BC — 201

2015

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

*Answer any **five** questions.*

1. (a) Define Venn diagram. Give Venn diagram representation of the following :

   (i) $A \Delta B$

   (ii) $(A \Delta B) \Delta C$

   (b) Prove that :

   $$\bar{\bar{A}} = A$$

2. (a) A computer company must hire 20 programmers to handle system programming jobs and 30 programmers for application programming. Of those hired,

5 are expected to perform jobs of both types. How many programmers must be hired ?

(b) Define equality of two sets. Are the following sets equal to each other ?

$A = \{x : x^2 + 1 = 0\}$ and $B = \{x : x(x^2 + 1) = 0\}$

3. (a) Let R and S be relations on a set A. Prove that if R and S are transitive, then $R \cap S$ is transitive.

(b) Consider the following relation on {1, 2, 3, 4, 5, 6}.

$R = \{(i, j) : |i - j| = 2\}$. Is R transitive ? Is R reflexive ?

4. (a) Define mapping from a set A to set B. Show that the functions $f(x) = x^3$ and $g(x) = x^{\frac{1}{3}}$ for all $x \in R$ are inverses of one other.

(b) Show that the function $f : R \to R$ given by $f(x) = \cos x$ for all $x \in R$ is neither 'one-to-one' nor 'onto'.

5. (a) Define semi group and monoid with examples.

(b) Show that identity element of a subgroup is the same as that of the group.

6. (a) Define partial order set with two examples.

(b) Draw the Hasse diagram for the partial ordering $\{(A, B) / A \subseteq B\}$ on the power set P(S) where S = {a, b, c}.

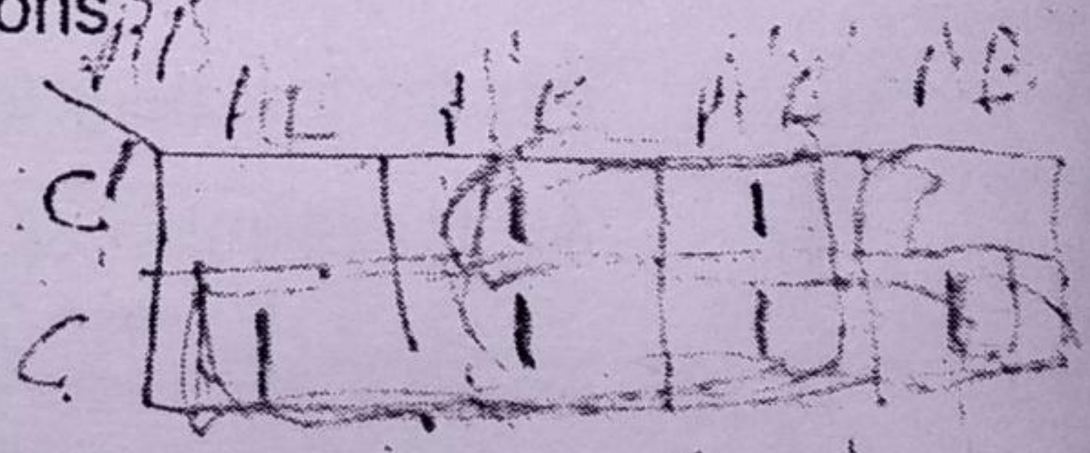
7. (a) Prove that in a distribution lattice, if an element has a complement, then this comlement is unique.

(b) Show, with an example, that the union of two sub-lattices may not be a sub-lattice.

8. (a) Find the complement of the following Boolean expressions :

(i) $xy' + x'z$

(ii) $x(y'z' + yz)$



(b) Define Boolean algebra.

