

MCA II Semester Regular & Supple. Examinations, May-2026

Sub Code: R24MCA201

COMPUTER NETWORKS

R24

Time: 3 hours

Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No		Questions	KL	CO	M
1	Unit-I				
	a	i) Explain the differences among LAN, MAN, and WAN with suitable examples and characteristics.	II	1	6M
		ii) Differentiate the performance and analyze how these influence the performance of the physical layer.	IV	1	6M
	OR				
	b	i) Describe the OSI reference model in detail. What are the functions of each layer?	II	1	6M
		ii) Classify the different guided media. Determine the best medium for high-speed data transmission over long distances.	III	1	6M
2	Unit-II				
	a	i) Explain the key services provided by the data link layer to the network layer.	II	2	6M
		ii) Compare and analyze the efficiency, complexity, and reliability of Go-Back-N vs Selective Repeat protocols.	IV	2	6M
	OR				
	b	i) Draw and explain the flow diagram for a Simplex Stop-and-Wait Protocol for a noisy channel.	III	2	6M
		ii) List and explain any three error-detecting codes used at the data link layer.	II	2	6M
3	Unit-III				
	a	i) Explain the channel allocation problem in computer networks. How does it impact overall performance?	II	3	6M
		ii) Apply CSMA protocol in a shared medium and explain how carrier sensing and backoff reduce collision.	III	3	6M
	OR				
	b	i) Describe the working principle of Pure ALOHA and Slotted ALOHA protocols.	II	3	6M
		ii) Analyze how MAC protocols must adapt in mobile and dynamic wireless environments, focusing on 802.11 mechanisms.	IV	3	6M
4	Unit-IV				
	a	i) Describe the services provided by the network layer to the transport layer.	II	4	6M
		Evaluate different congestion control policies and their suitability in multimedia traffic scenarios.	IV	4	6M
	OR				
	b	i) Define and explain the structure of an IPv4 address. What is the role of subnetting?	II	4	6M
		ii) Consider a network graph with weights, apply Dijkstra's algorithm to find the shortest path between two nodes.	III	4	6M

5	Unit-V				
	a	i) List and describe the major features of TCP, including connection-oriented communication and reliability.	II	5	6M
		ii) Illustrate the difference between control connection and data connection in FTP with an example session.	III	5	6M
	OR				
	b	i) Define the name space in DNS. How is it structured and managed?	II	5	6M
		ii) Compare and analyze HTTP and FTP protocols in terms of their use cases, session management, and security.	IV	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

MCA II Semester Regular & Supple. Examinations, May-2026

Sub Code: R24MCA202 NETWORK SECURITY & CYBER SECURITY

R24

Time: 3 hours

Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M
1	Unit-I			
	a i) Explain Cryptographic Attacks with examples.	2	1	6M
	ii) Describe the concept of cryptographic services and mechanisms. How do these ensure data security?	2	1	6M
	OR			
	b i) Apply a substitution cipher to encrypt the following message: "CYBER SECURITY" with a Caesar cipher shift of 3. Also, decrypt the ciphertext.	3	1	6M
2	ii) Analyze how Data Encryption Standard (DES) works. Explain its round functions.	4	1	6M
	Unit-II			
	a i) What is RSA? Write down the steps involved in RSA encryption and decryption.	1	2	6M
	ii) Explain how public and private keys are used in asymmetric cryptography with a neat diagram.	2	2	6M
	OR			
3	b i) Differentiate between symmetric and asymmetric cryptography with examples.	2	2	6M
	ii) Use the HMAC algorithm to compute the MAC for a simple message using a given key and hash function.	3	2	6M
	Unit-III			
	a i) Explain the architecture of internet mail with the help of a neat diagram.	2	3	6M
	ii) Describe the structure and purpose of Authentication Header (AH) and Encapsulating Security Payload (ESP).	2	3	6M
4	OR			
	b i) Compare and contrast the functionalities of S/MIME and PGP in securing email.	4	3	6M
	ii) Explain the IP Security (IPSec) architecture and its components.	2	3	6M
	Unit-IV			
	a i) Define cybercrime and explain the origin of the term.	1	4	6M
5	ii) Compare and contrast traditional cybercrime methods with modern attacks on smartphones.	4	4	6M
	OR			
	b i) Explain the difference between cybercrime and information security.	2	4	6M
	ii) What are Botnets? Explain how they are formed and used in cyber-attacks.	2	4	6M
	Unit-V			
	a Write short notes on i) SQL Injection ii) DDoS Attacks	2	5	12M
5	OR			
	b i) What is phishing? How can people avoid falling for phishing emails?	1	5	6M
	ii) Explain the concept of steganography. How is it different from cryptography?	2	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

