R1052

Sub. Code
541201

M.C.A. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Computer Applications

DESIGN AND ANALYSIS OF ALGORITHM

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. ———————— can be used for modelling a wide variety of applications, including transportation, communication, social and economic networks, project scheduling, and games. (CO1, K1)

   (a) Graphs (b) Tree

   (c) PERT (d) Algorithm

2. The time factor when determining the efficiency of algorithm is measured by (CO1, K1)

   (a) Counting microseconds

   (b) Counting the number of key operations

   (c) Counting the number of statements

   (d) Counting the kilobytes of algorithm

3. BFS is best compared to DFS in the case of ————————. (CO2, K3)

(a) The graph's width is large

(b) The graphs depth is large

(c) The graph consists of many nodes

(d) The graph is complex

4. From the following sorting algorithms which has the lowest worst case complexity? (CO2, K3)

(a) Bubble sort (b) Quick sort

(c) Merge sort (d) Selection sort

5. Prims algorithm is based on ———————— method. (CO3, K4)

(a) Divide and conquer method

(b) Dynamic programming

(c) Greedy method

(d) Branch and bound

6. The Knapsack problem where the objective function is to minimize the profit is ————————. (CO3, K4)

(a) Greedy

(b) Dynamic 0 / 1

(c) Back tracking

(d) Branch and Bound 0/1

7. A complete binary tree with the property that the value at each node is at least as large as the values at its children is known as (CO4, K3)

(a) Binary search tree

(b) AVL tree

(c) Completely balanced tree

(d) Heap

8. If the given input array is sorted or nearly sorted, which of the following algorithm gives the best performance? (CO4, K3)

(a) Insertion sort (b) Selection sort

(c) Quick sort (d) Merge sort

9. In Branch and Bound, what is the purpose of branching? (CO5, K5)

(a) To create subproblems

(b) To eliminate subproblems

(c) To merge subproblems

(d) To reorder subproblems

10. Which of the following methods can be used to solve 8-queen's problem? (CO5, K5)

(a) Greedy algorithm

(b) Divide and conquer

(c) Iterative improvement

(d) Backtracking

Part B (5 × 5 = 25)

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

11. (a) Define time and space complexity. Explain with examples. (CO1, K1)

Or

(b) Write down the procedure for Analyzing the Time Efficiency of Nonrecursive Algorithms. (CO1, K1)

12. (a) Explain Depth first search. (CO2, K3)

Or

(b) Describe the working mechanism of binary search. (CO2, K3)

13. (a) List out the differences between Greedy method and Dynamic Programming. (CO3, K4)

Or

(b) Explain the mechanism of Floyd's Algorithm. (CO3, K4)

14. (a) Write a short note on problem reduction. (CO4, K3)

Or

(b) Write down the mechanism of Heap sort. (CO4, K3)

15. (a) Illustrate 8 – Queens problem. (CO5, K5)

Or

(b) Write in detail about Hamiltonian cycles. (CO5, K5)

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

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

16. (a) Describe the general plan for the Empirical Analysis of Algorithm Time Efficiency. (CO1, K1)

Or

(b) Elaborate on the factors which affects the running time of the algorithm. (CO1, K1)

17. (a) What is Convex hull problem? Explain the brute force approach to solve convex-hull with an example. (CO2, K3)

Or

(b) With suitable example explain the Strassen's matrix multiplication. (CO2, K3)

18. (a) Write short note on Greedy Method. (CO3, K4)

Or

(b) Apply the dynamic programming algorithm to find all the solutions to the change-making problem for the denominations 1, 3, 5 and the amount n = 9. (CO3, K4)

19. (a) With suitable example explain the topological sort. (CO4, K3)

Or

(b) Discuss the significance of Presorting. (CO4, K3)

20. (a) Give solution to Subset sum problem using Backtracking technique. (CO5, K5)

Or

(b) Explain P, NP and NP-complete problems. (CO5, K5)

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R1053

Sub. Code
541202

M.C.A DEGREE EXAMINATION, APRIL 2024.

