FACULTY OF INFORMATICS

M.C.A. I-Semester (CBCS) (New) (Main & Backlog) Examination,

April / May 2022

Subject: Computer Architecture

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

Note: Answer any five questions from the following.
All questions carry equal marks.

1. a) Describe the concept of complements with r's and (r-1)'s complements for each number system and give examples for each
   b) Explain about the instruction cycle with a program execution illustration

2. a) Discuss about floating point representation with illustrations.
   b) With an illustration, explain Bus structure

3. a) Write notes on how Register transfer takes place.
   b) Construct and explain hardwired control unit of basic computer with its control timing signals

4. a) Construct a 4-bit adder - subtractor
   b) Explain the flowchart for the fetch phase.

5. a) Write notes on microprogrammed control organization
   b) Describe the block diagram of a 64-word stack.

6. a) Describe the microinstruction format
   b) Demonstrate numerical example of Booth's multiplication algorithm.

7. a) With a figure, explain memory hierarchy in a computer system.
   b) Illustrate direct mapping with an example.

8. a) Write notes on auxiliary memory
   b) Explain read and write operations in associative memory.

9. a) Differentiate between isolated and memory mapped I/O.
   b) Explain the block diagram of computer with I/O processor

10. a) Explain the arithmetic pipeline for floating –point addition and subtraction.
    b) State the need for studying performance.

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Code No. D-0714/CDE

FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester, (Main) Examination, October/ November 2022

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) Using 2's complements, subtract the binary numbers 1010100-1000011.
   b) Elaborate the bus interconnection.

(OR)

2. a) Represent the decimal number +6132.789 using fraction and exponent form.
   b) Explain about the bus structures.

Unit – II

3. a) Construct bus system for four registers using multiplexers.
   b) Illustrate direct and indirect address with its demonstration.

(OR)

4. a) Elaborate 4-bit binary adder subtractor with its logic diagram.
   b) Explain how the basic computer registers are connected to a common bus system.

Unit – III

5. a) Explain the flow chart for selection of control memory address.
   b) Describe the block diagram of general register organization.

(OR)

6. a) Elaborate the microinstruction format.
   b) Give an overview of subroutine call and return.

Unit – IV

7. a) Discuss the block diagram and function table of a typical RAM chip.
   b) Explain the memory table for mapping a virtual address.

(OR)

8. a) Elaborate the two way associative mapping cache.
   b) Explain the logical to physical address mapping in segmented page memory management unit.

Unit – V

9. a) Explain the connection of I/O bus to input-output devices.
   b) Describe the source-initiated strobe for data transfer.

(OR)

10. a) Compare isolated versus memory-mapped I/O.
    b) Discuss the block diagram of DMA.

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FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester, (Main) Examination, October/ November 2022

Subject: Managerial Economics & 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 nature and scope of Managerial Economics.
   b) Evaluate the usefulness of Managerial economics to Engineers.

(OR)

2. Discuss how fundamental concept plays an important role in economic theory?

Unit – II
3. Explain the law of Demand with suitable examples.

(OR)

4. Elaborate various types of Income elasticity of demand and also its significance.

Unit – III
5. Describe the Iso-Quant production function and also expansion path.

(OR)

6. Discuss in detail characteristics that are essential for the existence of Perfect Competition and explain how price and output determined in the long-run.

Unit – IV
7. a) Explain the significance of working capital management and capital budgeting.
   b) What are the steps of NPV and IRR method of capital budgeting.

(OR)

8. a) Explain the different traditional methods with few examples.
   b) Explain the merits and demerits of ARR method.

Unit – V
9. a) Explain the advantages of double-entry book keeping.
   b) Explain about the various types of subsidiary books along with examples.

(OR)

10. a) From the following balances taken from the books of Jinni and Granni Ltd. for the year ending March 31, 2021, calculate the gross profit.

	(₹)
Closing Stock	2,50,000
Net sales during the year	40,00,000
Net purchases during the year	15,00,000
Opening stock	15,00,000
Direct expenses	80,000

b) Write notes on (1) Trial balance (2) Contra-entry situations.

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FACULTY OF INFORMATICS

M.C.A (CDE) I – Semester (Main) Examination, October / November 2022

Subject: Data Structures using C

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 compilation and linking process in C?
   (b) How do you define a constant?

(OR)

2. (a) Explain literals in C.
   (b) Explain Tokens in C.

Unit – II

3. (a) List out various types of functions supported by C?
   (b) What is recursion function?

(OR)

4. (a) Explain Pass by value and Pass by Reference.
   (b) List out various C Library functions?

Unit – III

5. (a) What is data structure ? What are the types of data structures?
   (b) How memory allocation is done in arrays?

(OR)

6. (a) Explain in detail Circular Linked List?
   (b) Explain Linked list implementation of stack?

Unit – IV

7. (a) Explain various types of tree traversals in C?
   (b) What is binary search tree? Explain advantages of binary search tree?

(OR)

8. (a) Define Graph ? Explain briefly about graph terminology?
   (b) Explain Breadth First search algorithm?

