R2826

Sub. Code
541201

M.C.A. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Computer Applications

DESIGN AND ANALSIS OF ALGORITHM

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A ($10 \times 1 = 10$)

Answer **all** questions, by choosing the correct option.

1. An algorithm is ————————. (CO1, K1)
   (a) A problem
   (b) A procedure for solving a program
   (c) A real life mathematical problem
   (d) Continuous Knapsack problem

2. Requirement to main measures of the efficiency of an algorithm are (CO1, K2)
   (a) Time and space complexity
   (b) Data and space
   (c) Processor and memory
   (d) Complexity and capacity

3. What is the maximum number of swaps that can be performed in the Selection Sort algorithm? (CO2, K1)
   (a) n – 1 (b) n
   (c) n – 2 (d) 1

4. What is the time complexity of the binary search algorithm? (CO2, K2)
   (a) O(n) (b) O(1)
   (c) O(log2 n) (d) O(n^2)

5. Which of the following algorithms are used to find the shortest path from a source node to all other nodes in a weighted graph? (CO3, K1)

(a) BFS (b) Djikstra's Algorithm

(c) Prims Algorithm (d) Kruskal Algorithm

6. Identify the approach followed in Floyd Warshall's algorithm? (CO3, K2)

(a) Linear programming

(b) Dynamic Programming

(c) Greedy Technique

(d) Backtracking

7. What is the time complexity in decreasing the node value in a binomial heap? (CO4, K1)

(a) O(N) (b) O(1)

(c) O(log N) (d) O(N log N)

8. Which of the following are applications of Topological Sort of a graph? (CO4, K2)

(a) Sentence ordering

(b) Course scheduling

(c) OS deadlock detection

(d) All the above

9. Which of the following is used for solving the N Queens Problem? (CO5, K1)

(a) Greedy Algorithm

(b) Dynamic Programming

(c) Backtracking

(d) Sorting

10. Which of the following is known to be not an NP-Hard Problem? (CO5, K2)

(a) Vertex cover problem

(b) 0/1 Knapsack problem

(c) Maximal independent set problem

(d) Travelling salesman problem

Part B (5 × 5 = 25)

Answer **all** questions, not more than 500 words each.

11. (a) Develop the fundamental of solving algorithmic problem. (CO1, K3)

Or

(b) Elaborate the mathematical analysis of non-recursive algorithm. (CO1, K6)

12. (a) Demonstrate the bubble sort. Discuss its complexity analysis. (CO2, K2)

Or

(b) Construct the binary search algorithm with an example. (CO2, K3)

13. (a) Appraise the Warshall's and Floyd's algorithms. (CO3, K5)

Or

(b) Elaborate with an example about Kruskal's algorithm. (CO3, K6)

14. (a) Assess the time complexity of insertion sort. Explain. (CO4, K5)

Or

(b) Compile the Problem Reduction in Transform and Conquer Technique. (CO4, K6)

15. (a) Analyze the complexity analysis of 8 queen problem. (CO5, K4)

Or

(b) Examine the NP hard and NP complete problems. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions, not more than 1000 words each.

16. (a) Demonstrate the fundamentals of analysis of algorithm efficiency. (CO1, K2)

Or

(b) Construct the algorithm for computing Fibonacci number. (CO1, K3)

17. (a) Analyze the divide and conquer technique with an example. (CO2, K4)

Or

(b) Elaborate the Strassen's matrix multiplication. (CO2, K6)

18. (a) Examine the optimal search in binary tree. Explain with an example. (CO3, K4)

Or

(b) Construct the Prim's algorithm with diagram. (CO3, K6)

19. (a) Compose an algorithm for generating Combinatorial Objects. (CO4, K4)

Or

(b) Examine time complexity of help sort. (CO4, K4)

20. (a) Make use of the graph coloring giving an example. (CO5, K3)

Or

(b) Construct Travelling sales man problem using branch and bond techniques. (CO5, K6)

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R2827

Sub. Code
541202

M.C.A. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Computer Applications

ADVANCED JAVA PROGRAMMING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions by choosing the correct option.