Second Semester

Computer Applications

ADVANCED JAVA PROGRAMMING

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. What is the extension of compiled java classes? (CO1, K1)

   (a) class (b) java

   (c) .txt (d) .js

2. Java is a ———————— Language. (CO1, K1)

   (a) Functional (b) Object Oriented

   (c) Markup (d) Structured

3. What is the purpose of the "this" keyword in Java? (CO2, K6)

   (a) To refer to the super class

   (b) To create multiple instances of a class

   (c) To hide data and methods within a class

   (d) To refer to the current object

4. What is an interface in Java? (CO2, K6)

(a) A class

(b) A data type

(c) A blueprint for a class

(d) A data structure

5. Select the packages in which JDBC classes are defined? (CO3, K6)

(a) jdbc and javax.jdbc

(b) rdb and javax.rdb

(c) jdbc and java.jdbc.sql

(d) sql and javax.sql

6. Which of the following is not a valid statement in JDBC? (CO3, K6)

(a) Statement

(b) Prepared statement

(c) Query statement

(d) Callable statement

7. An RMI Server is responsible for (CO4, K3)

(a) Creating an instance of the remote object

(b) Exporting the remote object

(c) Binding the instance of the remote object to the RMI registry

(d) All mentioned above

8. ———————— is an object, acts as a gateway for the client side (CO4, K3)

(a) Stub

(b) Skeleton

(c) Both (a) and (b)

(d) None of the above

9. AWT components are (CO5, K6)

(a) Plat form dependent

(b) Platform Independent

(c) Both Platform dependent and Platform Independent

(d) None of the above

10. To make dropdown menu of choice which component is used in AWT? (CO5, K6)

(a) List (b) Combobox

(c) Checkbox (d) Choice

Part B (5 × 5 = 25)

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

11. (a) What are the different components of JDK? Explain (CO1, K1)

Or

(b) Java is pure Object Oriented Language" Justify (CO1, K1)

12. (a) a Create a java program to display "Hello! Java" using Class, Object and Method. (CO2, K6)

Or

(b) Explain how to create user defined package in java with example (CO2, K6)

13. (a) Explain ResultSet (CO3, K6)

Or

(b) Describe the SQL Exceptions (CO3, K6)

14. (a) What are differences between Stub and Skelton? (CO4, K3)

Or

(b) Write a short note on Inet address (CO4, K3)

15. (a) List out the difference between AWT and Swing (CO5, K6)

Or

(b) How are the elements of different layouts organized? (CO5, K6)

Part C (5 × 8 = 40)

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

16. (a) Illustrate the Iteration Statements with example. (CO1, K1)

Or

(b) Explain type of operators in Java with example programs. (CO1, K1)

17. (a) Discuss in detail the access specifies available in Java (CO2, K6)

Or

(b) Define the term Class and Objects. Discuss the concept of Constructor with suitable example. (CO2, K6)

18. (a) Define JDBC. Explain its architecture. (CO3, K6)

Or

(b) Describe the steps to execute JDBC. (CO3, K6)

19. (a) What is RMI? Explain the architecture of RMI with suitable diagram. (CO4, K3)

Or

(b) Write a RMI program to communicate a client to remotely available server. (CO4, K3)

20. (a) What is AWT? What are the various components in AWT? (CO5, K6)

Or

(b) Write a program to stimulate the layout and working of a basic calculator. (CO5, K6)

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R1054

Sub. Code
541203

M.C.A. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Computer Applications

ACCOUNTING AND FINANCIAL MANAGEMENT

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Section A (10 × 1 = 10)

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

1. According to the going concern concept a business entity is assumed to have (CO1, K2)

   (a) A long life (b) A very short life

   (c) Eternal life (d) All the above

2. Basic objective of costing accounting is (CO1, K2)

   (a) Tax compliance

   (b) Financial audit

   (c) Cost ascertainment

   (d) Cost audit

3. Sales Rs. 10,000, Variable cost Rs. 6,000 ; Fixed costs Rs. 3,000 : Break Even Sales in value (CO2, K3)

   (a) Rs. 7,500 (b) Rs. 5,700

   (c) Rs. 750 (d) Rs. 6,000

4. Factory cost = (CO2, K3)

(a) Prime cost + factory expenses

(b) Prime cost + administrative expenses

(c) Prime cost + selling expenses

(d) Prime cost + distribution expenses

5. Variance analysis involves (CO3, K4)

(a) Dividing variance according to causes

(b) Identifying gains in working

(c) Fixing responsibility for loss

(d) None of the above

6. Budgeting is (CO3, K4)

(a) A technique

(b) A method of costing

(c) Maintaining ledger accounts

(d) None of the above

7. A firm which uses debt in its capital structure is (CO4, K5)

(a) Unlevered firm (b) Levered firm

(c) Optimum firm (d) None of the above

8. Financial Management is primarily concerned with ————————. (CO4, K5)

(a) Efficient Management of the business

(b) Procurement and utilization of finance

(c) Arrangement of funds

(d) None of the above

9. ———————— refers to a make-up of a firm's capitalization. (CO5, K5)