9. Define Karnaugh map and use it to simplify the following :

$X = A'B'C' + A'B'C + A'BC + A'BC' + AB'C + ABC$

10. Write short notes on any **four** of the following :

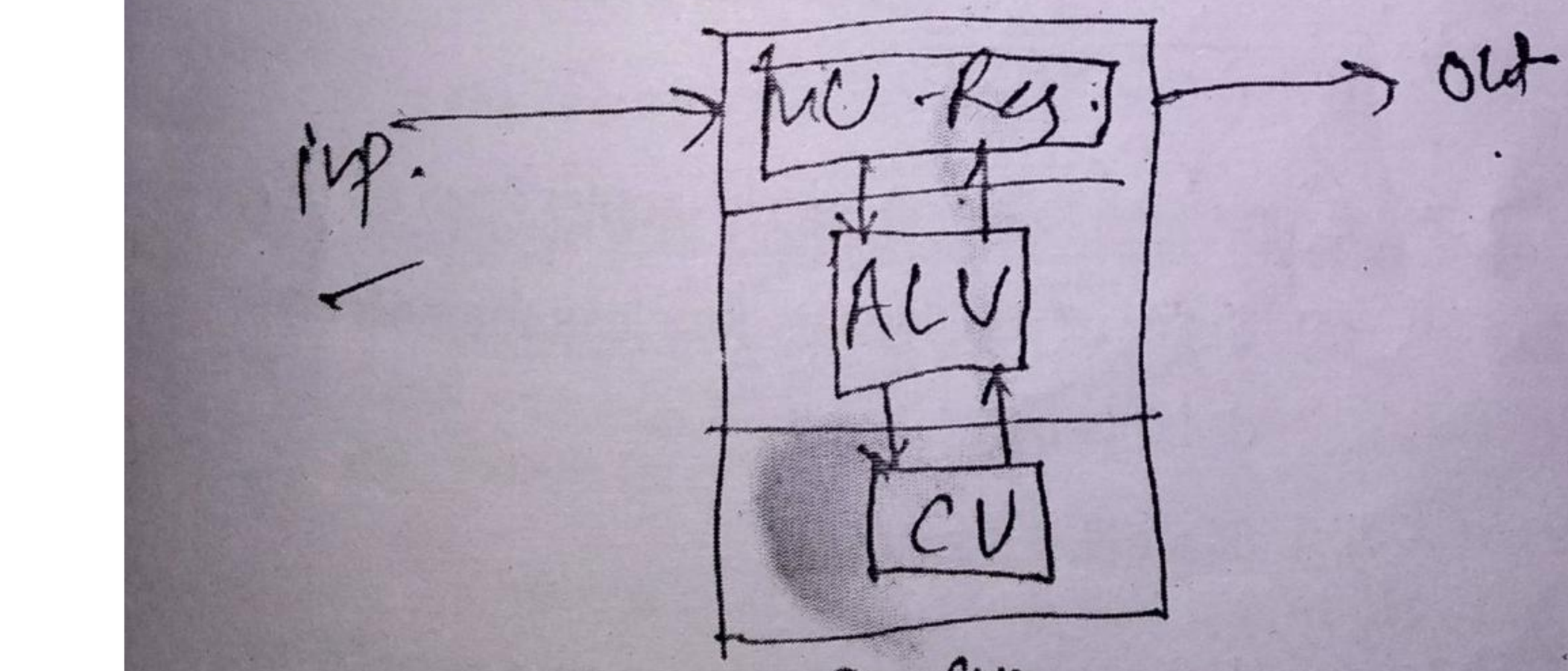
(a) Operation on sets

(b) Relation matrix

(c) Vector Space

(d) Least upper bound and greatest lower bound

(e) Boolean Lattice



BC — 202

2015

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The figures in the margin indicate full marks.

*Answer any **five** questions.*

1. (a) What is shift register ? Draw a shift register using D flip-flops. 6

   (b) What is sequential logic circuit ? Write types of Flip Flops and explain any one of them. 10

2. (a) List and discuss the different types of Read-Only Memories. 8

   (b) Define multiplexers. Draw 4 to 1 line multiplexer and explain it. 8

3. (a) Explain, how error occurred in a data transmission can be detected using parity bit. 8

(b) State and explain the rules in arithmetic operations on floating point numbers. 8

4. (a) What is the difference between restoring and non-restoring division algorithms ? 6

(b) With neat flow chart, explain non-restoring division algorithm. 10

5. Explain instruction formats for various types of computer organizations as single accumulator, general register and stack. 16

6. Briefly explain all the addressing modes of computer instruction. 16

7. (a) Explain add and subtract operation with the help of flow chart. 8

(b) Draw the diagram of 4-bit adder-subtractor. 8

8. Write the Booth's algorithm for multiplication of two numbers and explain it using an example. 16

9. (a) Explain the memory hierarchy based on speed, size and cost. 6

(b) Define virtual memory. What is the necessity for using the concept of virtual memory? 10

10. Explain the concept of cache memory. Discuss the techniques for mapping data from the main memory to the cache memory. 16

BC — 203

2015

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

Answer any five questions.

1. (a) Describe the features of C Language.

   (b) Compare between while and do while loop with example.

2. (a) Write an algorithm nearer to C Language to delete the first node from a Circular List.

   (b) Write an algorithm nearer to C Language to implement push operation on a stack.

3. (a) Write an algorithm nearer to C Language to count the number of occurrences of a given value in a linked list.

   (b) Write short notes on pointer.

4. (a) What is queue ?

(b) Is it more appropriate to implement a queue in a linear array or in a circular array ? Why ?

5. (a) Write an algorithm nearer to C Language to implement queues in a circular array.

(b) Write an algorithm nearer to C Language to delete a node from a binary search tree.

6. Write an algorithm nearer to C Language to traverse a binary tree using inorder, preorder traversal technique.

7. (a) Which technique of searching an element in an array would you prefer to use and in which situation ?

(b) Write an algorithm nearer to C Language to implement binary search technique.

8. Write an algorithm nearer to C Language to implement selection sort technique.

9. Describe two dimensional array with example.

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BC — 301

2015

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

*Answer any **five** questions.*

1. Define the term MIS. Discuss the importance of Management Information System for any organisation. 16

2. (a) Differentiate between a decision and a decision-making process. 8

   (b) Explain different phases of Simon model of Decision making with suitable example. 8

3. (a) Define the concept of Information. Explain cost and value of Information. 8

(b) Discuss the various categories of Informa... with proper examples. 8

4. What is System Analysis ? Why is it needed ? Briefly explain the phases involved in system design. 16

5. Explain different stages of waterfall model of system development. 16

6. What is DFD ? What is the difference between logical and physical modeling ? Why is logical modeling more important in system analysis ? 16

7. (a) What is DSS ? Explain briefly the various types of DSS with example. 8

(b) Explain the various components of an Enterprise Management System (EMS). 8

8. Write notes on the following : 16

(a) Modularisations

(b) Module Specification

9. Whart is role of audit trail ? What is its requirement in system analysis and design ? Give your own concepts. 16

10. On the time of design and development of project ? what are the main criteria of slecting software ? 16