MCA II Semester Regular & Supple. Examinations, May-2026

Sub Code: R24MCA203 OBJECT ORIENTED PROGRAMMING USING JAVA

R24

Time: 3 hours

Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M
1	Unit-I			
	a i) Explain the principles of Object-Oriented Programming. Discuss how Java supports these principles.	KL2	1	6M
	ii) Write a Java program to reverse a given string and check whether it is a palindrome.	KL2	1	6M
	OR			
	b i) Discuss the concepts of constructors and method overloading with suitable Java examples.	KL2	1	6M
	ii) Explain the scope and lifetime of variables in Java.	KL2	1	6M
2	Unit-II			
	a i) What are abstract classes? Explain their purpose with a Java example.	KL1	2	6M
	ii) Write a Java program to define and implement an interface for calculating area of different shapes.	KL2	2	6M
	OR			
	b i) Explain the concept of inheritance. Discuss any four types of inheritance in Java with examples.	KL2	2	6M
	ii) How are packages created and imported in Java? Illustrate with an example.	KL3	2	6M
3	Unit-III			
	a i) What is exception handling? Write a Java program to demonstrate multiple catch blocks.	KL2	3	6M
	ii) Define thread synchronization. Write a Java program to demonstrate synchronization.	KL2	3	6M
	OR			
	b i) Explain the thread life cycle with a neat diagram.	KL2	3	6M
	ii) How are daemon threads different from user threads? Give an example.	KL3	3	6M
4	Unit-IV			
	a i) What is the delegation event model in Java? How is it used for event handling?	KL3	4	6M
	ii) Write a Java program to handle mouse click and keyboard key press events.	KL4	4	6M
	OR			
	b i) Describe any four AWT components with their usage and methods.	KL3	4	6M
	ii) Explain layout managers in Java. Compare BorderLayout and GridLayout with example code.	KL2	4	6M
5	Unit-V			
	a i) Explain the architecture of Swing and its advantages over AWT.	KL3	5	6M
	ii) Develop a Java Swing application that displays a form with text fields, checkboxes, and a submit button.	KL4	5	6M
	OR			
	b Explain how JTabbedPane and JScrollPane are used in Java Swing with example code.	KL2	5	12M

MCA II Semester Regular & Supple. Examinations, May-2026

Sub Code: R24MCA204

SOFTWARE ENGINEERING

R24

Time: 3 hours

Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M
1	Unit-I			
	a i) Apply the concept of the software crisis to a real-world software project failure. Identify the issues that occurred and explain how they reflect the symptoms of the software crisis.	3	1	6M
	ii) Compare and contrast the Waterfall Model and the Incremental Model of software development. In what scenarios is each model more suitable?	2	1	6M
	OR			
	b i) Apply the Spiral Model to the development of a mobile banking application. Explain how each phase of the spiral would be executed for this project.	4	1	6M
	ii) Analyze the differences between Rational Unified Process (RUP), Rapid Application Development (RAD), and Agile methodology. What are the strengths and limitations of each when applied to time-constrained projects?	4	1	6M
2	Unit-II			
	a i) Explain the importance of requirement analysis in software engineering. How does it influence the success of a software project?	2	2	6M
	ii) Apply the requirement analysis process to develop a student attendance management system. List some functional and non-functional requirements.	3	2	6M
	OR			
	b i) Discuss the difference between functional and non-functional requirements. Give suitable examples for each.	2	2	6M
	ii) Analyze the challenges of writing an SRS document for real-time systems.	3	2	6M
3	Unit-III			
	a i) Demonstrate how the goals of good software design help achieve long-term software success. Support your answer with suitable examples.	3	3	6M
	ii) Describe the concepts of coupling and cohesion in structured design. How do they influence software quality?	2	3	6M
	OR			
	b i) Explain the role of Data Flow Diagrams (DFDs) in structured analysis. How are DFDs useful in understanding system processes?	2	3	6M
	ii) Apply top-down design methodology to break down a college examination portal into major functional components.	3	3	6M
4	Unit-IV			
	a i) Explain the steps involved in the software testing process. Why is each step important?	2	4	6M
	ii) Analyze the role of decision table testing in designing effective test cases. In what types of scenarios is this technique most beneficial, and why?	4	4	6M
	OR			
	b i) Differentiate between alpha testing and beta testing. Explain how each is applied in real-world software development with suitable examples.	3	4	6M
	ii) Apply the concepts of unit testing, integration testing, and system testing	3	4	6M

		to explain their roles in the software testing process. How are these levels of testing connected in practice?			
5	Unit-V				
	a	i) Explain the different types of software maintenance. Why is each type necessary in the software life cycle?	2	5	6M
		ii) Analyze the relationship between reverse engineering and software reengineering in the context of software maintenance. In what situations is each technique most effectively used, and why?	4	5	6M
	OR				
	b	i) Summarize the role of configuration management in maintaining software consistency.	4	5	6M
		ii) Describe how documentation supports the maintenance of a software system.	2	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