(a) Capital structure

(b) Capital budgeting

(c) Equity shares

(d) Dividend policy

10. Which of the following factors does not affect the capital structure of a company? (CO5, K5)

(a) Cost of capital

(b) Composition of the current assets

(c) Size of the company

(d) Expected nature of cash flows

Section B (5 × 5 = 25)

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

11. (a) What is Accounting? Explain the golden rules of accounting. (CO1, K2)

Or

(b) M/s Asoka Ltd. has submitted the following balance sheet as on 30th June 2022 (CO1, K2)

Liabilities	Rs.	Assets	Rs.
Equity Capital	1,50,000	Fixed Assets	1,62,000
Revenue Reserves	30,000	Current Assets:	
8% Debentures	20,000	Stock	22,000
Current Liabilities:		Debtors	51,000
Sundry Creditors	49,000	Bills receivable	2,000
		Bank	12,000
	2,49,000		2,49,000

Find the current ratio and quick ratio.

12. (a) Explain the scope and uses of cost and management accounting. (CO2, K3)

Or

(b) From the following data calculate : (CO2, K3)

(i) P/V ratio

(ii) Variable Cost

(iii) Profit

Sales	Rs. 80,000
Fixed Expenses	Rs. 15,000
Break Even point	Rs. 50,000

13. (a) Product X requires 20 kgs. of material at Rs. 4 per kg. The actual consumption of material for the manufacturing of product X came to 24 Kgs. of material at Rs. 4.50 per kg. (CO3, K4)

Calculate:

(i) Material Cost Variance

(ii) Material Price Variance

(iii) Material Usage Variance.

Or

(b) What are the steps involved in budgetary control? (CO3, K4)

14. (a) List out the objectives of Financial Management. (CO4, K5)

Or

(b) Explain the relationship between risk and return. (CO4, K5)

15. (a) Blue Sky Ltd has an EBIT Rs. 2,00,000. The cost of debt is 10% and the outstanding debt is Rs. 9,00,000. The overall capitalization rate (Ko) is 12.5%. Calculate the total value of the firm (V) and equity capitalization rate. (Ke). (CO5, K5)

Or

(b) Explain the various types of dividend policy. (CO5, K5)

Section C (5 × 8 = 40)

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

16. (a) Describe the various accounting concepts and conventions. (CO1, K2)

Or

(b) The following balances were extracted from the books of Thomas as on 31st March, 2022 (CO1, K2)

Particulars	Rs.	Particulars	Rs.
Purchases	75,000	Capital	60,000
Returns inward	2,000	Creditors	30,000
Opening stock	10,000	Sales	1,20,000
Freight inwards	4,000	Returns outward	1,000
Wages	2,000		
Investments	10,000		
Bank charges	1,000		
Land	30,000		
Machinery	30,000		
Building	25,000		
Cash at bank	18,000		
Cash in hand	4,000		
	2,11,000		2,11,000

Additional information :

(i) Closing stock Rs. 9,000

(ii) Provide depreciation @ 10% on machinery

(iii) Interest accrued on investment Rs. 2,000

Prepare Trading account, Profit and loss account and Balance Sheet.

17. (a) Examine the concept, applications and limitations of Break-Even Analysis. (CO2, K3)

Or

(b) From the following particulars prepare cost sheet: (CO2, K3)

	Rs.
Direct Materials	80,000
Direct wages	60,000
Direct Expenses	25,000
Administrative overheads	40,000
Factory overheads	50,000
Selling and Distribution Expenses	25,000
Sales	4,00,000

18. (a) The expenses for budgeted production of 10,000 units in a factory are furnished below: (CO3, K4)

Particulars	Per Unit Rs.
Material	70
Labour	25
Variable overheads	20
Fixed overheads (Rs. 1,00,000)	10

Particulars	Per Unit Rs.
Variable Expenses (Direct)	5
Selling Expenses (10% Fixed)	13
Distribution Expenses (20% Fixed)	7
Administration Expenses	5
Total cost per unit	155

Prepare a budget for production of:

(i) 8,000 Units

(ii) 6,000 Units

(iii) Indicate cost per unit at both the levels

Assume that administration expenses are fixed for all levels of production.

