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R22



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Operating Systems
Course Code : A405305
Branch : CSE/ CSC/ IT/ CSD
Date & Session : 08-12-2025 FN **Duration:** 3 hours **Max. Marks:** 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

- | | |
|--|-----|
| 1. Define a batch processing. | 1 M |
| 2. What is a Multi programmed? | 1 M |
| 3. List a four System Call. | 1 M |
| 4. What is a Deadlock? | 1 M |
| 5. What is Synchronization? | 1 M |
| 6. Define a shared memory. | 1 M |
| 7. What is a Logical Address? | 1 M |
| 8. What is Segmentation? | 1 M |
| 9. What is a File System? | 1 M |
| 10. List any four file access methods. | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the list of services and system calls in Operating system. 10M

OR

11. B). i) Demonstrate the Process Control Block in OS. 5M
 ii) Describe in detailed Thread life cycle in OS. 5M
12. A). Consider the set of 5 processes whose arrival time and burst time are given below, the CPU scheduling policy is Round Robin Scheduling where time TQ is 3ms and Priority Scheduling using non preemption; calculate the average waiting time and average turnaround time. 10M

Process Id	Arrival time	Burst time	Priority
P1	0	4	2
P2	1	3	3
P3	2	1	4
P4	3	5	5
P5	4	2	5

OR

12. B). Explain the Methods for Deadlocks avoidance and Detection in Operating System. 10M
13. A). Explain the Semaphores in Process Synchronization and Types. 10M
- OR**
13. B). Demonstrate the shared memory in OS with a suitable example. 10M

(P.T.O.)

14. A). Explain the Page Replacement Algorithms with the following references 701301703713 10M
using FIFO, LRU and Optimal page replacements algorithm using 3 frames and calculate
the number of page faults.

OR

14. B). Demonstrate the Segmentation with paging with a suitable example. 10M

15. A). Explain the file Allocation methods in OS file system. 10M

OR

15. B). Explain about directory structure in detail. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	: B.Tech IV Semester Supplementary Examinations Nov/Dec-2025		
Course Name	: Discrete Mathematics		
Course Code	: A405306		
Branch	: CSE/ IT/ CSM/ CSD/ AIM		
Date & Session	: 10-12-2025 FN	Duration: 3 hours	Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Define the Statement. 1 M
2. Define the conditional Operator. 1 M
3. What is the difference between a subset and a proper subset? 1 M
4. What is a one-to-one (injective) function? Give an example. 1 M
5. State the difference between a Semigroup and a Monoid. 1 M
6. Define a lattice in terms of a poset. 1 M
7. What is the principle of inclusion-exclusion for two sets? 1 M
8. What is the difference between a permutation and a combination? 1 M
9. Define the vertices and edges with examples. 1 M
10. Describe the Eulerian and Hamiltonian graphs. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). If p, q, and r are the propositions in a set S, then construct the truth table for the proposition $(p \wedge q) \vee (\sim q \wedge r)$. 10M

OR

11. B). Obtain the PCNF of the following: 10M
 $(\sim p \rightarrow q) \wedge (q \leftrightarrow p)$ b) $(p \wedge q) \vee (\sim p \wedge q)$

12. A). Define the following terms with examples: 10M
 i) Set
 ii) Subset
 iii) Power set
 iv) Universal set
 v) Venn diagram

OR

12. B). Prove using Venn diagrams: 10M
 i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (Distributive Law)
 ii) $\overline{A \cap B} = \overline{A} \cup \overline{B}$ (De Morgan's Law)

13. A). Prove that the set of integers Z under addition forms a monoid but not a group under multiplication. 10M

OR

13. B). What is a lattice? Explain different types of lattices with diagrams. 10M

(P.T.O.)

