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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Discrete Mathematics
Course Code : A405306
Branch : CSE/ IT/ CSM/ CSD/ AIM
Date & Session : 09-01-2025 AN **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 tautology. 1 M
2. What is Quantifier? 1 M
3. Express the $\{3,5,7,9,\dots,87,89\}$ in set builder form. 1 M
4. If $f : R^+ \rightarrow R$ is defined by $f(x) = \log(x+1)$ find $f^{-1}(x)$. 1 M
5. Give an example of a monoid which is not a group. 1 M
6. Define Poset. 1 M
7. Compute $C(10,8)$. 1 M
8. What is permutations and combinations? 1 M
9. Define Degree of a graph. 1 M
10. Which graph is said to be Hamiltonion? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Obtain the principal conjunctive normal form $(\neg p \Rightarrow r) \wedge (q \Leftrightarrow p)$ without using truth table. 5M
ii) Verify the validity of the following argument Some dogs are animals Some cats are animals. Therefore some dogs are cats. 5M
- OR**
11. B). i) Using CP-rule show that $p \rightarrow s$ from $\neg p \vee q, \neg q \vee r, r \rightarrow s$. 5M
ii) Construct the truth table for $(\sim p \wedge (\sim q \wedge r)) \vee (q \wedge r) \vee (p \wedge r)$. 5M
12. A). i) If R be a relation in the set of integers Z defined by $R = \{(x, y) : x \in Z, y \in Z, (x - y) \text{ is divisible by } 6\}$. The prove that R is an Equivalence relation. 5M
ii) If $f : R \rightarrow R$ and $g : R \rightarrow R$ be defined by $f(x) = x^2$ and $g(x) = \sin x$ for all $x \in R$. Show that $gof \neq fog$. 5M
- OR**
12. B). i) Explain about Asymmetric relation, Irreflexive relation and Antisymmetric relation. 4M
ii) Explain about different types of functions in detail. 6M

(P.T.O.)

13. A). i) Show that if a, b are arbitrary elements of a group G , then $(ab)^2 = a^2b^2$ if and only if G is abelian 6M
ii) For any a and b in Boolean algebra then prove that 4M
 $\overline{a \vee b} = a \wedge b, \quad \overline{a \wedge b} = a \vee b.$

OR

13. B). i) Is the set $\{1, -1, i, -i\}$ forms an Abelian group with respect to multiplication. 6M
ii) Prove that every distributive lattice is modular. 4M
14. A). i) What is the coefficient of $x^3y^2z^2$ in $(x + y + z)^9$.? 5M
ii) In how many ways can 2 balloons be distributed at a birthday party among 10 children. 5M

OR

14. B). i) A man has 7 relatives, 4 of them are ladies and 3 gentlemen, his wife has 7 relatives and 3 of them are ladies and 4 gentlemen. In how many ways they invite a dinner party of 3 ladies and 3 gentlemen. So that there are 3 of man's relatives and 3 of wife's relatives? 5M
ii) State and prove binomial theorem. 5M
15. A). i) Define regular graph, complement of graph, Isomorphic of a graph and spanning tree. 5M
ii) Explain about Konisberg bridge problem. 5M

OR

15. B). i) Define complete graph, Chromatic number, Bipartite graph, path and walk. 5M
ii) Prove that a simple graph G has a spanning tree if and only if G is connected. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Business Economics & Financial Analysis
Course Code : A400102
Branch : Computer Science & Engineering
Date & Session : 07-01-2025 AN **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 partnership. 1 M
2. Draw a diagram to represent Business Cycle. 1 M
3. List out Characteristics of good Forecasting. 1 M
4. Explain law of Supply. 1 M
5. What is Law of Returns to Scale? 1 M
6. Define Production. 1 M
7. Differentiate between ledger and journal. 1 M
8. Define Double entry book Keeping. 1 M
9. Write the Formula for Stock Leverage Ratio. 1 M
10. Write the formulae of liquidity Ratio. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Define Business and explain different sources of Capital. 10M
- OR**
11. B). Explain the Multi-Disciplinary nature of Business Economics. 10M
12. A). Describe Law of Demand and explain different types of Elasticity for Law of Demand. 10M
- OR**
12. B). Explain the Supply function along with its determinants. 10M
13. A). Explain the features of Perfect Competition and Monopoly and differentiate between them. 10M
- OR**
13. B). Explain different types of Costs which involved in any Manufacturing company. 10M
14. A). Explain various Accounting Concepts and Conventions. 10M

(P.T.O..)