1. Which of the following is not a basic concept of OOP? (CO1, K2)

   (a) Encapsulation (b) Polymorphism

   (c) Abstraction (d) Compilation

2. Java is considered platform-independent because of its: (CO1, K2)

   (a) Compiler (b) Bytecode

   (c) High speed (d) Syntax

3. What is method overloading? (CO2, K2)

   (a) Defining multiple methods with the same name but different return types

   (b) Defining multiple methods with the same name but different parameters

   (c) Reusing a method from the parent class

   (d) Reusing a method from the child class

4. Which of the following allows inheritance in Java? (CO2, K4)

(a) extends (b) implements
(c) inherits (d) super

5. Which package is required to use JDBC in Java? (CO3, K4)

(a) java.jdbc (b) java.db
(c) java.sql (d) javax.jdbc

6. What is the purpose of the execute Update( ) method in JDBC? (CO3, K2)

(a) Executes queries that return data
(b) Executes SQL statements like INSERT, UPDATE, DELETE
(c) Retrieves database metadata
(d) Executes callable statements

7. What class is used to represent an IP address in Java? (CO4, K2)

(a) Inet Address (b) IP Address
(c) Network Address (d) Address

8. What is the key difference between TCP and UDP? (CO4, K4)

(a) UDP is connection-oriented, TCP is connectionless
(b) TCP is connection-oriented, UDP is connectionless
(c) UDP is more secure than TCP
(d) There is no difference

9. Which class in Java is used to represent a combo box (dropdown list)? (CO5, K4)

(a) List Box (b) Combo Box
(c) Choice (d) Dropdown List

10. In AWT, which event listener is used to handle button clicks? (CO5, K4)

(a) Key Listener (b) Mouse Listener
(c) Action Listener (d) Window Listener

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) List and explain the basic features of Java. (CO1, K4)

Or

(b) Discuss the data types of Java. (CO1, K4)

12. (a) Explain constructors in Java. Write a program to demonstrate parameterized and default constructors. (CO2, K6)

Or

(b) What are wrapper classes in Java? Give examples. (CO2, K6)

13. (a) Write short notes on the Result Set interface in JDBC. (CO3, K4)

Or

(b) What is an SQL exception? How is it handled in JDBC? (CO3, K5)

14. (a) Define Data gram Socket and explain its usage. (CO4, K4)

Or

(b) Discuss the components of an RMI application in brief. (CO4, K4)

15. (a) Discuss the role of Button and Combo Box in AWT with examples. (CO5, K6)

Or

(b) Explain the concept of Graphics class in AWT and how it is used to draw shapes. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Write a Java program to demonstrate the use of if-else and switch. (CO1, K6)

Or

(b) Write short notes in JVM, JRE and JDK. (CO1, K4)

17. (a) Define a class in Java . Write a program to define a class Person with fields name, age and a method display Details( ). Create an object and call the method. (CO2, K6)

Or

(b) Explain how an interface is defined and implemented in Java. (CO2, K5)

18. (a) Describe the JDBC architecture and its key components. (CO3, K4)

Or

(b) Write a Java program to connect to a database and insert a new record into a table, update and delete a record. (CO3, K6)

19. (a) Explain the concept OF TCP/IP client and server sockets in Java. (CO4, K4)

Or

(b) Write a basic RMI application where a client calls a remote method to compute the sum of two integers. (CO4, K6)

20. (a) What are Layout Managers in AWT? Explain the different types of layout managers. (CO5, K4)

Or

(b) Write a Java program to create a form with fields for user input, including a text field for the name, a combo box for age group and a submit button. (CO5, K6)

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R2828

Sub. Code
541203

M.C.A. DEGREE EXAMINATION, APRIL – 2025.

Second Semester

Computer Applications

ACCOUNTING AND FINANCIAL MANAGEMENT

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following questions type questions by choosing the correct option.

1. Solvency Ratio indicate (CO1, K2)
   (a) Profitability (b) Activity
   (c) Credit worthiness (d) None of these

2. Funds from operation is (CO1, K2)
   (a) Gross profit (b) Net profit
   (c) Operating profit (d) None of these

3. Marginal cost is (CO2, K1)
   (a) Prime cost (b) Variable cost
   (c) Works cost (d) Cost of production

4. Break even chart is a chart of (CO2, K2)
   (a) Sales (b) Total cost
   (c) Profit (d) Sales and total cost

5. Standard costing is a (CO3, K1)
   (a) Method of costing
   (b) Technique for cost reduction
   (c) Cost control Technique
   (d) None of the above

6. Budgeting is (CO3, K2)
   (a) Technique
   (b) Method of costing
   (c) Maintaining ledger accounts
   (d) None of the above

7. IRR is the rate of return at which (CO4, K2)
   (a) NPV is Nil (b) NPV is positive
   (c) NPV is Negative (d) None of the above

8. A high capital gearing ratio indicates (CO4, K2)
   (a) Over capitalization
   (b) Borrowed capital
   (c) Long-term funds
   (d) Under capitalization

9. The cost of equity share or debt is known as (CO5, K1)
   (a) The specific cost of capital
   (b) The related cost of capital
   (c) The burden on the shareholder
   (d) None of the above

10. Which of these is not a part of capital structure (CO5, K1)
   (a) Equity shares
   (b) Debentures
   (c) Short-term borrowings
   (d) Bonds

Part B ($5 \times 5 = 25$)

Answer **all** questions not more than 500 words each.