14. A). How many 4-digit numbers can be formed using 1, 2, 3, 4, 5 (with/without repetition)? 10M
Solve for both cases.

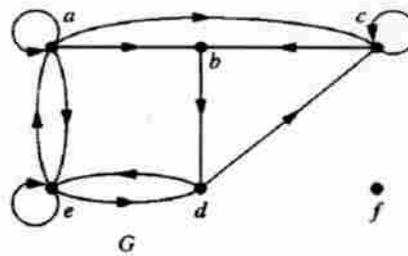
OR

14. B). i) Find the number of permutations of the word "MISSISSIPPI". 5M
ii) State and prove the Binomial Theorem. 5M

15. A). Define minimal spanning tree. Explain Prims algorithm with an example. 10M

OR

15. B). Find the in-degree and out-degree of each vertex in graph G with directed edges shown in the figure below: 10M



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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Computer Organization and Architecture
Course Code : A405307
Branch : CSE/ CSC
Date & Session : 19-12-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

**Answer all TEN questions
Each question carries ONE mark.**

10x1=10M

1. Define the term Computer Organization. 1 M
2. Mention various types of Interrupts. 1 M
3. Define Address Sequencing. 1 M
4. Distinguish between Auto Increment and Auto Decrement Addressing Mode. 1 M
5. Convert the Given Binary Number (11001011) into Hexadecimal. 1 M
6. Perform the 2's Complement Subtraction of Smaller Number (101011) from Larger Number (111001). 1 M
7. What is Interrupt-Driven I/O? 1 M
8. Which Memory is Volatile and which is Non-Volatile? 1 M
9. What is Pipeline Throughput? 1 M
10. Why is Arbitration needed in Multiprocessing Systems? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the Instruction Cycle in detail with a neat diagram. 10M
- OR**
11. B). What are Micro-Operations? Explain their types with Examples. 10M
12. A). i) What are the Different techniques used for Micro Instruction Address Sequencing? 5M
ii) Write a Micro Program to implement the Instruction LOAD R1, M[200]. 5M
- OR**
12. B). i) Discuss the Advantages and Limitations of General Register Organization in CPU design. 5M
ii) Compare Different Instruction Formats (Zero, One, Two, and Three-Address) with Examples. 5M
13. A). i) Distinguish between Fixed Point Representation and Floating-Point Representation. 6M
ii) Briefly write about r's Complement and (r-1)'s Complement. 4M
- OR**
13. B). Derive and Explain an Algorithm for Adding and Subtracting for any Two Floating Point Binary Numbers. 10M

(P.T.O.)

14. A). With a neat diagram Describe DMA Transfer in a Computer System. 10M

OR

14. B). What is Associative Memory? Explain its Working Principle with a diagram and also mention Advantages and Disadvantages? 10M

15. A). i) Compare and Contrast RISC and CISC Architecture in detail. 5M

ii) Explain Instruction Pipeline in detail with an Example. 5M

OR

15. B). i) Explain the Cache Coherence Problem with an example. 6M

ii) What is Inter-processor Communication (IPC)? Why is it needed? 4M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Computer Oriented Statistical Methods
Course Code : A400006
Branch : CSE/ CSC
Date & Session : 06-12-2025 FN **Duration:** 3 hours **Max. Marks:** 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Define Sample Space. Write possible outcomes of tossing a coin. 1 M
2. Compare the probability. One card is drawn from a deck of 52 cards, well-shuffled. that the card will (i) be an ace (ii) not be an ace. 1 M
3. Suppose if the data: $P(A) = 7/13$, $P(B) = 9/13$ and $P(A \cap B) = 4/13$, evaluate $P(A|B)$. 1 M
4. Define mean and Variances of Linear combinations of a random variables. 1 M
5. What is the Formula for Uniform Distribution? 1 M
6. Suppose $X \sim \text{Uniform}(1,2)$, $Y \sim \text{Uniform}(1,2)$, and given $X=x$, Y is exponential with parameter $\lambda = x$. Find $\text{Cov}(X, Y)$. 1 M
7. What is Statistical Inference? 1 M
8. What is Hypothesis Testing in Statistics? 1 M
9. Show the formulae for n-step transition probabilities? 1 M
10. Define Study State Distribution in Markov Chain. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Evaluate if $S = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ and $A = \{0, 2, 4, 6, 8\}$, $B = \{1, 3, 5, 7, 9\}$, $C = \{2, 3, 4, 5\}$, and $D = \{1, 6, 7\}$, list the elements of the sets corresponding to the following events:
- (a) $A \cup C$;
 - (b) $A \cap B$;
 - (c) C ;
 - (d) $(C \cap D) \cup B$;
 - (e) $(S \cap C)$;
 - (f) $A \cap C \cap D$.

OR

11. B). (i) Explain Baye's theorem stating its applications. 5M
(ii) Two classes A and B consist of 25 boys, 15 girls and 20 boys, 30 girls respectively. 5M
One student is selected at random and found to be girl. Find the probability that the selection was from class B.