OR

14. B). Prepare Trading and Profit and Loss account and Balance sheet from the following information. 10M

Trial Balance as on 31.03.2021

Particulars	Debit(₹)	Credit(₹)
Capital		1,00,000
Purchases	40,000	
Furniture	30,000	
Interest received		3,000
Cash	15,000	
Debtors	27,000	
Office Stationery	3,000	
Machinery	70,000	
Bank Loan		5,000
Bills Payable		2,000
Opening Stock	10,000	
Sales		90,000
Wages paid	600	
Salaries paid	2,500	
Electricity charges	1,200	
Insurance paid	700	
Total	2,00,000	2,00,000

Adjustments:

- i) Closing Stock ₹ 12,000
- ii) Depreciate Machinery @10% p.a.
- iii) Salaries outstanding ₹ 500

15. A). Explain how the Management can utilize different types of Ratios in decision making. 10M

OR

15. B). A firm makes sales of Rs. 50,00,000 for the year of which 60% is on credit basis. The balance of debtors at the beginning and the end of the year were Rs. 4,00,000 and Rs. 3,00,000 respectively. Calculate debtor's turnover ratio and debt collection period. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Computer Oriented Statistical Methods
Course Code : A400006
Branch : CSE/ CSC
Date & Session : 10-01-2025 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. 1 M
2. State addition law of probability for two events. 1 M
3. Give the formulae for mean and variance of a continuous random variable X. 1 M
4. Write the probability law of binomial distribution. 1 M
5. If X is a Uniformly distributed random variable in the interval (2, 3), then find the mean and variance of X. 1 M
6. What do you understand by sampling distribution? 1 M
7. Define the terms population and sample. 1 M
8. Give the formula for testing of difference of means when the population variances are equal. 1 M
9. Define Markov process. 1 M
10. What is transition probability? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). State and prove Baye's theorem. 10M
- OR**
11. B). The probability that India wins a cricket test match against England known to be 2/5. If India and England play three test matches, what is the probability that (i) India will lose all the three matches (ii) India will win at least one test match (iii) India will win at most one match? 10M
12. A). The probability density function of a continuous random variable is given by $f(x) = ce^{-|x|}$, $-\infty < x < \infty$. Show that $c = 1/2$ and find the mean and variance of the distribution. Also calculate the probability that the variable lies between 0 and 1. 10M
- OR**
12. B). The probability that the life of a bulb is 0.05. Find the probability that out of 6 bulbs (i) at least one (ii) greater than four (iii) none will be having a life of 100 days. 10M
13. A). In a normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution. Areas should represent in a neat diagram. 10M
- OR**
13. B). A population consists of elements 2, 3, 6, 8 and 11. Consider all possible samples of size 2 which can be drawn using without replacement technique. (i) Show that the sample mean is an unbiased estimator of the population mean. (ii) Find the standard error of the sampling distribution of means. 10M

(P.T.O.)

