	Examine the role of search engine marketing in driving traffic compared to social media campaigns.	CO5	L4

8.	Critically assess how keyword research influences the visibility and credibility of a brand's web presence. Provide an example to justify your evaluation.	CO5	L5
9.	Demonstrate how email marketing and forums can be integrated into a single marketing strategy.	CO3	L3

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Total No. of Pages: 01 **Total No. of Questions: 09**

MCA, Semester- 3rd

ADVANCED COMPUTER NETWORKING

Subject Code: PGCA1925

M.Code: 90798

Date of Examination: 08-12-2025

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION B & C have FOUR questions each.**
3. **Attempt any FIVE question of SECTION B & C carrying TEN marks each.**
4. **Select at least TWO questions from SECTION B & C.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	List any two uses of computer networks.	CO1	L1
b.	Explain layered network architecture.	CO1	L2
c.	Define Selective Repeat ARQ.	CO2	L1
d.	Illustrate HDLC protocol.	CO2	L2
e.	Define cell splitting in reference to mobile network.	CO3	L1
f.	Explain wireless communication.	CO3	L2
g.	List any two protocols used in adhoc networks.	CO3	L1
h.	Compare analog and digital signal.	CO4	L2
i.	What is 2G cellular network?	CO4	L1
j.	Classify framing in data link layer (any two).	CO2	L2
	SECTION-B		
2.	Identify the types of multiplexing? Compare all with help of diagram?	CO1	L3
3.	Examine error detection techniques: parity check, checksum, and CRC.	CO2	L4
4.	Explain token bucket algorithm for congestion control with the help of diagram.	CO3	L5
5.	Determine the functions of the seven layers of the OSI model with the help of diagram.	CO1	L5
	SECTION-C		
6.	Identify the pure ALOHA protocol with throughput analysis.	CO3	L3
7.	Examine subnetting with the help of diagram. Also give an example to explain the concept.	CO4	L4
8.	Analyze the features of TCP and UDP protocols.	CO3	L5
9.	Explain the working of World Wide Web (WWW), Email system and file transfer protocol on network.	CO4	L4

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MCA Semester- 3rd

ARTIFICIAL INTELLIGENCE & SOFT COMPUTING

Subject Code: PGCA 1926

M.Code: 90799

Date of Examination: 02-12-2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE question from SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Identify two domains of Artificial Intelligence.	CO1	L2
b.	What is backward chaining?	CO1	L2
c.	Define hill climbing.	CO2	L1
d.	Explain the difference between uninformed and informed search techniques.	CO2	L2
e.	Explain the concept of supervised learning in machine learning.	CO3	L1
f.	Interpret the concept of Adaptive Resonance Theory (ART).	CO3	L2
g.	What is inference in fuzzy logic?	CO4	L1
h.	Summarize two applications of fuzzy systems.	CO4	L2
i.	List the types of hybrid soft computing system.	CO5	L1
j.	Explain the working principle of a genetic algorithm.	CO5	L2
	SECTION-B		
2.	Identify the challenges in inference using first-order logic.	CO1	L3
3.	Analyze the role of pragmatics in natural language processing.	CO2	L4
4.	Explain the significance of learning rules in neural networks.	CO3	L5
5.	Compare toy problems and real-world problems in AI.	CO1	L5
	SECTION-C		
6.	Identify the role of fuzzy relations in decision-making systems.	CO4	L3
7.	Analyze different encoding methods used in genetic algorithms.	CO5	L4
8.	Explain the real-world applications of soft computing for efficiency.	CO3	L5
9.	Apply fuzzification and defuzzification methods in a fuzzy logic control system.	CO4	L3

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Roll No. | | | | | | | | | | | | | | Total No. of Pages: 01