(P.T.O.)

12. A). Out of 800 families of 5 children each, how many would you expect to have i) 3 boys 10M
 ii) 5 girls iii) either 2 or 3 boys iv) at least 1 boy. Assume equal probability for boys and girls.

OR

12. B). i) Discuss the concept of Chebyshev's Theorem with suitable example. 3M
 ii) The mean and variance of a Binomial distribution are 3 and $\frac{9}{4}$, Find the value of 7M
 n,p,q.

13. A). In a normal distribution, 7% of the items are under 35 and 89% are under 63. Determine 10M
 the mean and variance of the distribution. Areas should represent in a neat diagrams.

OR

13. B). Distinguish between t-Distribution and F-Distribution with the suitable examples. 10M

14. A). i) Explain about i) point estimation ii) interval estimation 5M
 ii) A random sample of 500 apples was taken from a large consignment and 60 were 5M
 found to be bad. Obtain 95% confidence interval for the percentage number of bad apples
 in the consignment.

OR

14. B). Random samples of 400 men and 600 women were asked whether they would like to have 10M
 a flyover near their residence. 200 men and 325 women in favour of the proposal. Test the
 hypothesis that proportion of men and women in favour of the proposal at 5% LOS.

15. A). i) A raining process is considered as a two state Markov chain. If it rains, it is considered 6M
 to be in state 0. If it does not rain, the chain is in the state of 1. The transition probability
 of the Markov chain is defined by $P = \begin{bmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{bmatrix}$ Find the probability that it will rain after
 3 days from today assuming that it is raining today. Assume the initial probabilities of
 state 0 or 1 as 0.4 and 0.6 respectively.

- ii) Which of the following matrices are regular? 4M
 i) $\begin{bmatrix} 1/3 & 0 \\ 1/3 & 1 \end{bmatrix}$ ii) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

OR

15. B). (i) Explain about the transition probability Matrix. 5M
 (ii) Akash bats according to the following traits. If he makes a hit (S), there is a 25% 5M
 chance that he will make a hit his next time at bat. If he fails to hit (F), there is a 35%
 chance that he will make a hit his next time at bat. Find the transition probability matrix
 for the data and determine Akash's long- range batting average.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Business Economics & Financial Analysis
Course Code : A400102
Branch : Computer Science & Engineering
Date & Session : 09-12-2025 FN **Duration:** 3 hours **Max. Marks:** 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. What are the types of economics? 1 M
2. What is National Income? 1 M
3. Define the term Demand Forecasting. 1 M
4. What is elasticity of demand? 1 M
5. Explain about opportunity cost. 1 M
6. What is break even analysis? 1 M
7. Define Accounting Principle. 1 M
8. What is Trading Account? 1 M
9. Explain about Ratio Analysis. 1 M
10. List out any two types Propriety ratios. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the functions of any Business entity of your choice in detail. 10M
- OR**
11. B). Differentiate between Micro and Macro economics. 10M
12. A). Outline the assumptions and exceptions of Law of Demand. 10M
- OR**
12. B). i) What are the determinants of Law of supply? 5M
ii) Outline the exceptions of law of Supply. 5M
13. A). Classify various types of costs in detail. 10M
- OR**
13. B). i) Explain about Cost Volume Profit Analysis. 5M
ii) ABC company has sold 20,000 units at a selling price of Rs/- 30 per unit. The variable cost per unit is Rs/- 15 and fixed cost is Rs/-2, 40,000. Examine the BEP in units. 5M

(P.T.O.)

14. A). Analyze the concept of Accounting Cycle and explain the double entry bookkeeping. 10M

OR

14. B). From the following trial balance and adjustment of ABC company Ltd, prepare trading and profit and loss account and balance sheet for the period ending 31-12-2017 10M

	Rs/-	Rs/-
Sundry debtors	64,000	
Stock(1-1-2-17)	44,000	
Cash in hand	70	
Plant and machinery	35,000	
Sundry creditors		21,300
Trade expenses	2,150	
Sales		2,69,000
Salaries	4,450	
Carriage outwards	800	
Rent	1,800	
Bills payable		15,000
Purchases	2,37,740	
Discounts	2,200	
Business premises	69,000	
Capital (1-01-2017)		1,59,000
Cash at bank	3,090	
	4,64,300	4,64,300

Adjustments:

1. The stock as on 31-12-2017 was Rs/- 24,900
2. Rent was unpaid to the extent of Rs/- 170
3. Outstanding trade expenses were Rs/- 300
4. Write off for bad debts Rs/-800
5. Provide 5% for doubtful debts
6. Depreciate plant and machinery @ 10 % per annum

Business premises are to be depreciated by 2% per annum.