Or

(b) From the following data, Calculate overhead Variances: (CO3, K4)

	Budgeted	Actual
Fixed Overheads	Rs.3,00,000	Rs.3,20,000
Output in units	30,000	26,000
Working Hours	75,000	60,000

19. (a) Describe the factors affecting working capital requirement of a company. (CO4, K5)

Or

(b) Discuss in detail, the functions of financial management (CO4, K5)

20. (a) The following information relates to Vignesh Ltd. (CO5, K5)

Earnings per share	Rs. 9
Internal rate of return	18%
Cost of capital	12%
Payout ratio	33.33%

Compute the market price under the Walker's Model.

Or

(b) Discuss the in detail, the factors which determine the capital structure of a firm. (CO5, K5)

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	541204

M.C.A. DEGREE EXAMINATION, APRIL – 2024

Second Semester

Computer Applications

OPERATING SYSTEM

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective types questions by choosing the correct option.

1. What is the primary purpose of memory management in an operating system? (CO1, K1)

   (a) To store user data only

   (b) To optimize the use of computer memory

   (c) To provide a storage mechanism for the CPU

   (d) To control the input and output operations

2. What is the primary purpose of a file system in an operating system? (CO1, K1)

   (a) To provide a hierarchical organization for storing and retrieving data

   (b) To manage input/output devices

   (c) To control the CPU scheduling

   (d) To manage memory allocation

3. What is the purpose of the fork( ) system call in process management on Unix-like operating systems? (CO2, K3)

(a) To block a process

(b) To terminate a process

(c) To create a new process

(d) To switch between processes

4. What is a semaphore used for in process synchronization? (CO2, K3)

(a) To manage CPU scheduling

(b) To manage memory allocation

(c) To control access to shared resources by multiple processes

(d) To manage file system operations

5. What is the main disadvantage of the First Come First Serve (FCFS) scheduling algorithm? (CO3, K3)

(a) It may lead to starvation

(b) It may result in high waiting times for short processes

(c) It may result in low throughput

(d) It does not support priority levels

6. Which of the following is a necessary condition for a deadlock to occur? (CO3, K2)

(a) Mutual exclusion

(b) Hold and wait

(c) No preemption

(d) Circular wait

7. Which memory allocation strategy divides memory into fixed-sized partitions? (CO4, K3)

(a) Paging

(b) Segmentation

(c) Contiguous Allocation

(d) Fragmentation

8. Which term refers to the time it takes for a storage device to locate and retrieve data? (CO4, K3)

(a) Seek time

(b) Transfer time

(c) Access time

(d) Latency time

9. In file systems, what is the root directory? (CO5, K2)

(a) The top-level directory in a hierarchical structure

(b) The directory containing system files

(c) The directory where executable files are stored

(d) The directory reserved for temporary files

10. Which file system feature helps prevent data loss in case of a system crash or power failure by keeping a record of transactions? (CO5, K5)

(a) Journaling

(b) Inode table

(c) File allocation table

(d) Superblock

Part B (5 × 5 = 25)

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

11. (a) Explain the types of Computer-System Architecture with examples. (CO1, K2)

Or

(b) Classify the categories of System Programs. (CO1, K2)

12. (a) Examine how message passing is used in IPC. (CO2, K4)

Or

(b) Examine the critical section problem with example. (CO2, K4)

13. (a) Inspect FCFS CPU scheduling algorithm for given problem. (CO3, K4)

Process :	P1	P2	P3	P4
Process Time:	24	3	5	6

Or

(b) Examine deadlock recovery with example. (CO3, K4)

14. (a) Explain paging in detail. (CO4, K2)

Or

(b) Write short notes on Disk management. (CO4, K2)

15. (a) Explain about File operation. (CO5, K5)

Or

(b) Explain in detail the file system structure. (CO5, K5)

Part C

$(5 \times 8 = 40)$

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

16. (a) Explain different operations performed by the operating system. (CO1, K2)

Or

(b) Explain briefly system calls with examples. (CO1, K2)

17. (a) Examine process states and process control block in details. (CO2, K4)