MCA II Semester Regular & Supple. Examinations, May-2026

Sub Code: R24MCA205

ARTIFICIAL INTELLIGENCE

R24

Time: 3 hours

Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No		Questions	KL	CO	M
1	Unit-I				
	a	i) Explain what Artificial Intelligence (AI) means and describe the types of problems it is designed to solve.	2	1	6M
		ii) Describe the key components of an AI program and explain their roles in the system's functioning with relevant examples.	2	1	6M
	OR				
	b	i) Discuss various real-world applications of AI. Discuss the impact of Artificial Intelligence on the healthcare industry.	2	1	6M
		ii) Define the concept of an intelligent agent in AI. Describe the anatomy and structure of an intelligent agent.	2	1	6M
2	Unit-II				
	a	i) Apply the concept of a Problem-Solving Agent in AI to a real-world scenario. Identify and explain how each of the four main components functions in this context	4	2	6M
		ii) Compare and contrast uninformed search methods: Depth First Search (DFS), and Depth First Iterative Deepening (DFID).	3	2	6M
	OR				
	b	i) Describe the A* Search algorithm and explain how it combines the benefits of Uniform Cost Search and Greedy Best-First Search.	3	2	6M
		ii) What is local beam search? Explain how it works with multiple current states and how it improves search efficiency	3	2	6M
3	Unit-III				
	a	i) Define a knowledge-based agent and list the key components of its architecture. Describe the role of the knowledge base and inference engine in such agents.	2	3	6M
		ii) Explain the syntax and semantics of propositional logic with examples	3	3	6M
	OR				
	b	i) Describe the universal ($\forall$) and existential ($\exists$) quantifiers used in First Order Logic (FOL).	2	3	6M
		ii) Compare and contrast propositional logic with first-order logic (FOL). Discuss the limitations of propositional logic that FOL addresses.	3	3	6M

4	Unit-IV				
	a	i) Briefly describe the main types of agent architectures and the key characteristics of each.	3	4	6M
		ii) Differentiate between competitive agents and swarm systems with examples highlighting their operation and interaction within a system.	3	4	6M
	OR				
	b	i) Explain how domain knowledge is represented in expert systems. Describe various knowledge representation techniques such as rules, frames, and semantic networks.	3	4	6M
		ii) Distinguish the strengths and weaknesses of biologically inspired models compared to traditional multi-agent systems in solving distributed problems.	3	4	6M
5	Unit-V				
	a	i) Describe the architecture of an expert system, listing and explaining the main components	3	5	6M
		ii) Explain the roles of expert systems in decision-making and problem-solving, with examples from engineering (DART) and education (XOON)	4	5	6M
	OR				
	b	i) Demonstrate the process of knowledge acquisition in expert systems. Using a specific domain, outline how knowledge engineers extract and encode domain knowledge.	4	5	6M
		ii) What is an Expert System Shell? Describe its main components and how it can be used to build expert systems without programming from scratch.	4	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

MCA II Semester Regular & Supple. Examinations, May-2026

Sub Code: R24MCA208

DATA WAREHOUSING & DATA MINING

R24

Time: 3 hours

Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No		Questions	KL	CO	M
1	Unit-I				
	a	i) Explain the types of data with suitable examples and describe how they impact data mining tasks.	2	1	6M
		ii) Demonstrate data pre-processing steps on a sample dataset including cleaning, transformation, and reduction.	3	1	6M
	OR				
	b	i) Differentiate between various similarity and dissimilarity measures with suitable distance metric examples.	4	1	6M
		ii) Justify the need for data warehouse architecture and critique the role of OLAP in multidimensional data analysis.	5	1	6M
2	Unit-II				
	a	i) Summarize the classification process and discuss its applications in real-world scenarios.	2	2	6M
		ii) Illustrate the construction of a decision tree using a simple training dataset.	3	2	6M
	OR				
	b	i) Compare the performance metrics: accuracy, precision, recall, and F1-score, and analyze their trade-offs.	4	2	6M
		ii) Assess the classification performance of KNN, Naïve Bayes, and SVM for a given dataset scenario.	5	2	6M
3	Unit-III				
	a	i) Explain the concept of market basket analysis and describe its use in discovering association rules.	2	3	6M
		ii) Implement the Apriori algorithm to find frequent itemsets from a given transactional dataset.	3	3	6M
	OR				
	b	i) Examine the differences between Apriori and FP-Growth algorithms for generating frequent itemsets.	4	3	6M
		ii) Evaluate the effectiveness of association rules using confidence and support measures on sample data.	5	3	6M

4	Unit-IV				
	a	i) Describe the need for clustering and explain the different types of clustering methods with examples.	2	4	6M
		ii) Use the K-Means algorithm to cluster a given dataset and show the iteration process.	3	4	6M
	OR				
	b	i) Differentiate between agglomerative and density-based clustering techniques in terms of their working and output.	4	4	6M
		ii) Assess the quality of clustering using cohesion, separation, and proximity matrix metrics.	5	4	6M
5	Unit-V				
	a	i) Identify different types of web mining and explain their roles in web-based applications.	2	5	6M
		ii) Demonstrate the working of a web search engine by outlining its architecture and components.	3	5	6M
	OR				
	b	i) Compare various web page ranking algorithms and analyze their impact on search engine results.	4	5	6M
		ii) Explain enterprise search techniques and evaluate their effectiveness in knowledge management systems.	2	5	6M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks
