2024
(Session : 2023-26)
(Paper ID : 12006)

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. Given U (Universal set) = {1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {1, 2, 3, 4, 5}, B = {3, 4, 5, 7} and C = {2, 4, 5}. Find :

   (a) $(A - B) \cup (B - A)$

   (b) $(A \cap B) \cup C$

   (c) $A^C - B^C$

   (d) $(A \cup B) - (A \cap B)$

2. Define composition of relations. If A = {1, 2, 3, 4}, let R be a relation such that XRY : if Y = X +1 and S be the relation such that XRY : if X < Y. Then find RoS and SoR with the help of diagram.

3. Define equivalence relation with an example.

4. Let f and g be functions from R to R defined by $f(x) = ax + b$, $g(x) = 1 - x + x^2$. If $(gof)(x) = 9x^2 - 9x + 7$, determine a, b.

5. If f is a function from R to R, where R is a set of real number, defined by $f(x) = \sqrt{2x+1}$, then find the inverse function of f at point 0, 1.5, – 25 and 40.

6. List all partition of {a, b, c, d}.

7. If S = {2, 3, 6, 12, 24, 36}, let R be a relation on set S defined by R = {(x, y) : x divides y} :

   (a) Construct Hasse diagram

   (b) Is POSET a Lattice

8. Define Group. Prove that set of integers with respect to addition is a commutative group.

9. Define the following with an example :

(a) Regular graph

(b) Complete graph

(c) Euler cycle

(d) Trees

10. Define the following :

(a) Power set

(b) Lattice

(c) Ring

(d) Operations on set

2024

(Session : 2023-26)

(Paper ID : 12008)

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. What is Function ? Discuss the type of function. Explain Call by Value and Call by Reference methods. Write a C program to print Factorial value of a given Integer using function.

2. What is Array ? Discuss double dimension array with syntax. Write a C program to enter M × N element in an array, print the number in M × N matrix format. Where M represents Rows and N columns.

3. What is Data Structure ? Discuss the types of Data structure using net diagam.

4. What is Stack ? Write down the algorithm for push and pop operation using Array implementation.

5. What is Tree ? Explain the different Tree terminology used in Tree. Also discuss the different Tree traversal method used in Binary Tree.

6. What is Circular Link List ? Write a C program to create, add, delete, display and count the element of Circular Link List.

7. What is Sorting ? Discuss the type of sorting. Explain Bubble sorting. Write a C program to enter N number in an array, print the number in sorted order using Bubble sorting.

8. What is Searching ? Discuss the type of searching. Write a C program to Enter N number in an array search the specific number in the given list of array using sequential search.

9. What is Binary Tree ? Discuss the different Tree Traversal Method with suitable example.

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

(a) Graph

(b) Doubly Linked List

(c) Pointer

(d) Non Linear Data Structure

BCA(II) — Comp. Arch. (BC – 202)

2024

(Session : 2023-26)

(Paper ID : 12007)

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) Solve the following :

(i) $(41)_{10} = (\ )_2$

(ii) (F3A7C2)16 = $(\ )_8$

(iii) 110110 ÷ 101

(iv) 101011 + 111000

(v) $(623)_8 = (\ )_2$

(b) Addition of the following :

(i) 1101.11 + 1011.10

(ii) 10111.01 + 11001.11

(iii) 100100111 + 10110010

(iv) 1000011000+110000010

(v) 110100111 + 101100100

2. (a) Explain the meaning of overflow and underflow with an example.

   (b) Define any four number systems depending on different base values. Convert the binary number 11000111.1101 form 2's complement form to equivalent decimal form.

3. Determine by means of a truth table the validity of De-Morgan's theorem for three variables (ABC)' = A' + B' + C'.

4. Simplify the following expressions using Boolean Algebra :

   (a) AB + AB'

   (b) AB + A(CD + CD)

   (c) (BC' + A'D) (AB' + CD')

5. Explain Timings sequence digital logic families.

6. Write short notes on the following :

   (a) Multiplexer

(b) Disk and Tape

(c) Magnetic Drum

(d) Input / Output Interface

7. (a) Give the circuit and working of shift registers. How can we make them shift in both directions ?

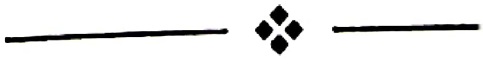
(b) List any four types of counters with their features.

8. (a) Give the design of any one 4-bit binary decoder.

(b) Explain the T and RS, JK flip-flops with their limitations.

9. What is Counter ? Explain Asynchronous counter of MOD 8 with Block diagram and Truth Table.

10. What do you mean by Data Transfer ? Differentiate Synchronous and Asynchronous mode of data transfer.



BCA(II) — Sys. Anal. & Dgn. (BC – 204)

2024

(Session : 2023-26)

(Paper ID : 12009)

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. Explain Waterfall Model. What are the frequently encountered issues when Waterfall model is applied ?

2. Define Cohesion and Coupling in the context of design. Also explain its types used in modular design.

3. What is Documentation ? Differentiate between system and user documentation with their application.

4. Explain basic relevant rules to constructing a Data Flow Design (DFD). Distinguish between DFD and flow chart with examples.

5. What are the role, attributes and responsibilities of System analysis ? Explain.

6. Write short notes on any **two** of the following :
   (a) Analysis Tools
   (b) Output Design
   (c) Report File
   (d) System Conversion Plan

7. What are the purposes of information gathering Tools ? Discuss various methods of information gathering.

8. What is System Implementation Process ? Explain various system implementation methods with their merits and demerits.

9. What is SDLC ? Explain various phases of SDLC in detail.

10. What is Herbert Simon's Model ? Discuss various phases of Herbert Simon's model in decision making.