15. A). i) Explain the importance and limitations of Ratio Analysis. 5M

ii) Outline the various types of Liquidity Ratios. 5M

OR

15. B). Calculate the debt equity ratio and current ratio from the following information 10M

Particulars	Amount(Rs/-)	Particulars	Amount(Rs/-)
Debentures	1,40,000	Bank balance	30,000
Long term loans	70,000	Sundry debtors	70,000
General reserve	40,000		
Creditors	66,000		
Bills payable	14,000		
Share capital	1,20,000		



CMR COLLEGE OF ENGINEERING & TECHNOLOGY (UGC AUTONOMOUS)

Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Database Management Systems
Course Code : A405304
Branch : IT/ CSM/ AIM
Date & Session : 09-12-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

- | | | |
|-----|--|-----|
| 1. | Draw the notations of ER-Diagram. | 1 M |
| 2. | Define Data and Information. | 1 M |
| 3. | Discuss the use of rename operation. | 1 M |
| 4. | State about PROJECT operation in Relational algebra. | 1 M |
| 5. | Define Triggers. | 1 M |
| 6. | What is transitive dependency? | 1 M |
| 7. | What is ARIES and list the phases of ARIES? | 1 M |
| 8. | Discuss recoverable schedules. | 1 M |
| 9. | List out the approach for Organization Data Entries. | 1 M |
| 10. | Discuss the Primary and Secondary indexes. | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | | |
|-----------|---|-----|
| 11.A). | Explain the block diagram of DBMS. | 10M |
| OR | | |
| 11. B). | Write about the conceptual design of University with an ER Diagram. | 10M |
| 12. A). | Explain about logical database design. | 10M |
| OR | | |
| 12. B). | Describe in detail Tuple Relational Calculus (TRC) with syntax and semantics with examples in detail. | 10M |
| 13. A). | Consider the following relation schema. (Evaluating)
Sailors(sid: integer, sname: string, rating: integer, age: real)
Boats(bid: integer, bname: string, color: string)
Reserves(sid: integer, bid: integer, day: date)
Write the following queries in SQL.
(i) Find the avg age of the sailor who are eligible for voting for each rating level that has at least two sailors. (ii) Find the name of sailors who have reserved both red and a green boat. (iii) Find the sailor_id of sailors who have reserved a red boat. | 10M |
| OR | | |
| 13. B). | Differentiate between BCNF and 4NF. | 10M |
| 14. A). | Illustrate Concurrent execution of transaction with examples. | 10M |
| OR | | |
| 14. B). | Describe Timestamp based locking protocols and Validation-based locking protocols. | 10M |
| 15. A). | Explain in detail about ISAM. | 10M |
| OR | | |
| 15. B). | Explain B+ trees? Discuss about this Dynamic Index Structure. | 10M |

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Java Programming
Course Code : A412304
Branch : Information Technology
Date & Session : 19-12-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. Differentiate between a constructor and a method in Java. 1 M
2. What is the use of the this keyword in Java? 1 M
3. What is the difference between throw and throws in Java? 1 M
4. What is the role of the finally block in exception handling? 1 M
5. State the function of StringTokenizer. 1 M
6. Name any two collection interfaces. 1 M
7. What is the difference between a process and a thread? 1 M
8. What is the full form of JDBC? 1 M
9. What does MVC stand for? 1 M
10. Name any one class used to handle mouse events. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Demonstrate the use of access modifiers in a Java program with an example that includes public, private, and protected. 10M

OR

11. B). Evaluate the differences between method overloading and method overriding. Provide code examples and discuss runtime vs compile-time polymorphism. 10M

12. A). Write a Java program that demonstrates exception handling using try, catch, finally, and throws 10M

OR

12. B). Analyze the structure and functionality of the RandomAccessFile class in Java. Provide an example illustrating both read and write operations. 10M

13. A). Develop a Java program using Scanner, Date, and Random utility classes to take user input, generate random numbers, and print the current date in a formatted manner. 10M

OR

13. B). Create a Java application that demonstrates sorting a list of custom objects using both Comparable and Comparator interfaces. 10M

(P.T.O.)

