09423551050 8

13th June 2023

Code No. E – 15761

FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester (Main) Examination, June 2023

Subject: Mathematical Foundations of Computer Science

Time: 3 Hours **Max. Marks: 70**

Note: I. Answer one question from each unit. All questions carry equal marks.
II. Missing data, if any, may be suitably assumed.

Unit – I

1. a) Define tautological implication with an example.
   b) If A and B are two sets, then $A = \{1,2,3\}$ $B = \{1,3,5\}$ then find the set $((A \Delta B) \Delta B) - (A \Delta (B \Delta B))$

(OR)

2. a) Show that $(\sim p \wedge (\sim q \wedge r)) \vee (q \wedge r) \vee (p \wedge r) \Leftrightarrow r$.
   b) State and prove De Morgan's Law.

Unit – II

3. a) State and prove the principle of Inclusion and Exclusion.
   b) Compute how many integers between 1 and 1,000 are not divisible by 2,3,5 *or* 7.

(OR)

4. a) State and prove pigeonhole function.
   b) What is Hasse diagram? Explain the procedure for drawing Hasse diagram.

Unit – III

5. a) Show that the generating function for the sequence $0^2, 1^2, 2^2, 3^2, \ldots$ *is* $\frac{x+1}{(1-x)^3}$
   b) Find a formula to express $0^2 + 1^2 + 2^2 + \ldots + n^2$ as a function of 'n'.

(OR)

6. a) State and explain first-order linear recurrence relation.
   b) Solve the recurrence relation $a_n - 9_{an-1} + 26_{an-3} = 0$ for $n > 3$.

Unit – IV

7. a) Prove that $< Q, +, * >$, where $*$ is the binary operation defined by $a * b = ab/5$ is a group.
   b) If G is a group such that $(ab)^n = a^n b^n$, three consecutive integers, then $ab = ba$.

(OR)

8. a) State and Prove Lagrange's theorem.
   b) Define a subgroup of a group G.

Unit – V

9. a) Explain Depth First search with example.
   b) Explain Kruskal's and Prim's algorithm for finding minimal spanning trees.

(OR)

10. a) State and prove Euler's theorem.
    b) State and explain the four-color problem for planar graphs.

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0924355 10508

15th June 2023

FACULTY OF INFORMATICS

Code No. E-15762

M.C.A. (CDE) I- Semester (Main) Examination, June 2023

Time: 3 Hours

Subject: Data Structures using C

Max. Marks: 70

Note: I. Answer one question from each unit. All questions carry equal marks.
II. Missing data, if any, may be suitably assumed.

Unit-I

1. a) Write a program to print first N terms of the given series recursion
0,1,1,2,3,5,8,13..... N.
b) Why associativity is used with operators? What does it mean? Explain in detail.

(OR)

2. a) Explain the syntax of switch case contract. Write a Menu driven C program Using switch case to take two integers as input and print their sum, difference, multiplication and division depending on the choice provided by the user.
b) What is the difference between while and do-while loop? Explain with example.

Unit-II

3. a) What do you understand by Function declaration, function call and definition of a function? Explain by using an example for finding cube of a given number using functions.
b) Explain syntax and example:
(i) malloc() (ii) calloc() (iii) realloc() (iv) free()

(OR)

4. a) What is a pointer? Write a program to illustrate pointers arithmetic.
b) Differentiate between structure and Union with suitable example.

Unit-III

5. a) Convert following arithmetic infix expression into postfix by using stack :
A*(b + c) + (b/d) * a + z * u
b) What is Data structure? Explain Queue and discuss about algorithm for linked representation of Queue with its various operations.

(OR)

6. a) What is meant by circular queue. Write a function to insert and delete an element from a circular queue.
b) Define list. What are the type of linked list? What are the advantages and disadvantages of linked list and application of linked list.

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Unit-IV

7. a) Define balanced Tree and its applications.
   b) Construct AVL Tree for the following sequence of numbers - 50 , 20 , 60 , 10 , 8 , 15 , 32 , 46 , 11 , 48

(OR)

8. a) Define binary search tree. Write an algorithm to search an element in Binary search tree.
   b) Define non linear data structure. Explain graph traversing techniques with suitable example.