14. A). Discuss (i) Null and Alternative hypotheses (ii) Simple and Composite hypotheses (iii) Type I and Type II errors (iv) One tailed and Two tailed tests. 10M

OR

14. B). If the distribution of the weights of all men travelling by air between Delhi and Mumbai has a mean of 163 pounds and a standard deviation of 18 pounds. What is the probability that the consigned gross weight of 36 men travelling between these two cities is more than 160 pounds? 10M

15. A). The transition probability matrix of a markov chain $\{X_n\}$, $n=1,2,\dots$ having three states 1,2 and 3 is 10M

$$P = \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \end{bmatrix} \text{ and the initial distribution is } P^{(0)} = [0.7 \ 0.2 \ 0.1].$$

Find (i) $P\{X_2 = 3\}$

(ii) $P\{X_3 = 2, X_2 = 3, X_1 = 3, X_0 = 2\}$

OR

15. B). Explain the classification of stochastic processes with suitable examples. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Algorithm Design and Analysis
Course Code : A467301
Branch : IT/ CSD
Date & Session : 10-01-2025 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 time complexity and space complexity. 1 M
2. What is recursion tree method? 1 M
3. Define Travelling sales person problem. 1 M
4. What is the use of Bin Packing. 1 M
5. What is n-queen problem? 1 M
6. What is Hamiltonian cycle? 1 M
7. What is Network flow algorithm? 1 M
8. List down the Shortest Path Algorithms. 1 M
9. Differentiate between NP Hard and NP Complete. 1 M
10. What is Game Tree? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss the concepts of asymptotic notations and its properties. 10M
- OR**
11. B). Illustrate an algorithm for (i) Finding factorial of n number. (ii) Sum of n numbers. 10M
12. A). Write the General method of Divide – and – Conquer with example. 10M
- OR**
12. B). Consider the following instance and show the optimal solution for job sequence by applying greedy method? Let $n=4$, $(P_1, P_2, P_3, P_4) = (100, 10, 15, 27)$ and $(d_1, d_2, d_3, d_4) = (2, 1, 2, 1)$ 10M
13. A). Find an optimal solution to 0/1 knapsack using LCBB when $P: \{20, 30, 35, 12, 3\}$, $w: \{2, 5, 7, 3, 1\}$, Knapsack capacity, $m:19$. 10M
- OR**
13. B). What is Branch and bound strategy? Explain with example. 10M
14. A). Explain Prim's algorithm to find minimum spanning tree with example. 10M
- OR**
14. B). Develop an algorithm for Breadth First Search Traversal of a graph and discuss with an example. 10M
15. A). Explain the P, NP and NP-Hard? Give Relationship between them. 10M
- OR**
15. B). i) Briefly explain Reduction techniques. 5M
ii) Write a short note on min-max problem. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations Jan-2025

Course Name : Operating Systems

Course Code : A405305

Branch : CSE/CSC/IT/CSD

Date & Session : 25-01-2025 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 objectives of an operating system? 1 M
2. Differentiate between multi-tasking and multi programming? 1 M
3. What are the advantages of hierarchical operating system structure? 1 M
4. Define the process scheduling? 1 M
5. What are message queues? Explain? 1 M
6. What are the classical problems of synchronization? 1 M
7. Differentiate segmentation and paging? 1 M
8. Differentiate between logical and physical address space? 1 M
9. List any four file operations? 1 M
10. What are different disk scheduling algorithms? 1 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)

Each question carries TEN Marks.

5x10=50M

11. A. How operating system acts as a resource manager? Explain? 10M

OR

11. B. What are the different states of a process? Explain using a process state transition diagram? 10M

12. A. How to characterize deadlocks? What are the different methods for handling deadlocks? Explain? 10M

OR

12. B. Define system call? Explain different types of system calls? 10M

13. A. Explain about inter process communication 10M

OR

13. B. Describe the producer/consumer problem. Discuss the solution to producer/consumer problem using semaphore. 10M

(P.T.O.)

14. A. Explain about paging and structure of page table? 10M

OR

14. B. Consider a logical address space of 64 pages of 1024 words each, mapped into a physical address of 32 frames. 10M

i) How many bits are there in the physical address?

ii) How many bits are there in the logical address?