Unit – V

9. (a) Write an algorithm to implement Merge sort?
   (b) Differentiate between Quick sort and Merge Sort?

(OR)

10. (a) What is hashing? Why we need hashing?
    (b) What is collision? Explain various collision resolution techniques?

****

[4]

6. a) What is interval estimate?
   b) For the purpose of estimating the mean annual income X of 800 families of a particular community a simple random sample of size 56 was drawn and the following results were obtained: X=Rs.5376 ,S=Rs. 840. Find a 90% confidence interval for the population men.

[10]

Unit – IV   [4]

7. a) Write testing for difference between proportions and large samples.
   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.

[10]

(OR)   [4]

8. a) What is small sample test?
   b) A machine which produced mica insulating washers for use in electric devices is set to turn out washers having a thickness of 10mm.A sample of 10 washers has an average thickness of 9.52mm with a standard deviation of 0.60mm. Test whether the sample is drawn from the given population.

[10]

Unit – V   [4]

9. a) What is goodness of fit?   [10]
   b) 10 competitors in a musical test were ranked by 3 judges X,Y,Z in a following order.

R(x)	1	6	5	10	3	2	4	9	7	8
R(y)	3	5	8	4	7	10	2	1	6	9
R(z)	6	4	9	8	1	2	3	10	5	7

(OR)

[4]

10. a) What is correlation?
    b) Find the coefficient of correlation and two regression equations for the following data. Estimate the value of X when Y=75.

[10]

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

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FACULTY OF INFORMATICS

M.C.A. (CDE) I - Semester (Main) Examination, October/ November 2022

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) What is vector subspace?   [4]

   b) Let w be the set of all vectors of the form $\begin{bmatrix} 2b + 3c \\ -b \\ 2c \end{bmatrix}$ where b & c are arbitrary.

   Find vector u & V such that w=span (u,v).Does w is a subspace of R^3.   [10]

(OR)

2. a) Define kernel and range of a linear transformation.   [4]
   b) Find bases for the null spaces of the matrix.   [10]

$$\begin{bmatrix} 1 & 0 & -3 & 2 \\ 0 & 1 & -5 & 4 \\ 3 & -2 & 1 & -2 \end{bmatrix}$$

Unit – II

3. a) Define exhaustive event, Impossible events,.   [3]
   b) In a single throw of 2 dice, Find   [11]
      (i) Probability of odd number on the first dice and 6 on the second.
      (ii) Probability of a number greater than 4 on each dice.
      (iii) Probability of total 11.
      (iv) Probability of a total 9 or 11.

(OR)

4. a) What is Poisson distribution?   [3]
   b) Obtain moment generating function and mean, variance of Poisson distribution. [11]

Unit – III

5. a) Define Non random sampling.   [4]
   b) What are the advantages of random sampling and explain the concept of standard
      errors?   [10]

(OR)

..2..

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) Show that $p \to (q \to p) \Leftrightarrow \sim p \to (p \to q)$
   (b) $(p \to q) \land (r \to q) \Leftrightarrow (p \lor r) \to q$

(OR)

2. (a) If $A = \{1,2,3\}$ $B = \{2,3,4\}$ $C = \{1,3,4\}$ then find (i) $A - (B \cap C)$ (ii) $A - (B - C)$
   (b) Prove that $B - \bar{A} = B \cap A$

Unit – II

3. (a) State and explain pigeonhole principle.
   (b) If 4 men and 7 women form a queue show that at least 3 men will be next to each other.

(OR)

4. (a) State and prove principle of Inclusion exclusion with 3-sets?
   (b) How many derangements are there for 1,2,3,4,5?

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) Explain summation operator.

(OR)

6. (a) Explain second – order linear homogenous recurrence relation.
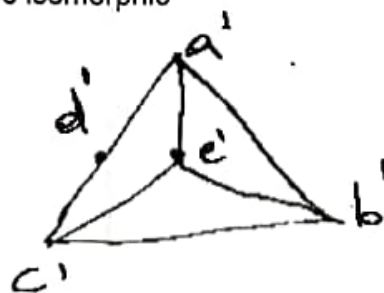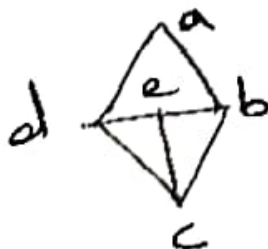   (b) Solve $a_n - 4a_{n-1} - 4a_{n-2} = (n+1)^2$ given $a_n = 0; a_1 = 1$

Unit – IV

7. (a) Define Abelian group with an example.
   (b) If $(G,*)$ is a group and $(a,b) \in G$, then show that $(a * b)^{-1} = b^{-1} * a^{-1}$

(OR)

8. State and prove Lag ranges theorem.

Unit – V

9. (a) Show that two simple graphs are isomorphic

(b) Define (a) Bipartite Graph (b) Spanning Tree

(OR)

10. (a) Explain BFS with example?
    (b) State and explain four colour problem for planar graphs?

FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester, (Main) Examination, October/ November 2022

Subject: Managerial Economics & 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 nature and scope of Managerial Economics.
   b) Evaluate the usefulness of Managerial economics to Engineers.