Or

(b) Examine in detail semaphore and its implementation. (CO2, K4)

18. (a) Inspect SJF CPU Scheduling algorithm for given problem. (CO3, K4)

Process :	P1	P2	P3	P4
Process Time:	8	4	9	5
Arrival Time:	0	1	2	3

Or

(b) Examine Deadlock Avoidance (Banker's Algorithm) with an Example. (CO3, K4)

19. (a) What is contiguous memory allocation? Explain it. (CO4, K2)

Or

(b) Explain the following: (CO4, K2)

(i) Magnetic disk

(ii) Solid State Disks

(iii) Magnetic Tapes

20. (a) Explain about access method with example. (CO5, K5)

Or

(b) What is free space management technique? Explain with example. (CO5, K5)

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R1056

Sub. Code
541554

M.C.A. DEGREE EXAMINATION, APRIL – 2024

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 following objective questions by choosing the correct option.

1. What is state space? (CO1, K4)

   (a) The whole problem

   (b) Your Definition to a problem

   (c) Problem you design

   (d) Representing your problem with variable and parameter

2. Best-First search can be implemented using the following data structure. (CO1, K4)

   (a) Queue (b) Stack

   (c) Priority Queue (d) Circular Queue

3. _____ knowledge generates new information from the given information. (CO2, K2)

   (a) Inferential (b) General

   (c) Domain (d) All

4. Resolution produces proofs by refutation. (CO2, K2)

(a) Natural deduction (b) Resolution

(c) Predicate logic (d) None

5. Who proposed the learning machine? (CO3, K4)

(a) Arthur Samuel (b) Alan Turing

(c) Frank (d) None

6. _____ is called descriptive learning (CO3, K4)

(a) Supervised learning

(b) Unsupervised learning

(c) Reinforcement learning

(d) All

7. Principal component is a technique for (CO4, K3)

(a) Feature selection

(b) Dimensionality reduction

(c) Exploration

(d) None of the above

8. _____ can tell how bad the model (CO4, K3)

(a) Cost function (b) Loss function

(c) Objective function (d) All

9. A player is selected at random from among all those who are over six feet tall. What is the probability that the player is a female? (CO5, K5)

(a) 3/11 (b) 2/5

(c) 2/11 (d) 1/11

10. In statistical terms, this represents the weighted average score. (CO5, K5)

(a) Variance (b) Mean

(c) Median (d) More

Part B (5 × 5 = 25)

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

11. (a) Assess when hill climbing fails to find a solution. (CO1, K4)

Or

(b) What are the advantages of Breadth First Search? (CO1, K4)

12. (a) Briefly explain the Resolution. (CO2, K2)

Or

(b) Explain the Inheritable Knowledge. (CO2, K2)

13. (a) With suitable example explain Supervised learning. (CO3, K4)

Or

(b) Elaborate on the process of machine learning. (CO3, K4)

14. (a) What is meant by data pre-processing? Explain. (CO4, K3)

Or

(b) Write the difference between Nominal and ordinal data. (CO4, K3)

15. (a) What is likelihood probability? Give an example. (CO5, K5)

Or

(b) Explain how Naïve Bayes classifier is used for Text classification. (CO5, K5)

Part C (5 × 8 = 40)

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

16. (a) Identify the problems encountered during hill climbing and list the ways available to deal with these problems. (CO1, K4)

Or

(b) Briefly describe the various problem characteristics. (CO1, K4)

17. (a) Write down the Unification Algorithm. (CO2, K2)

Or

(b) Explain the Knowledge Representation Framework. (CO2, K2)

18. (a) List out the differences among the supervised, unsupervised, and reinforcement learning.(CO3, K4)

Or

(b) Discuss the applications of Machine learning. (CO3, K4)

19. (a) What are the different techniques for data pre-processing? Explain, in brief, dimensionality reduction and feature selection. (CO4, K3)

Or

(b) Explain, with proper example, different ways of exploring categorical data. (CO4, K3)

20. (a) There are 100 men on a ship. If X is the weight of the i^{th} man on the ship and Xi's are independent and identically distributed and also $EX_i = \mu = 170$ and $\sigma = \sigma = 30$. Find the probability that the total weight of the men on the ship exceeds 18,000. (CO5, K5)

Or

(b) Explain the concept of Prior, Posterior, and Likelihood with an example. (CO5, K5)

———————