11. (a) Explain briefly the Accounting Conventions. (CO1, K2)

Or

(b) Calculate funds from operations from the following: (CO1, K2)

Profit and Loss account

	Rs.		Rs.
To administration expenses	25,000	By gross profit	2,15,000
To selling expenses	16,000	By interest on investments	5,000
To depreciation	26,000	By profit on sales of machinery	4,000
To loss on sale of building	6,000		
To goodwill written off	5,000		
To discount on issue of debentures	2,000		
To net profit	1,44,000		
	2,24,000		2,24,000

12. (a) Explain how costs can be classified? (CO2, K3)

Or

(b) ABC ltd presents the following results for one year. Calculate he P/V ratio and BEP (CO2, K4)

	Rs.
Sales	2,00,000
Variable cost	1,20,000
Fixed cost	50,000
Net profit	30,000

13. (a) Calculate material cost variances from the following data: (CO3, K2)

Particulars	Standard	Actual
Quantity	400 kgs	460 kgs
Price	Rs. 2 per kg	Rs.1.5 pre kg
Value	Rs.800	Rs.690

Or

(b) You are required to prepare a production budget from the following information: (CO3, K4)

Product	Budgeted sales quantity (units).	Actual stock on 31.12.2020 (units)	Desired stock on 30.06.2021 (units)
S	20,000	4,000	5,000
T	50,000	6,000	10,000

14. (a) What are the objectives of capital budgeting? (CO4, K2)

Or

(b) From the following information extracted from the books of a manufacturing company, compute the operating cycle in days: (CO4, K4)

Average period of credit allowed by suppliers: 16 days

	Rs.
Average total of debtors outstanding	4,80,000
Raw materials consumption	44,00,000
Total production cost	1,00,00,000
Total cost of sales	1,05,00,000
Sales for the year	1,60,00,000
Value of stock maintained:	
Raw materials	3,20,000
Work-in-progress	3,50,000
Finished goods	2,60,000

15. (a) Sai Ltd issued 60,000 15% irredeemable preference shares of Rs.100 each. The issue expenses were Rs.60,000 determine the cost of preference capital if shares are issued (i) at par (ii)at premium.(CO5, K4)

Or

(b) Two firms Rands are identical except in the method of financing Firm R has no debt, while firm S has Rs. 3,00,000 8% Debentures in financing. Both the firms have a Net operating income (EBIT) of Rs. 1,20,000 and equity capitalization rate of 12%. The corporate tax rate is 35%. Calculate the value of the firm using MM approach. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1,000 words each.

16. (a) From the following Trail balance as on 31.12.2021 prepare Trading, Profit and Loss a/c and Balance as on that date. (CO1, K4)

Particulars	Debit	Credit
Stock on 1.1.2016	5,800	–
Cash in hand	2,000	–
Drawings	2,840	–
Rent	480	–
Machinery	4,000	–
Tax	600	–
Provision for bad debts	–	420
Bad debts	800	–
Capital	–	19,000
General expenses	1,760	–
Purchases	41,200	–
Debtors	16,800	–
Sales	–	46,160
Creditors	–	8,960
Commission	–	1,740
	76,280	76,280

Adjustments:

(i) Depreciation on machinery 10% p.a.

(ii) Rent outstanding Rs.500.

(iii) Tax prepaid Rs. 100.

(iv) Provision for bad debts is to be increased to 5% on debtors.

(v) Closing stock Rs. 3,500.

Or

(b) The following figures relate to the trading activities of a company for the year ended 31.12.2018. (CO1, K3)

Particulars	Rs.	Particulars	Rs.
Sales	1,00,000	Salary of salesmen	1,800
Purchase	70,000	Advertising	700
Closing stock	14,000	Travelling expenses	500
Sales return	4,000	Salaries	3,000
Dividend received	1,200	Rent	6,000
Profit on sales of fixed assets	600	Stationery	200
Loss on sale of shares	300	Depreciation	1,000
Opening stock	11,000	Other expenses	2,000
		Provision for tax	7,000

You are required to calculate:

(i) Gross profit ratio

(ii) Operating profit ratio

(iii) Operating ratio

(iv) Net profit ratio

17. (a) The sales turnover and profit during two years were as follows: (CO2, K4)

Year	Sales	Profit
2018	1,40,000	15,000
2019	1,60,000	20,000

Calculate:

(i) P/V ratio

(ii) Break-even point

(iii) Sales required to earn a profit of Rs.40,000

(iv) Fixed expenses

(v) Profit when sales are Rs.1,20,000.