Unit-V

9. a) Write algorithm for binary search. Explain with suitable example.
   b) Explain the various collision resolving technique used in hashing functions.

(OR)

10. a) Explain Quick sort algorithm with suitable example.
    b) Write a brief note on Hashing. Explain Hash functions in detail.

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09423551050 8
17th June 2023

Code No. E-15763

FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester (Main) Examination, June 2023

Subject: Object Oriented Programming using java

Time: 3 Hours **Max. Marks: 70**

Note: I. Answer one question from each unit. All questions carry equal marks.
II. Missing data, if any, may be suitably assumed.

Unit – I

1. a) Explain OOPs concepts with examples.
   b) Write a java program to demonstrate 2d-array.

(OR)

2. a) Describe the data types in java.
   b) Write a java program to implement single inheritance.

Unit – II

3. a) Demonstrate the working of multiple catch clauses.
   b) Write notes on StringBuffer class.

(OR)

4. a) Implement Runnable interface in a java program.
   b) Give an overview of BufferedReader class.

Unit – III

5. a) Explain about the ArrayList class.
   b) Describe the methods defined by StringTokenizer class.

(OR)

6. a) Illustrate for-each alternative to iterators.
   b) Write notes on BitSet class.

Unit – IV

7. a) Give an overview of the ActionEvent classes.
   b) Implement a java program using TextField.

(OR)

8. a) Demonstrate how to handle lists in AWT.
   b) Write the notes on layout managers.

Unit – V

9. a) Implement a java program to read data from a file.
   b) Write an overview about Swing package.

(OR)

10. a) Write the description on Serialization.
    b) Define the networking classes in java.net package.

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0942355105 08
19th June 2023

Code No. E-15764

FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester (Main) Examination, June 2023

Subject: Computer Architecture

Time: 3 Hours Max. Marks: 70

Note: I. Answer one question from each unit. All questions carry equal marks.
II. Missing data, if any, may be suitably assumed.

Unit – i

1. a) Illustrate the procedures with examples for conversion of Hexa-Decimal to Binary, Octal and Decimal.
   b) Describe instruction cycle with interrupts.

(OR)

2. a) Explain the procedure for subtraction of unsigned numbers with an example of binary and decimal numbers.
   b) Write notes on computer components with a neat figure.

Unit – II

3. a) Explain the flowchart for the fetch phase.
   b) Demonstrate the illustration of direct – indirect address.

(OR)

4. a) Construct and explain hardwired control unit of basic computer with its control timing signals.
   b) Demonstrate the interrupt cycle.

Unit – III

5. a) Write notes on microprogrammed control organization.
   b) Evaluate the arithmetic expression (3*4) + (5*6) using reverse polish notation.

(OR)

6. a) Explain the general register organization with a neat figure.
   b) Define and explain types of addressing modes.

Unit – IV

7. a) Draw and explain block diagram of associative memory.
   b) Describe segmented-page mapping with a figure.

(OR)

8. a) With a figure, explain memory hierarchy in a computer system.
   b) Discuss address mapping using pages.

Unit – V

9. a) Explain Strobe control method of asynchronous data transfer.
   b) Explain the arithmetic pipeline for floating-point addition and subtraction.

(OR)

10. a) Elaborate on the steps for instruction pipeline.
    b) Discuss the block diagram of DMA controller.

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0942355 10508
21st June 2023

Code No. E-15765

FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester (Main) Examination, June 2023

Subject: Probability and Statistics

Time: 3 Hours **Max. Marks: 70**

Note: I. Answer one question from each unit. All questions carry equal marks.
II. Missing data, if any, may be suitably assumed.

Unit-I

1. a) Define Null Space of $m \times n$ matrices.
   b) Let $A = \begin{bmatrix} 3 & -5 & -3 \\ 6 & -2 & 0 \\ -8 & 4 & 1 \end{bmatrix}$. Determine if $w = \begin{bmatrix} 1 \\ 3 \\ -4 \end{bmatrix}$ is in $Null\ A$.

(OR)

2. a) Define Kernel and Range of a linear transformation.
   b) Use coordinate vectors to test whether the following set of polynomial span p^2.
   $1-3t+5t^2$, $-3+5t-7t^2$, $-4+5t-6t^2$, and $1-t^2$.