14. A). Analyze the need for thread synchronization. Discuss the problems faced in its absence and provide code examples. 10M

OR

14. B). Compare different types of JDBC drivers. 10M

15. A). Analyze the differences between AWT and Swing in terms of architecture, look and feel, and platform independence. 10M

OR

15. B). Analyze the role of adapter classes in event handling. How do they simplify event handling when compared to listener interfaces? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Computer Networks
Course Code : A462301
Branch : CSC
Date & Session : 09-12-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. What are the different types of transmission technology? 1 M
2. What are the design issues in computer networks at various layers? 1 M
3. What do you understand by CSMA protocol? 1 M
4. Define bit stuffing. Give an example. 1 M
5. Define multicast routing. 1 M
6. What is the difference between routing and flooding? 1 M
7. What is the UDP header? 1 M
8. What is connection management? 1 M
9. Outline the need of DNS. 1 M
10. Differentiate IMAP and POP. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain in detail classification computer networks. 10M
- OR**
11. B). Draw the OSI network architecture and explain the functionalities of every layer in detail. 10M
12. A). Discuss in detail simple stop and wait protocol with neat sketch. 10M
- OR**
12. B). Explain about different types of Switching techniques in data link layer with example. 10M
13. A). Explain about Distance Vector routing algorithm with example. 10M
- OR**
13. B). Describe about Congestion Control Algorithm. 10M
14. A). Discuss TCP and its various operations in details. 10M
- OR**
14. B). Explain in detail elements of Transport Protocol. 10M
15. A). Discuss in detail about HTTP operation. 10M
- OR**
15. B). Summarize the elements of network management and explain the operation of SNMP protocol in detail. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Cyber Security Essentials
Course Code : A462302
Branch : CSC
Date & Session : 10-12-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions
Each question carries ONE mark.

10x1=10M

1. Define Integrity. 1 M
2. What is Windows Firewall? 1 M
3. What is ICMP? 1 M
4. Define Botnet. 1 M
5. Define Race condition. 1 M
6. What is DoS attack? 1 M
7. What are Hypervisors? 1 M
8. Define Spyware. 1 M
9. What is malicious code naming? 1 M
10. Define memory forensics. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Elaborate the concept of Virtualization. 10M
- OR**
11. B). Briefly discuss windows Tokens and Windows Programs. 10M
12. A). Demonstrate fraud techniques in detail and also explain its importances in cyber security. 10M
- OR**
12. B). What is the fast – flux? Give a neat sketch of the protective layers that flux domains provide. 10M
13. A). Explain Web exploit tools in detail and how these tools are useful in cyber security. 10M
- OR**
13. B). Briefly discuss Brute force, Dictionary and DNS amplification attacks. 10M
14. A). Explain persistent software techniques. 10M
- OR**
14. B). Explain Man-in-the-Middle attacks and DLL injection. 10M
15. A). Discuss Honeypots in detail and define types of Honeypots along with neat diagram. 10M
- OR**
15. B). Explain Automated malicious code analysis systems. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY (UGC AUTONOMOUS)

Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025

Course Name : Automata Theory and Compiler Design

Course Code : A412303

Branch : CSM/ AIM

Date & Session : 06-12-2025 FN

Duration: 3 hours

Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

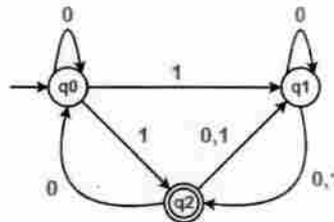
1. Define alphabet and string in the context of automata. 1 M
2. Can a DFA accept an empty string? Justify. 1 M
3. List basic operations used in regular expressions. 1 M
4. Why can't the pumping lemma be used to prove that a language is regular? 1 M
5. Give an example of a language accepted by a PDA but not by a FA. 1 M
6. Define the Halting Problem. 1 M
7. Define a token, pattern and lexeme. 1 M
8. What is left recursion? Why is it a problem for top-down parsers? 1 M
9. Define a syntax-directed definition (SDD). 1 M
10. What is the role of the symbol table in run-time environment? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