Or

(b) Explain the uses of management accounting. (CO2, K3)

18. (a) Explain the merits and demerits of standard costing. (CO3, K5)

Or

(b) Draw up a flexible budget for production at 75% and 100% capacity on the basis of the following data for a 50% activity: (CO3, K5)

Particulars	Per unit
Materials	100
Labour	50
Variable expenses	10
Administrative Expenses (50% Fixed)	40,000
Selling and distribution expenses (60% fixed)	50,000
Present production (50% activity)	1000 units

19. (a) Explain briefly the different sources of working capital. (CO4, K6)

Or

(b) An investment of Rs.10,000 (having scrap value of Rs.500) yields the following returns; (CO4, K6)

Year	1	2	3	4	5
Cash flow	4,000	4,000	3,000	3,000	2,500

The cost of capital is 10%. Is the investment desirable? Discuss it according to NPV method

Year	1	2	3	4	5
PV factor	0.909	0.826	0.751	0.683	0.620

20. (a) Sakthi Ltd issued 20,000 8% debentures of Rs.100 each on 1st April 2009. The cost of issue was Rs. 50,000. The company's tax rate is 35%. Determine the cost of debentures if they were issued (CO5, K6)

(i) at par

(ii) at premium

(iii) at discount.

Or

(b) Explain the factors determining the capital structure of a firm. (CO5, K6)

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Sub. Code
541204

M.C.A. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Computer Applications

OPERATING SYSTEM

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions by choosing the correct option.

1. ———————— is the heart of an operating system? (CO1, K2)
   (a) Software (b) Programs
   (c) CPU (d) Kernel

2. The hardware mechanism that allows a device to notify the CPU is called (CO1, K2)
   (a) polling (b) interrupt
   (c) driver (d) controlling

3. A situation where several processes access and manipulate the same data concurrently and the outcome of the execution depends on the particular order in which access takes place is called (CO2, K3)
   (a) data consistency (b) race condition
   (c) aging (d) starvation

4. A monitor is characterized by (CO2, K3)
   (a) a set of programmers defined operators
   (b) an identifier
   (c) the number of variables in it
   (d) low level synchronization construct

5. The processes that are residing in main memory and are ready and waiting to execute are kept on a list called ————————. (CO3, K4)

(a) job queue (b) ready queue

(c) execution queue (d) process queue

6. A computer system has 6 tape drives, with 'n' processes competing for them. Each process may need 3 tape drives. The maximum value of 'n' for which the system is guaranteed to be deadlock free is? (CO3, K3)

(a) 2 (b) 3

(c) 4 (d) 1

7. The ———————— swaps processes in and out of the memory. (CO4, K1)

(a) Memory manager (b) CPU

(c) CPU manager (d) User

8. In segmentation, each address is specified by (CO4, K4)

(a) a segment number and offset

(b) an offset and value

(c) a value and segment number

(d) a key and value

9. The directory can be viewed as a ———————— that translates file names into their directory entries. (CO5, K4)

(a) symbol table (b) partition

(c) swap space (d) cache

10. Reliability of files can be increased by. (CO5, K2)

(a) keeping the files safely in the memory

(b) making a different partition for the files

(c) by keeping them in external storage

(d) by keeping duplicate copies of the file

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Write Short notes on System calls. (CO1, K2)

Or

(b) Explain Computer System Architecture. (CO1, K2)

12. (a) Write short notes on Inter Process Communication. (CO2, K3)

Or

(b) Write short notes on Semaphores. (CO2, K3)

13. (a) List the methods for handling deadlocks. (CO3, K4)

Or

(b) What are the 3 different types of scheduling queues? (CO3, K3)

14. (a) Write short notes on Contagious memory Allocation. (CO4, K2)

Or

(b) Write Short notes on Mass storage structure. (CO4, K3)

15. (a) What are the different accessing methods of a file? Explain. (CO5, K4)

Or

(b) Explain about free space management with example. (CO5, K3)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Discuss in detail about services of Operating system. (CO1, K2)

Or

(b) Explain in detail about Operating system operations. (CO1, K4)

17. (a) Explain in detail about Process Scheduling. (CO2, K3)