15. A. Explain about File system structure and implementation? 10M

OR

15. B. Explain about disk scheduling and Free-Space Management? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Computer Organization and Architecture
Course Code : A405307
Branch : CSE/ CSC
Date & Session : 27-01-2025 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. Why is CPU known as the heart of the computer? 1 M
2. List the generic Instruction types present in a computer system. 1 M
3. What is Program control? 1 M
4. List the Data Manipulation Instructions. 1 M
5. List the data types used in data representation. 1 M
6. What is fixed point representation? 1 M
7. Define miss penalty for cache memory. 1 M
8. What is magnetic tape? 1 M
9. What is locality of reference? 1 M
10. What is CISC ? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the following: 10M
- i) Register transfer.
 - ii) Input-Output and interrupt.

OR

11. B). i) Demonstrate construction of a common bus system with multiplexers. 5M
- ii) Draw block diagram of a control memory and the associated hardware needed for selecting the next micro instruction address. 5M

12. A). Explain the following terms: 10M
- i) Control memory
 - ii) Address sequencing.

OR

12. B). i) What is the difference between a direct and an indirect address instruction? How many references to memory are needed for each type of instruction to bring an operand into a processor register? 5M
- ii) Explain about the microinstruction format with neat sketch. 5M

13. A). i) Explain floating point representation of decimal numbers. 5M
- ii) Explain the subtraction operation with signed 2's complement data. 5M

OR

13. B). i) Perform $(-25) + (-10)$ in binary with negative numbers in 2's complement. 5M
- ii) Draw a flow chart for Floating point Add/subtract operations. 5M

(P.T.O.)

14. A). i) Explain the working process of DMA. 5M
ii) Explain about cache memory in detail. 5M

OR

14. B). i) What are various modes of transfer? Explain. 5M
ii) How does SDRAM differ from ordinary DRAM? 5M

15. A). i) Discuss the characteristics of multi-processors. 5M
ii) Discuss about RISC Pipeline. 5M

OR

15. B). i) Discuss the serial arbitration technique. 5M
ii) Explain the Inter-process communication and synchronization. 5M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Database Management Systems
Course Code : A405304
Branch : IT/ CSM/ AIM
Date & Session : 07-01-2025 AN **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 and differentiate Data and Information 1 M
2. Define entity and attribute with examples. 1 M
3. Why are tuple in a relation not ordered? 1 M
4. Explain Domain relational calculus. 1 M
5. Define dependency preserving decomposition 1 M
6. Define a trigger. 1 M
7. What is serializability? 1 M
8. What is Transaction? 1 M
9. What is the relationship between files and indexes? 1 M
10. What are the Pros and Cons of ISAM? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

11.A). What is E-R Model? Draw an E-R Diagram for any Banking system. 10M

OR

11. B). Explain the functions of Database Administrator. 10M

12. A). What is Relational Model? Distinguish between Super key, Candidate key, Primary Key for a relation with examples. 10M

OR

12. B). i) What is a view? How to specify a view? Write about view implementation techniques. 6M

ii) Refer to the relation schemas given below and answer the questions asked after schema description. 4M

Suppliers (S.No., Sname, City)

Parts(P.No., Pname, Colour, City)

Projects (ProjectNo., ProjectName, City)

Sup-Par-Proj(S.No., P.No., ProjectNo., Quantity)

What are the entity integrity constraints in the relations?

What are the referential integrity constraints in the relations?

13. A). i) Explain 2NF, 3NF, 4NF with examples. 5M

ii) What is functional dependency? Write the inference rules of functional dependencies. 5M

(P.T.O.)

OR

13. B). i) Write SQL syntax for creating table
EMP (EMPNO, FIRSTNAME, LASTNAME, SALARY, JDATE, DEPENDENT,
SUPERVISOR). 2M
- ii) Write SQL syntax for insert two rows in table, delete one row from table, update salary
and view whole table. 4M
- iii) Retrieve the name of each employee who has a dependent with the same first name as
the employee. 2M
- iv) Retrieve the names of all employees who do not have supervisors. 2M
14. A). i) What is lock? Explain various types of locks with an example. 5M
- ii) What is the phantom problem? What impact does it have on performance? 5M

OR

14. B). i) How to test serializability of a schedule? Explain with an example. 5M
- ii) Explain log-based recovery protocol. 5M
15. A). What is meant by file organization? Explain in brief about Indexed Sequential Access
Method (ISAM). 10M