Unit – II

3. a) Define probability.
   b) Explain Additional theorem of probability

(OR)

4. a) What is conditional probability.
   b) Two groups are competing for the position on the board of directors of a corporation. The probability is that first and second groups wins are 0.6 and 0.4.Further if the first group wins, the probability of introducing a new product is 0.8.The corresponding probability of second group wins 0.3.What are the probability that the new product is introduced by
   (i) First group (ii) Second group.

Unit – III

5. a) What is confidence interval.
   b) Explain about sampling and Non-Sampling errors. What are the limitations of sampling?

(OR)

6 a) Explain the procedure of testing the hypothesis.
   b) 9 patients to whom a certain drink was administrated, Registered the following increments in blood pressure.7,3,-1,4,-3,5,6,-4,1.show that the data do not indicate that the drink was responsible for these increments.

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Code No. E-15765

Unit – IV

7. a) What is Large Sample test?
   b) Samples of two different types of bulbs were tested for length of life and the following data were obtained

	Sample size	Sample mean	Sample S.D
Type-I	8	1234 hrs	36 hrs
Type-II	7	1136 hrs	40 hrs

(OR)

8. a) Write the differences between large sample and small sample.
   b) A random sample of 40 salesman selected from a city, their average sale is found to be 1000 units with a standard deviation of 100.test whether average sale of the salesman is > 900 units.

Unit – V

9. a) What is Chi Square Distribution?
   b) Explain the Chi Square as a test of independence.

(OR)

10.a) Find Karl person's coefficient for the following data.

X	10	12	18	15	14	20
Y	5	18	20	25	20	30

b) Find two regression equations.

X	40	45	52	55	38	42	45
Y	75	82	91	77	78	75	34

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0942355 10508
23rd June 2023

Code No. E-15766

FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester (Main) Examination, June 2023

Subject: Managerial Economics and Accountancy

Time: 3 Hours **Max. Marks: 70**

Note: I. Answer one question from each unit. All questions carry equal marks.
II. Missing data, if any, may be suitably assumed.

Unit-I

1. a) Explain the principles of managerial economics.
   b) Discuss the various types of managerialism.

(OR)

2. a) Explain time perspective principle with an example.
   b) Discuss the various types and functions of profit.

Unit – II

3. a) Explain the law of demand and its exceptions.
   b) Explain the elasticity and cross elasticity of demand.

(OR)

4. a) Explain demand estimation with an example.
   b) Define equilibrium. Consider the market for digital cameras, where demand and supply curves are given by Q_d=500-2p, Q_3=-80+3P respectively. Find the equilibrium price

Unit – III

5. a) Explain the types if production functions with suitable examples.
   b) Discuss the various stages of law of variable proportion.

(OR)

6. a) How is break-even analysis used in managerial decision making,
   b) A monopoly publisher either pays an author
   (i) a royalty of a percentage of the revenues from the book
   (ii) a lump-sum amount of L dollars
   Show how the compensation scheme affects the price the publisher sets and the number of books that the publisher sells.

Unit – IV

7. a) Explain the different elements of working capital management.
   b) Discuss the various types of capital budgets with examples.

(OR)

8. a) Discuss the different methods of capital budgeting.
   b) Explain the advantages and disadvantages of traditional methods in capital budgeting.

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Code No. E-15766

Unit – V

9. a) Explain the significance of using Journal.
   b) What are subsidiary books? Explain its importance.

(OR)

10. a) Discuss the steps for preparation of final accounts with simple adjustments.
    b) Mr. X runs a business. In the month of April till 7th, the following transactions took place in the business. Prepare the necessary double-column Cash-book using the data given below:

Date	Transactions
1-Apr	Balance of cash on hand at the beginning of the month is $ 100,000
1-Apr	Balance of Bank account at the beginning of the month is $ 150,000
1-Apr	Received a check worth $ 25,000 from Mr. A to whom goods were sold on credit in the previous month.
3-Apr	Purchased stationery for cash worth $ 150
4-Apr	Goods bought for cash worth $ 15,000
5-Apr	Paid $ 900 for the office expenses in cash
7-Apr	Goods sold for cash worth $ 11,000