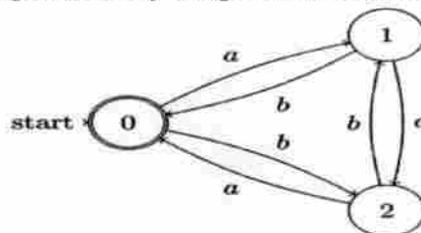
- 11.A). Convert the following NFA into its equivalent DFA 10M



OR

11. B). Discuss with suitable diagrams how ϵ -transitions can be eliminated from an NFA to obtain an equivalent NFA without ϵ -transitions. 10M

12. A). Find the regular expression generated by the given finite automata. 10M



OR

12. B). What is an ambiguous grammar? Check the grammar G having productions $E \rightarrow E + E / E * E / (E) / id$ ambiguous or not using derivation tree? 10M

(P.T.O..)

13. A). What is the role of the stack in a Push Down Automata? Design a PDA for the language $L = \{a^n b^n / n \geq 1\}$. 10M

OR

13. B). Explain in detail undecidable problems about Turing Machines. 10M

14. A). What is the significance of removing white spaces and comments in lexical analysis? Explain with an example. 10M

OR

14. B). What is an LALR parser? Construct LALR parser for the grammar $S \rightarrow CC, C \rightarrow cC, C \rightarrow d$ 10M

15. A). Give the SDT scheme for Desk calculator which performs basic Arithmetic operations and evaluate the expression $(28/7)*5+5$ using SDT scheme. 10M

OR

15. B). Compare and contrast heap and stack in the run-time environment. 10M

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R22



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Artificial Intelligence
Course Code : A466301
Branch : CSM/ AIM
Date & Session : 08-12-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions
Each question carries ONE mark. **10x1=10M**

1. Define an intelligent agent. 1 M
2. Differentiate between breadth-first search and depth-first search. 1 M
3. What is Alpha–Beta pruning? 1 M
4. Define Constraint Satisfaction Problem (CSP). 1 M
5. What is meant by unification in first-order logic? 1 M
6. Distinguish between forward chaining and backward chaining. 1 M
7. What is hierarchical planning? 1 M
8. Explain the purpose of a planning graph. 1 M
9. Define Bayesian network. 1 M
10. What is probabilistic reasoning? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

- 11.A). Explain in detail the various types of intelligent agents with examples. 10M
- OR**
11. B). Discuss different search strategies in Artificial Intelligence and compare their efficiency. 10M
12. A). Describe the working of Alpha–Beta pruning algorithm with an example. 10M
- OR**
12. B). Explain constraint propagation and backtracking search for CSPs. 10M
13. A). Explain the syntax and semantics of first-order logic with examples. 10M
- OR**
13. B). Illustrate the process of inference using resolution in first-order logic. 10M
14. A). Describe the classical planning problem and its approaches. 10M
- OR**
14. B). Discuss hierarchical planning and evaluate algorithms used for state space search. 10M
15. A). Explain the concept of probabilistic reasoning under uncertainty using suitable examples. 10M
- OR**
15. B). Describe the structure and inference process of Bayesian networks. 10M



CMR COLLEGE OF ENGINEERING & TECHNOLOGY (UGC AUTONOMOUS)

Examination	: B.Tech IV Semester Supplementary Examinations Nov/Dec-2025	
Course Name	: Object Oriented Programming through Java	
Course Code	: A405303	
Branch	: CSM/ AIM	
Date & Session	: 19-12-2025 FN	Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

- | | | |
|-----|--|-----|
| 1. | Explain the role of a constructor in a class. | 1 M |
| 2. | Summarize the difference between a nested class and an inner class. | 1 M |
| 3. | Outline the difference between a class and an interface. | 1 M |
| 4. | Explain the key difference between method overloading and method overriding. | 1 M |
| 5. | Explain the purpose of the finally block. | 1 M |
| 6. | Outline the difference between a checked and an unchecked exception in Java. | 1 M |
| 7. | List any three AWT layout managers. | 1 M |
| 8. | Outline the root class of the AWT hierarchy. | 1 M |
| 9. | Outline the life cycle of an applet. | 1 M |
| 10. | Explain about Servlet. | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | | |
|--------|--|-----|
| 11.A). | Explain the concepts of Classes and Objects. Discuss static variables and methods with examples. Explain how is memory allocated for static members. | 10M |
|--------|--|-----|