OR

15. B). How does a B+ tree index handle the search, insert and delete? Discuss. 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations Jan-2025
Course Name : Java Programming
Course Code : A412304
Branch : IT
Date & Session : 27-01-2025 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. Write four major differences between C and Java 1 M
2. Identify the importance of Super keyword. 1 M
3. List the Common java Exceptions. 1 M
4. Define the need for static keyword. 1 M
5. How do we tell java that we want to use a particular package in a file? 1 M
6. Define abstract class with example. 1 M
7. Give the type of drivers in JDBC. 1 M
8. How do we start a thread? 1 M
9. What is event handling mechanism? Give different event handling classes. 1 M
10. List the components of MVC architecture. 1 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)

Each question carries TEN Marks.

5x10=50M

11. A. Explain Java Features in detail. 10M

OR

11. B. Write a java program to simulate the operations of numerical calculator to perform the functions Addition (+), subtraction (-), Multiplication (*), Division (/). 10M

12. A. What is a finally block? When and how is it used? Give a suitable example. 10M

OR

12. B. Explain the concept of user defined exception with suitable example. 10M

13. A. What is the use of package? Write a java program to explain the concept of package. 10M

OR

13. B. Describe comparator interfaces. Give example 10M

(P.T.O)

14. A. Explain basic steps involved in developing JDBC application with example. 10M

OR

14. B. Write a program to create threads where one thread prints 1 to 100 and another thread prints 1 to 200. 10M

15. A. Discuss about the AWT component classes with suitable example program. 10M

OR

15. B. Write a java program to implement Mouse Events. 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Computer Networks
Course Code : A462301
Branch : CSC
Date & Session : 07-01-2025 AN **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 is a network? And what are the benefits of the networks? 1 M
2. Distinguish between byte stuffing and bit stuffing. 1 M
3. Outline about CSMA/CD. 1 M
4. Explain the stop and wait procedure in brief. 1 M
5. Define Congestion. What are the general Principles of Congestion? 1 M
6. Summarize the quality of service in networks. 1 M
7. List any four services of transport layer. 1 M
8. Show the TCP header diagrammatically. 1 M
9. Explain the advantages of DNS. 1 M
10. Summarize the HTTP message format. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain Twisted pair cables, connectors of twisted pair cables with neat diagram. Explain the performance of Twisted pair cables. 10M

OR

11. B). Explain in detail about TCP/IP protocol suite with neat diagram. 10M

12. A). Analyze the Go-Back-N and Selective repeat. Which is the best approach justify your answer with an example. 10M

OR

12. B). Distinguish between pure and slotted ALOHA with examples. 10M

13. A). Analyze the Flooding, Hierarchical routing algorithms used in computer networks with example. 10M

OR

13. B). Compare and contrast broadcast and multicast routings. 10M

14. A). Illustrate in detail about UDP header format with neat sketch. 10M

OR

14. B). Explain in detail about TCP's general policy for handling congestion. 10M

15. A). Assess the services of world wide web. 10M

OR

15. B). Elaborate how SMTP protocol is used in email applications. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Software Engineering
Course Code : CSD
Branch : A405308
Date & Session : 07-01-2025 AN 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 characteristics of Software? 1 M
2. What are the various categories of software? 1 M
3. What is a Feasibility Study? 1 M
4. What is SRS? 1 M
5. What is a use case diagram? 1 M
6. What are the various UML diagrams? 1 M
7. What is the difference between Verification and Validation? 1 M
8. What is regression testing? 1 M
9. Mention some project management tools. 1 M
10. How do you approach project estimations? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Briefly describe water fall process model. 5M
ii) Mention the incremental process model advantages and disadvantages. 5M

OR

11. B). Elaborate on evolution of software. Give the comparison of software and software system product. 10M

12. A). i) Explain how a software requirements document is structured 5M
ii) What is the goal of the requirements analysis phase? Give reasons why the requirements analysis phase is a difficult one. 5M

OR

12. B). i) Explain requirements engineering process. 5M
ii) Explain about requirements management phases of requirement engineering process. 5M

13. A). Describe various prototyping techniques and discuss on object oriented analysis and modeling. 10M

OR

13. B). i) Discuss about architectural design in brief. 5M
ii) Compare Class diagrams and sequence diagrams. 5M

(P.T.O..)