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MCA, Semester- 3RD

THEORY OF COMPUTATION

Subject Code: PGCA1927

M.Code: 90800

Date of Examination: 29-11-2025

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION B & C have FOUR questions each.**
3. **Attempt any FIVE question from SECTION B & C carrying TEN marks each.**
4. **Select at least TWO questions from SECTION B & C.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define diagonal argument.	CO1	L1
b.	Compare DFA and NDFA.	CO1	L2
c.	List the operations on regular languages.	CO2	L1
d.	Explain the use of pumping lemma in proving non-regularity.	CO2	L2
e.	What is ambiguity in CFG?	CO3	L1
f.	State the difference between CNF and GNF.	CO3	L2
g.	What is a tape alphabet?	CO4	L1
h.	Analyze the Recursive Languages with examples.	CO4	L2
i.	What is an unrestricted grammar?	CO5	L1
j.	Differentiate between solvable and unsolvable problems.	CO5	L2
	SECTION-B		
2.	Construct an example showing the difference between language and grammar.	CO1	L3
3.	Analyze the properties of CFLs with examples.	CO2	L4
4.	Evaluate how grammar simplification enhances parser efficiency.	CO3	L5
5.	Evaluate the equivalence of two automata by giving any example.	CO2	L5
	SECTION-C		
6.	Construct a TM equivalent to a context-sensitive grammar. By taking suitable example.	CO4	L3
7.	Explain the Halting Problem and prove its undesirability.	CO5	L4
8.	Compare all four types of Chomsky Hierarchy with their acceptors.	CO5	L5
9.	Construct a CFG for balanced parentheses.	CO3	L3

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MCA, Semester-3rd

SOFTWARE PROJECT MANAGEMENT

Subject Code: PGCA1930

M.Code: 90801

Date of Examination: 05-12-2025

Time: 3 Hrs.

Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE question of SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What are the main processes involved in initiating a project?	CO1	L1
b.	Summarize the role of risk evaluation in software projects.	CO1	L2
c.	Define cash flow forecasting in project management.	CO2	L1
d.	Interpret Project Cost Estimate with an example.	CO2	L2
e.	What are the main processes involved in initiating a project?	CO1	L1
f.	Explain evaluation techniques with an example.	CO3	L2
g.	Define controlling quality in project management.	CO3	L1
h.	Illustrate directing and managing Project Work with an example.	CO4	L2
i.	Recall types of Contracts in project management.	CO4	L1
j.	Illustrate Schedule Compression with an example.	CO3	L2
	SECTION-B		
2.	Choose an example related to planning for risks in project management.	CO1	L3
3.	Discover a project's COCOMO II estimate and explain variances against historical data.	CO2	L4
4.	Conclude the importance of Software Project Management Activities in project success.	CO2	L5
5.	Prioritize the impact of organizational structure on team communication and propose reorganization options.	CO3	L5

SECTION-C			
6.	Utilize earned value analysis to track project performance.	CO3	L3
7.	Analyze relationships between stress, health, and project performance.	CO4	L4
8.	Interpret stress management techniques for a project team under tight deadlines.	CO4	L5
9.	Develop a work plan for executing a project using a Gantt chart.	CO4	L3

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Total No. of Questions: 09

MCA, Semester- 4th

ADVANCED WEB TECHNOLOGIES

Subject Code: PGCA 1958

M.Code: 91856

Date of Examination: 05-12-2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Each question of SECTION B & C consists of TEN marks.
4. Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define server-side scripting. Mention any two examples.	CO1	L1
b.	Compare static and dynamic web pages.	CO1	L2
c.	What is XML? Mention any two advantages of using XML	CO2	L1
d.	Explain AJAX and its uses.	CO3	L2
e.	Classify the web services? Give one real-life example.	CO6	L2
f.	Recall the components of the API.	CO5	L1
g.	Summarize the uses of ReactJS.	CO6	L2
h.	What is 'type conversion' in PHP ?	CO4	L1
i.	Illustrate CRUD. Define any two operations.	CO5	L2
j.	How Date picker is used in Jquery. Explain with the help of an example.	CO4	L1
	SECTION-B		
2.	Explain the uses and benefits of the content management system in detail.	CO6	L5
3.	Identify the various predefined constants in PHP? Explain the use of the constant() functions in PHP.	CO4	L3
4.	Evaluate the role of PHP-MySQL integration in dynamic website development. Provide suitable examples.	CO4	L5
5.	Compare the client-side and server-side programming. Describe the request-response cycle of a web application.	CO1	L4
	SECTION-C		
6.	Discuss various data types of XML and also explain how to create XML documents with the help of example	CO2	L6