Or

(b) Illustrate and explain the classic problem of synchronization. (CO2, K4)

18. (a) How can deadlock be detected? Explain with an example. (CO3, K4)

Or

(b) Illustrate the various CPU scheduling algorithms. (CO3, K3)

19. (a) What is paging? Explain the steps required to handle a page fault in paging with suitable example. (CO4, K4)

Or

(b) List the various disk-scheduling algorithms? Explain in detail. (CO4, K4)

20. (a) Illustrate the functions of file and file implementation. (CO5, K3)

Or

(b) Explain in detail about File sharing. (CO5, K4)

R2830	Sub. Code
	541554

M.C.A. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Computer Applications

Elective : ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the questions by choosing the correct option.

1. What is the definition of Artificial Intelligence? (CO1, K2)

   (a) The ability of machines to perform tasks requiring human intelligence

   (b) The creation of physical robots

   (c) Developing faster databases

   (d) Automating repetitive tasks

2. What is the "state space" in AI? (CO1, K2)

   (a) The computational complexity of an algorithm

   (b) The memory allocation for a program

   (c) A set of all possible configurations for a problem

   (d) The time required for a solution

3. What is the main feature of Predicate Logic? (CO2, K4)

(a) Representation of knowledge using frames

(b) Formal representation of facts and relationships

(c) Rule-based systems for reasoning

(d) Optimization of memory structures

4. Which reasoning method is goal-driven? (CO2, K4)

(a) Forward reasoning

(b) Modus Ponens

(c) Matching

(d) Backward reasoning

5. What type of learning involves identifying patterns in data without labels? (CO3, K2)

(a) Supervised learning

(b) Unsupervised learning

(c) Reinforcement learning

(d) Machine learning

6. What is the primary focus of SAS in Machine Learning? (CO3, K2)

(a) Visualizations

(b) Database management

(c) Statistical analysis

(d) Mathematical analysis

7. Which method splits the data into training and test datasets? (CO4, K4)

(a) Holdout method

(b) K-fold cross-validation

(c) Bootstrap sampling

(d) Dimensionality reduction

8. What is the primary goal of data preprocessing? (CO4, K4)

(a) Building a model

(b) Cleaning and transforming data for better analysis

(c) Visualizing data

(d) Testing models

9. The probabilistic approach used in machine learning is closely related to: (CO5, K2)

(a) Statistics (b) Physics

(c) Mathematics (d) Psychology

10. What does a Bayesian Belief Network describe? (CO5, K4)

(a) The conditional independence of attributes in their marginal space

(b) The posterior probability of a set of attributes

(c) The likelihood of a hypothesis given data

(d) The joint probability distribution of a set of attributes in their joint space

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Describe the characteristics of a Production System in AI. (CO1, K4)

Or

(b) Discuss the main objectives and applications of AI. (CO1, K6)

12. (a) Give an example to represent simple facts with predicate logic. (CO2, K6)

Or

(b) Differentiate procedural knowledge and declarative knowledge. (CO2, K4)

13. (a) Compare the different types of machine learning. (CO3, K4)

Or

(b) Compare Python and R as tools for machine learning. (CO3, K4)

14. (a) Distinguish between predictive models and descriptive models. (CO4, K4)

Or

(b) Explain lazy learners and eager learners. (CO4, K6)

15. (a) Explain the concept of hypothesis testing. (CO5, K6)

Or

(b) Explain why Bayesian methods are important in machine learning. (CO5, K6)

Part C ($5 \times 8 = 40$)

Answer **all** the questions not more than 1000 words each.

16. (a) Describe the working principle of Hill Climbing in detail. (CO1, K4)

Or

(b) Discuss Best-First Search as a heuristic search technique in detail. (CO1, K6)

17. (a) What do you understand by knowledge representation? Describe the various methods used to represent knowledge in AI systems. (CO2, K4)

Or

(b) Illustrate the concept of forward and backward reasoning. Give appropriate examples. (CO2, K4)

18. (a) Discuss the different types of human learning with suitable examples. (CO3, K4)

Or

(b) Explain the applications of machine learning in the insurance sector. Provide examples of its use in risk prediction. (CO3, K6)

19. (a) What are the different techniques for data pre-processing? Explain dimensionality reduction and feature selection in brief. (CO4, K4)

Or

(b) Write short notes on Holdout method and 10-fold cross-validation. (CO4, K5)

20. (a) Define random variables. Explain the difference between discrete and continuous random variables. (CO5, K4)

Or

(b) Describe the structure of a Bayesian Belief Network and its applications in machine learning. (CO5, K3)

———————