14. A). Explain Software quality and metrics for analysis model. 10M

OR

14. B). What is black box testing? Is it necessary to perform this? Explain various test activities. 10M

15. A). i) Describe the role of software reviews in achieving good quality software. 5M

ii) Explain the Developing a risk table. 5M

OR

15. B). List and explain the various software quality factors. 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Cyber Security Essentials
Course Code : A462302
Branch : CSC
Date & Session : 09-01-2025 AN **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 is the CIA triad in cybersecurity? 1 M
2. List two types of cyber-attacks. 1 M
3. How does encryption ensure data confidentiality? 1 M
4. What is the role of a digital certificate? 1 M
5. Differentiate between a virus and a worm. 1 M
6. What is ransomware? List any recent Ransomware attack. 1 M
7. Explain the concept of single sign-on (SSO). 1 M
8. Illustrate two types of biometric authentications. 1 M
9. What are the stages of an incident response process? 1 M
10. Explain about windows firewall. 1 M

PART-B

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

- 11.A). Discuss the various layers of cybersecurity and their significance. 10M
- OR
11. B). Analyze the impact of cyber-attacks on businesses. 10M
12. A). Describe the process of securing communications using SSL/TLS. 10M
- OR
12. B). Explain the working of blockchain technology and its applications in cybersecurity. 10M
13. A). Define and explain Persistent Software Techniques. 10M
- OR
13. B). Discuss the methods used for detecting and preventing phishing attacks. 10M
14. A). Develop a security protocol for accessing corporate networks remotely. 10M
- OR
14. B). Evaluate the strengths and weaknesses of two-factor authentication (2FA). 10M
15. A). Assess the role of intrusion detection systems (IDS) in network security. 10M
- OR
15. B). Critique the effectiveness of different data backup strategies. 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)**

Examination : B.Tech IV Sem Supplementary Examinations January-2025

Course Name : Automata Theory and Compiler Design

Course Code : A412303

Branch : CSM/ AIM

Date & Session : 10-01-2025 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 NFA. 1 M
2. What do you mean by derivation tree? 1 M
3. Define regular expression. 1 M
4. What is context free language? 1 M
5. Explain the term "satisfiability" in TM. 1 M
6. Write two properties of recursively enumerable languages. 1 M
7. What do you mean by parser? 1 M
8. Differentiate parse tree and syntax tree. 1 M
9. Define syntax directed translation. 1 M
10. What are the three kinds of intermediate representation? 1 M

PART-B

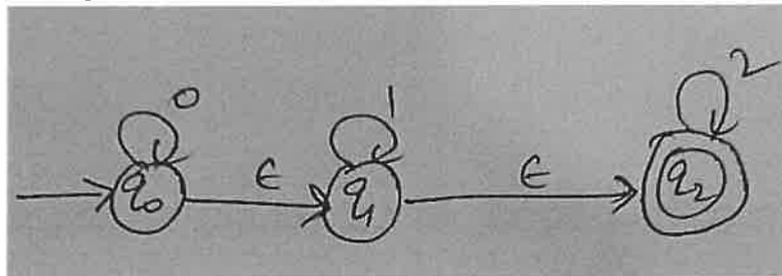
Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Design DFA that accepts the language over $\Sigma = \{0,1\}$ if all strings that contain neither the substring 00 nor the substring 11. 10M

OR

11. B). Convert the following NFA with ϵ transitions to NFA without ϵ transitions. 10M



12. A). Explain the closure properties of regular sets. 10M

OR

12. B). State pumping lemma for CFL. Also write some applications of pumping lemma in CFL. 10M

13. A). Design PDA for the language $L = \{0^n 1^{2n} / n \geq 1\}$. 10M

OR

13. B). Design a Turing Machine for the language $\{0^n 1^m 0^n / m, n \geq 1\}$. 10M

(P.T.O.)