7.	Explain the Bootstrap and its components.	CO5	L5
8.	Compare AJAX with traditional form submission. Discuss how AJAX improves user experience.	CO3	L4
9.	Construct the Node JS in detail with examples.	CO5	L3

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Total No. of Pages: 02

Total No. of Questions: 09

MCA, Semester - 4th

IOT & BLOCKCHAIN TECHNOLOGY

Subject Code: PGCA1967

M.Code: 91862

Date of Examination: 26-11-2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Each question of SECTION B & C consists of TEN marks.
4. Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly		
a.	Explain the concept of communication APIs in IoT.	CO2	L2
b.	What is distributed consensus?	CO1	L1
c.	Explain the process of Blockchain .	CO3	L2
d.	Define how blocks are linked together to form the chain.	CO1	L1
e.	How Low-Power, Wide-Area Networks (LPWAN) support IoT connectivity.	CO4	L
f.	Demonstrate the key security considerations in IoT system design and deployment.	CO2	L2
g.	Compare sensors and actuators in an IoT system.	CO3	L2
h.	Show how Blockchain technology is applied in KYC (Know Your Customer) processes.	CO4	L1
i.	Illustrate one IoT-based application in agriculture, describing its architecture.	CO4	L2
j.	Define a smart contract and explain how it automates agreement execution.	CO1	L1
	SECTION-B		
2.	Build the IoT solution framework and its implementation using a smart city case study.	CO2	L3
3.	Describe the different levels of IoT architecture and explain the deployment templates used for designing and implementing IoT systems.	CO2	L4
4.	Identify the role of Zigbee protocol in Industrial IoT (IIoT) and discuss its suitability for low-power and long-range communication applications	CO1	L3
5.	Elaborate two key application domains where IoT provides significant benefits, explaining their use cases, functionality, and impact.	CO4	L5

SECTION-C			
6.	Compare transactions with traditional payment systems in terms of speed, cost, and scalability, and discuss the trade-offs involved.	CO3	L4
7.	Explain how Blockchain technology is applied in Supply Chain emphasizing transparency and security benefits.	CO4	L5
8.	Identify different security attacks in Blockchain, emphasizing the 51% majority attack and its implications on network integrity.	CO4	L3
9.	Evaluate Bitcoin script and discuss the peer-to-peer (P2P) network components that enable decentralized transaction validation in the Bitcoin system.	CO3	L5

NOTE: Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the student.

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Total No. of Questions: 09

MCA, Semester- 4th

MACHINE LEARNING & DATA ANALYTICS USING PYTHON

Subject Code: PGCA1976

M.Code: 91855

Date of Examination: 29.11.2025

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION B & C have FOUR questions each.
3. Attempt any FIVE question of SECTION B & C carrying TEN marks each.
4. Select at least TWO questions from SECTION B & C.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Explain array indexing.	CO3	L2
b.	Define logistic regression.	CO2	L1
c.	Explain bar plot.	CO5	L2
d.	Illustrate about classification in Python.	CO2	L2
e.	Why is Machine Learning important?	CO1	L1
f.	List the different Python modules.	CO4	L1
g.	Recall the main goal of clustering.	CO3	L2
h.	What is the difference between training data and testing data?	CO1	L1
i.	Outline the role of series and DataFrame.	CO4	L2
j.	What is a scatter plot?	CO5	L1
	SECTION-B		
2.	Apply the learning process in supervised and unsupervised learning. How does the availability of labeled data affect the performance and outcome of these algorithms?	CO1	L3
3.	Compare and contrast Linear Classification and Logistic Regression in terms of their use cases, output types, and model interpretation. Provide examples where each method is suitable.	CO2	L4
4.	Analyze and compare Decision Trees and Naive Bayes on a sample dataset in terms of accuracy and overfitting.	CO3	L4
5.	Evaluate how neural networks improve prediction accuracy using a practical dataset example.	CO3	L5
	SECTION-C		
6.	Apply Python functions and modular programming to automate a dataset analysis workflow.	CO4	L3

7.	Analyze arithmetic, comparison, and logical operators in Python with best practices for applying them.	CO4	L4
8.	Evaluate the differences between histograms and bar charts with Matplotlib examples.	CO5	L5
9.	Construct the grids and subplots in data visualization, explaining their roles, differences, and applications	CO5	L3

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