

21COAC201

Reg No :

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
BCA SECOND SEMESTER DEGREE EXAMINATION AUGUST 2022

COMPUTER APPLICATIONS

Data Structures using C

Duration:2 Hours

Max Marks:60

PART A

Answer any FIVE questions:

(5×2= 10)

- 1) What is multi dimension array?
- 2) What is dynamic memory allocation?
- 3) How is an Array different from Linked List?
- 4) How to define a tree in data structure?
- 5) Evaluate the postfix expression 145^*+ .
- 6) Differentiate path and edge of a tree.

PART B

Answer any FIVE questions :

(5×6= 30)

- 7) Which sorting algorithm is considered as fastest? Why? Explain.
- 8) What are the different memory management functions? Explain.
- 9) How to delete a node from the following positions?
a) beginning b) end
- 10) Differentiate postorder traversal and preorder traversal with an example.
11. What are the applications of stack? Explain.
12. What are some applications of Data Structures? Explain.

PART C

Answer any TWO questions :

(2×10= 20)

13. Write a program to implement circular queue using array.
14. What is linked list? What are the different types of linked list? Explain.
15. What are the different traversal operations in binary tree. Explain

21COAC202

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
BCA SECOND SEMESTER DEGREE EXAMINATION AUGUST 2022
COMPUTER APPLICATIONS
Object Oriented Concepts using JAVA

Duration:2 Hours

Max Marks:60

PART A

Answer any FIVE questions:

(5×2= 10)

- 1) What is the use of the java tool?
- 2) What are identifiers in java?
- 3) What is the major difference between interfaces and classes?
- 4) List any four commonly used StringBuffer methods
- 5) How do we define a try block?
- 6) What is the difference between stopping and suspending a thread?

PART B

Answer any FIVE questions :

(5×6= 30)

- 7) What are the unique advantages of an object-oriented programming paradigm?
- 8) Explain any six mathematical functions with example.
- 9) Given a number, write a program using while loop to reverse the digits of the number.
- 10) Explain how to define a class and declare fields and methods with the help of an example.
11. How do we add a class or an interface to a package?
12. Describe the different stages in the life cycle of an applet. Distinguish between init() and start() methods.

PART C

Answer any TWO questions :

(2×10= 20)

13. Explain Streams in java.
14. Explain the different types of constants and variable data types in java.
15. Explain any two forms of inheritance with examples.

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
BCA SECOND SEMESTER DEGREE EXAMINATION AUGUST 2022
COMPUTER APPLICATIONS
Discrete Mathematical Structures

Duration:2 Hours

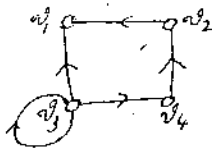
Max Marks:60

PART - A

I. Answer any SIX of the following:

6×2= 12

- a. Let $X = \{1, 2, 3, 4\}$ and $R = \{(3, 4)\}$. Check whether R is an equivalence relation.
- b. Let $R = \{(1, 2), (3, 4), (2, 2)\}$ and $S = \{(4, 2), (2, 5), (1, 3), (3, 1)\}$. Find $S \circ S, S \circ R$.
- c. Let $X = \{1, 5, p, Jack\}, Y = \{2, 5, 7, q, Jill\}$ and $f = \{(1, 2), (5, 7), (p, q), (Jack, q)\}$. Find domain of f , Range of f and $f(Jack)$.
- d. Determine whether the sequence $\{a_n\}$ where $a_n = 3n$ for every non-negative integer n , is a solution of the recurrence relation $a_n = 2a_{n-1} - a_{n-2}$ for $n=2,3,4,\dots$
- e. Write the dual statement of $\neg(P \vee Q) \wedge (P \vee \neg(Q \wedge T)) \vee Q$.
- f. Write the following in symbolic form .
 "If Roses are red and violets are blue, then Jack went up the hill"
- g. Find the adjacency matrix of the directed graph given below.



- h. Draw a graph of (i) Isolated graph (ii) Mixed graph

PART - B

II. Answer any TWO of the following:

2×6= 12

- a. Prove that $\sim(A \cap B) = \sim A \cup \sim B$ if $A = \{1, 2, 3, 4\}, B = \{2, 3, 4, 5, 6\}$ and $E = \{1, 2, 3, 4, 5, 6, 7\}$.
- b. Find the maximal compatibility blocks and also draw the graph of the following compatibility relation.

2	1				
3	1	1			
4	0	0	1		
5	1	0	1	1	
6	0	0	1	0	1
	1	2	3	4	5

- c. Let A be the set of all factors of a particular positive integer m and let \leq be the relation divides i.e., $\leq = \{(x, y)/x \in A \wedge y \in A \wedge (x \text{ divides } y)\}$. Draw the Hasse diagram for (i) $m=2$ (ii) $m=6$ (iii) $m=30$

PART - C

III. Answer any TWO of the following:

2×6= 12

- Let $f : R \rightarrow R$ be given by $f(x) = 2x + 3$. Is f bijective?
- Let $X = \{1, 2, 3\}$ and f, g are functions from $X \rightarrow X$ given by $f = \{(1, 2), (2, 3), (3, 1)\}$ and $g = \{(1, 2), (2, 1), (3, 3)\}$. Show that $(f \circ g)^{-1} = g^{-1} \circ f^{-1}$ and $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.
- Find the solution of the recurrence relation $a_n = -3a_{n-1} - 3a_{n-2} - a_{n-3}$ with initial condition $a_0 = 1, a_1 = 2, a_2 = -1$.

PART - D

IV. Answer any TWO of the following:

2×6= 12

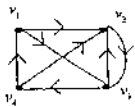
- Without constructing the truth table prove the following:
 $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$
- Solve: $25x \equiv 15 \pmod{29}$.
- Prove that $\neg(P \wedge Q) \rightarrow (\neg P \vee (\neg P \vee Q)) \Leftrightarrow (\neg P \vee Q)$ using the truth table.

PART - E

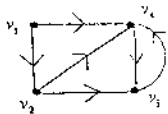
V. Answer any TWO of the following:

2×6= 12

- Define Adjacency matrix of a digraph and write the adjacency matrix of the following graph.
 i) $\{v_1, v_2, v_3, v_4\}$ ii) $\{v_2, v_1, v_3, v_4\}$



- Define Node base in a digraph and find the node base of the following graph.



- Convert the following tree to a Binary Tree.