14. A). What is the need of lexical analyzer? Write a simple approach to the design of lexical analyzer? 10M

OR

14. B). Write the steps to construct SLR Parsing table. 10M

15. A). Describe about Quadruples, Triples and Indirect Triples with suitable examples. 10M

OR

15. B). Discuss about simple stack allocation scheme in Run time storage administration. 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)**

Examination : B.Tech IV Sem Supplementary Examinations January-2025

Course Name : Computer Organization and Architecture

Course Code : A405307S

Branch : CSD

Date & Session : 10-01-2025 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 architecture. 1 M
2. What is register and bus? 1 M
3. Define control memory. 1 M
4. State instruction format. 1 M
5. Compare fixed vs floating point representation. 1 M
6. Define booth's algorithm. 1 M
7. List out the modes of transfer. 1 M
8. State Auxiliary memory. 1 M
9. List out some CISC characteristics. 1 M
10. Define multi-processor. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain in detail about computer design and computer architecture. 10M
- OR**
11. B). i) Write short notes on micro-operations. 5M
ii) Briefly discuss about instructions codes. 5M
12. A). Analyze the usage of address sequencing in computer organization. 10M
- OR**
12. B). Examine different types of addressing modes in computer architecture. 10M
13. A). Derive and explain an algorithm for adding and subtracting two floating point numbers. 10M
- OR**
13. B). Develop booth's algorithm for multiplication of signed two's complement numbers. 10M
14. A). Explain the concept of input-output interface with neat diagram. 10M
- OR**
14. B). Explain in detail about memory hierarchy design and its characteristics. 10M
15. A). i) Compare RISC and CISC Instruction. 5M
ii) Analyze the usage of vector processing. 5M
- OR**
15. B). Examine the working of data and control path techniques in pipelining. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech IV Sem Supplementary Examinations Jan-2025
Course Name : Artificial Intelligence
Course Code : A466301
Branch : CSM/AIM
Date & Session : 25-01-2025 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 goals of Artificial Intelligence?** 1 M
2. **List out the properties of Search Algorithm?** 1 M
3. **What is Perfect Information in the context of Games?** 1 M
4. **Define Horn Clause?** 1 M
5. **What is Predicate in first order logic?** 1 M
6. **How do you define ontological engineering?** 1 M
7. **What is meant by Planning Graph?** 1 M
8. **What is the purpose of Planning Domain Definition Language?** 1 M
9. **Describe a scenario where acting under uncertainty is necessary?** 1 M
10. **State Bayes' Theorem for conditional Probability?** 1 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)

Each question carries TEN Marks.

5x10=50M

11. A. i. **Explain the about Simulated annealing?** 5M
- ii. **Explain how a model-based reflex agent works?** 5M

OR

11. B. i. **What is Uninformed Search? Explain about Breadth-first search Algorithm with suitable example?** 5M
- ii. **Give an account on Hill-Climbing search algorithm?** 5M
12. A. **What is Alpha-Beta Pruning? Analyze the theoretical and practical benefits of combining alpha-beta pruning with effective move ordering in AI game playing?** 10M

OR

12. B. i. **Describe the syntax and semantics of propositional logic?** 4M
- ii. **Explain about CSP and Backtracking?** 6M

(P.T.O.)

13. A. i. Illustrate Knowledge Engineering process in First Order Logic? 6M
ii. Compare and contrast propositional inference and first-order inference? 4M

OR

13. B. Explain about forward chaining and backward chaining with example? 4M

14. A. i. Illustrate The spare tire problem for Classical Planning? 6M
ii. Write a short note on Hierarchical Planning? 5M

OR

14. B. Illustrate the steps in GRAPHPLAN algorithm with suitable example? 5M

15. A. We have a bag of three biased coins a, b and c with probabilities of coming up heads of 20%, 60%, and 80%, respectively. One coin is drawn randomly from the bag (with equal likelihood of drawing each of the three coins), and then the coin is flipped three times to generate the outcomes X1, X2, and X3. 10M
- a. Draw the Bayesian network corresponding to this setup and define the necessary CPTs.
- b. Calculate which coin was most likely to have been drawn from the bag if the observed flips come out heads twice and tails once.