OR

- | | | |
|---------|--|-----|
| 11. B). | Compare the Abstract Class and an Interface in Java with example. | 10M |
| 12. A). | Discuss the member access rules in inheritance (public, private, protected). Develop a Java program to demonstrate the use of access specifiers in a base and derived class. | 10M |

OR

- | | | |
|---------|--|-----|
| 12. B). | Develop the Java code to implement interface. Explain how can an interface extend another interface. | 10M |
| 13. A). | Summarize how exception handling occurs in Java with example. | 10M |

OR

- | | | |
|---------|---|-----|
| 13. B). | Outline the different states in a thread lifecycle. | 10M |
| 14. A). | Develop a GUI in Java with Swing components. | 10M |

OR

- | | | |
|---------|---|-----|
| 14. B). | Develop a Java program in the following: i) Swing ii) AWT | 10M |
| 15. A). | Develop a Java program to handle mouse events (click, enter, exit) on an AWT component. | 10M |

OR

- | | | |
|---------|---|-----|
| 15. B). | What are Servlets? Briefly explain the JDBC process to connect to a database. Demonstrate loading a driver and establishing a connection in Java. | 10M |
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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Software Engineering
Course Code : A405308
Branch : CSD
Date & Session : 09-12-2025 FN **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions
Each question carries ONE mark.

10x1=10M

1. Define Software engineering. 1 M
2. Define Process. 1 M
3. What is meant by software prototyping? 1 M
4. Define SRS. 1 M
5. What are the types of Design classes? 1 M
6. What are different components in Use Case Diagram? 1 M
7. Define unit testing. 1 M
8. Difference between verification testing and validation testing. 1 M
9. What is a software risk? 1 M
10. What are the metrics for software quality? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain in detail about software myths. 10M
- OR**
11. B). With a neat sketch, explain Capability Maturity Model Integration (CMMI). 10M
12. A). Explain the differences between functional requirements and non-functional requirements by giving suitable examples. 10M
- OR**
12. B). Explain in detail about Requirements Elicitation process. 10M
13. A). What are the various Architecture Models.and explain it? 10M
- OR**
13. B). Based on your experience with a bank ATM, draw a data-flow diagram modelling the data processing involved when a customer withdraws cash from the machine. 10M
14. A). Explain in detail about white-box and black-box testing techniques. 10M
- OR**
14. B). Discuss about metrics for software quality. 10M
15. A). Explain the following: i) Risk projection ii) Software reviews. 10M
- OR**
15. B). Explain ISO 9000 Quality standards. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech IV Semester Supplementary Examinations Nov/Dec-2025
Course Name : Ethics in Business & Corporate Governance
Course Code : A400604
Branch : CSE/ IT/ CSC/ CSM/ AIM/ CSD
Date & Session : 12-12-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark.

10x1=10M

1. What are the three levels of business ethics? 1 M
2. What is one common myth about business ethics? 1 M
3. What is an ethical dilemma? 1 M
4. What is cyber ethics? 1 M
5. Define corporate governance. 1 M
6. What was the one major corporate governance failure in recent history? 1 M
7. What is an independent director? 1 M
8. What is corporate governance rating? 1 M
9. Why is CSR important for companies? 1 M
10. Who typically constitutes a CSR committee? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain in detail for and against arguments of business ethics in present dynamic environment. 10M

OR

11. B). Elucidate about the carol gilligan's theory. 10M

12. A). Why are ethics necessary for the health care professionals? 10M

OR

12. B). What are the conditions for making code of ethics? State how corporates are marking effective codes and explain the code of ethics for different professional groups. 10M

13. A). What is corporate governance? Explain Need and importance of corporate governance. 10M

OR

13. B). i) Briefly explain OECD Principles. 5M

- ii) Is revised clause 49 of listing agreement better than earlier? If YES, justify 5M

14. A). Discuss the role of Women director in company's board. 10M

OR

14. B). Who is the director of a company? Explain the role of director in ensuring corporate governance. 10M

15. A). What are the best practices of CSR? Exemplify. 10M

OR

15. B). What is corporate social responsibility? Explain the principles and models of CSR. 10M
