**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, APRIL 2023**

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|  | **1BC2104** | Roll No. | Total Printed Pages: 2 |
| **1BC2104** |  |
| BCA I Year II Semester (Main/Back) End Semester Examination, April 2023  **(All Spl.)** | |
| **BCACCA2103 : Data Structure and Algorithm** | | | |

# Time: **3** Hours. Total Marks: **60**

Min. Passing Marks: **21**

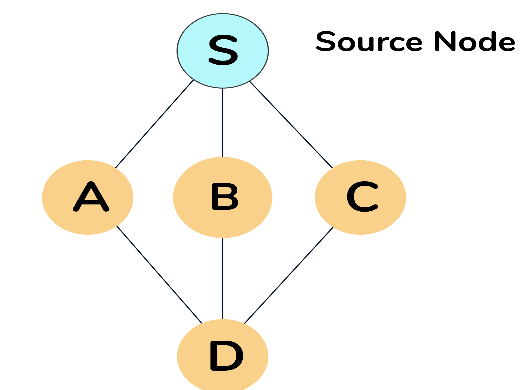
Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2.------------------Nil-----------------------**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | Consider the following code:  void main()  {  int A[5] = {2,4,6,8,10};  int \*p;  p = A;  }  Find value of \*(p++).  Is A++ a valid expression or not. Justify your answer. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Define Recursion. Write a program in C to find the factorial of a number using recursion. | **(6)** | **Apply** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.2** | **(a)** | What is the need of dynamic memory allocation? Explain with a suitable example. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Explain the following functions: malloc(), calloc(), free() and realloc(). | **(6)** | **Remembering** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
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| **Q.3** | **(a)** | Write down the time complexity of linear search and binary search. Also write down the best case and worst case of linear search and binary search. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Suppose an element is found at the first position in a sorted list of 100 elements. According to you which search technique will be faster: linear search or binary search. Justify your answer. Also write down the best case and worst case of linear search and binary search. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.4** | **(a)** | Explain the working of Bubble sort. Sort the following list of elements using the Bubble sort technique. | **(6)** | **Apply** |
|  |  |  |  |  |
|  | **(b)** | Write a program in C to implement Bubble sort algorithm. | **(6)** | **Apply** |
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|  |  | **UNIT-III (CO3)** |  |  |
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| **Q.5** | **(a)** | Define Stack. Also write down the different applications of Stack | **(6)** | **Apply** |
|  |  |  |  |  |
|  | **(b)** | Evaluate the following postfix expression using the concern algorithm.  P : 5 2 + 3 \* 9 3 / – | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.6** | **(a)** | Write down the algorithms for insertion & deletion in a Queue. | **(6)** | **Applying** |
|  |  |  |  |  |
|  | **(b)** | Define Circular Queue. What are the advantages of using a circular queue? | **(6)** | **Applying** |
|  |  |  |  |  |
|  |  | **UNIT-IV (CO4)** |  |  |
|  |  |  |  |  |
| **Q.7** | **(a)** | Which one is better: Array or Linked list? Justify your answer. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | How do you implement a stack using a linked list or an array? Explain with a suitable example. | **(6)** | **Remembering** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.8** | **(a)** | What are the Advantages of double linked list over single link list? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | What is a linked list? What are the advantages of using a linked list? | **(6)** | **Remembering** |
|  |  |  |  |  |
|  |  | **UNIT V (CO5)** |  |  |
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| **Q.9** | **(a)** | Construct a binary search tree for the following data: 23, 67, 100, 2, 11, 56, 90, 34, 99. Also perform all traversals of the constructed binary tree. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Construct a binary tree from the given preorder and inorder sequence:  Preorder : A B D G C E H I F  Inorder : D G B A H E I C F | **(6)** | **Applying** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.10** | **(a)** | Define Max-Heap. Construct a Heap tree for the following data: 12, 30, 50, 20, 10, 25, 90, 40, 15. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Traverse the following graph using BFS and DFS algorithms. | **(6)** | **Remembering** |

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