OR

15. B. What is Exact Inference? Explain the different methods used for performing exact inference in Bayesian Networks? 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)**

Examination : B.Tech IV Sem Supplementary Examinations January-2025

Course Name : Object Oriented Programming through Java

Course Code : A405303

Branch : CSM/AIM

Date & Session : 27-01-2025 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 Encapsulation? 1 M
2. What is an array? 1 M
3. Benefits of Inheritance. 1 M
4. Define Package. 1 M
5. Define Exception? 1 M
6. What are different thread priorities. 1 M
7. What is button 1 M
8. Define Event. 1 M
9. Define JApplet. 1 M
10. List out limitations of AWT 1 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)

Each question carries TEN Marks.

5x10=50M

11. A. What are conditional statements? Discuss various types with examples. 10M
- OR**
11. B. Explain briefly about the features (buzzwords) of Java. 10M
12. A. List different types of inheritances in java? Explain each of them in detail. 10M
- OR**
12. B. What is interface? Write Differences between classes and interfaces? 10M
13. A. What are try, catch, throw, throws and finally keywords in with an example 10M
- OR**
13. B. Difference between multi-threading and multitasking 10M
14. A. What is AWT? What are the various components in AWT? 10M
- OR**
14. B. Discuss the adapter class using example. 10M
15. A. Discuss about MVC Architecture. 10M
- OR**
15. B. Compare and Contrast differences between applets and applications 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : B.Tech IV Sem Supplementary Examinations January-2025
Course Name : Digital Electronics
Course Code : A404204
Branch : CSD
Date & Session : 27-01-2025 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. Convert 2345.89 in to Hexa decimal number system? 1 M
2. What do you mean by BCD codes? 1 M
3. What is switching theory? 1 M
4. What is a positive logic system? 1 M
5. Define combinational circuit? 1 M
6. Distinguish between an encoder and decoder? 1 M
7. Draw the excitation table of JK FF? 1 M
8. How many FFs are to design decade counter? 1 M
9. Define race free assignment? 1 M
10. Compare RAM , ROM and PAL? 1 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)
Each question carries TEN Marks. **5x10=50M**

11. A. Convert the following in to Octal number system 10M
1) 456.89 2) 110110.11 3) AB45.78 4) 235.23 5) 1DC.23

OR

11. B. Convert the following numbers in to 2s complement form 10M
1) 234.45 2) ADFE.23 3) 156.789 4) 345.987 5) 1578.89

12. A. Reduce the following expression to the simplest possible POS and SOP forms 10M

$$F = \sum m(6,9,13,18,19,25,27,29,31) + d(2,3,11,15,17,24,28)$$

OR

12. B. Reduce the following expression to the simplest SOP forms 10M

$$F = \sum m(0,3,4,5,8) + d(1,7,11,13) \text{ and implement using NAND gates?}$$

13. A. Design a 4 bit Binary -to- Gray code converter? 10M

OR

(P.T.O.)

13. B. Design a four bit comparator circuit? 10M
14. A. Design a mod-12 Ripple counter using JKFFs? 10M

OR

14. B. Design a mod – 10 synchronous counter using TFFs? 10M
15. A. Realize the following two Boolean functions with a PAL with four inputs and 3-wire AND-OR structure. Also write the PAL programming table. 10M

$$F_1(A,B,C,D) = \sum m(6,8,9,12,13,14,15)$$

$$F_2(A,B,C,D) = \sum m(4,5,6,7,9,10,11,12,13,14,15)$$

OR

15. B. Explain the design procedure of Asynchronous sequential circuits? 10M