(OR)

2. Discuss how fundamental concept plays an important role in economic theory?

Unit – II

3. Explain the law of Demand with suitable examples.

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4. Elaborate various types of Income elasticity of demand and also its significance.

Unit – III

5. Describe the Iso-Quant production function and also expansion path.

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6. Discuss in detail characteristics that are essential for the existence of Perfect Competition and explain how price and output determined in the long-run.

Unit – IV

7. a) Explain the significance of working capital management and capital budgeting.
   b) What are the steps of NPV and IRR method of capital budgeting.

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10. a) From the following balances taken from the books of Jinni and Granni Ltd. for the year ending March 31, 2021, calculate the gross profit.

	(₹)
Closing Stock	2,50,000
Net sales during the year	40,00,000
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Direct expenses	80,000

   b) Write notes on (1) Trial balance (2) Contra-entry situations.

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FACULTY OF INFORMATICS
M.C.A. (CDE) I - Semester (Main) Examination, October/ November 2022

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) What is vector subspace? [4]

   b) Let w be the set of all vectors of the form $\begin{bmatrix} 2b+3c \\ -b \\ 2c \end{bmatrix}$ where b & c are arbitrary.

   Find vector u & V such that w=span (u,v).Does w is a subspace of R^3. [10]

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Time: 3 Hours

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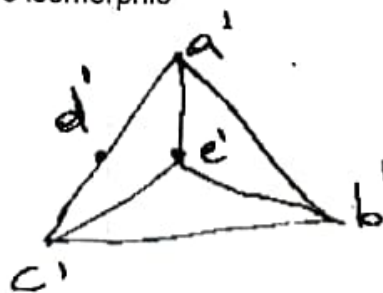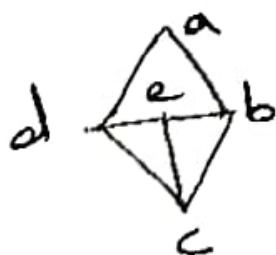   (b) How many derangements are there for 1,2,3,4,5?

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Code No. D-0714/CDE

FACULTY OF INFORMATICS

M.C.A. (CDE) I- Semester, (Main) Examination, October/ November 2022

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) Using 2's complements, subtract the binary numbers 1010100 1000011.
   b) Elaborate the bus interconnection.

(OR)

2. a) Represent the decimal number +6132.789 using fraction and exponent form.
   b) Explain about the bus structures.

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3. a) Construct bus system for four registers using multiplexers.
   b) Illustrate direct and indirect address with its demonstration.

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4. a) Elaborate 4-bit binary adder subtractor with its logic diagram.
   b) Explain how the basic computer registers are connected to a common bus system.

Unit – III

5. a) Explain the flow chart for selection of control memory address.
   b) Describe the block diagram of general register organization.

(OR)

6. a) Elaborate the microinstruction format.
   b) Give an overview of subroutine call and return.

Unit – IV

7. a) Discuss the block diagram and function table of a typical RAM chip.
   b) Explain the memory table for mapping a virtual address.

(OR)

8. a) Elaborate the two way associative mapping cache.
   b) Explain the logical to physical address mapping in segmented page memory management unit.

Unit – V

9. a) Explain the connection of I/O bus to input-output devices.
   b) Describe the source-initiated strobe for data transfer.

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10. a) Compare isolated versus memory-mapped I/O.
    b) Discuss the block diagram of DMA.

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   b) For the purpose of estimating the mean annual income X of 800 families of a particular community a simple random sample of size 56 was drawn and the following results were obtained: X=Rs.5376 ,S=Rs. 840. Find a 90% confidence interval for the population men. [10]

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R(z)	6	4	9	8	1	2	3	10	5	7

(OR)

10. a) What is correlation? [4]

   b) Find the coefficient of correlation and two regression equations for the following data. Estimate the value of X when Y=75. [10]

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FACULTY OF INFORMATICS

M.C.A (CDE) I – Semester (Main) Examination, October / November 2022

Subject: Data Structures using C

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 compilation and linking process in C?
    (b) How do you define a constant?

(OR)

2. (a) Explain literals in C.
    (b) Explain Tokens in C.

Unit – II

3. (a) List out various types of functions supported by C?
    (b) What is recursion function?

(OR)

4. (a) Explain Pass by value and Pass by Reference.
    (b) List out various C Library functions?

Unit – III

5. (a) What is data structure ? What are the types of data structures?
    (b) How memory allocation is done in arrays?

(OR)

6. (a) Explain in detail Circular Linked List?
    (b) Explain Linked list implementation of stack?

Unit – IV

7. (a) Explain various types of tree traversals in C?
    (b) What is binary search tree? Explain advantages of binary search tree?

(OR)

8. (a) Define Graph ? Explain briefly about graph terminology?
    (b) Explain Breadth First search algorithm?

Unit – V

9. (a) Write an algorithm to implement Merge sort?
    (b) Differentiate between Quick sort and Merge Sort?

(OR)

10. (a) What is hashing? Why we need hashing?
    (b) What is collision? Explain various collision resolution techniques?

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