B.E. (Computer Engineering) Third Semester (C.B.S.)

Programming Methodology & Data Structures Paper – IV

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Notes :
1. All questions carry marks as indicated.
2. Due credit will be given to neatness and adequate dimensions
3. Assume suitable data whenever necessary.

1.	a)	Describe the different problem solving techniques and also specify what is stepwise refinement? Explain by giving a suitable example.	**7**
	b)	Write a program to generate n prime numbers using recursion.	**7**

OR

2.	a)	Write a program to merge two sorted arrays.	**5**
	b)	Specify time difference between macro and functions.	**5**
	c)	Write a program to generate following pattern.	**4**

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

3.	a)	What is dynamic memory allocation? Explain all functions malloc( ) calloc ( ) free( ) and realloc ( )	**7**
	b)	Write a 'C' program using a function that takes one pointer argument and return reversed string.	**6**

OR

4.	a)	Print names and numbers of employees who have 5 year or more experience and salary less than Rs. 10,000 using array of structurers (name, number, experience and salary)	**7**
	b)	Explain storage classes.	**6**
5.	a)	What is data structure? Differentiate between primitive data structure and non-primitive data structure.	**5**
	b)	Sort the following list using insertion sort. specify time complexity for the same. 65 76 10 87 98 21 32 43 54 76	**4**
	c)	Write a program for binary search explain it with a suitable example.	**5**

OR

6.	a)	Distinguish between.	**10**
		a) Files and records. b) Sequential & Random access files.	
		c) Input, output, and input/output files. d) Text and binary files.	
		e) Absolute addressing and relative addressing.	
	b)	Differentiate between internal & external sorting.	**4**

7. a) What is the prefix form for each of the following. **6**

    i) $A * B - (C+D) - (E - F) + F/ H^\wedge I$.

    ii) $(CB*C) + C/D^\wedge F) + G$

    iii) $A^\wedge B*C - D + E/F/ (G + H)$

    b) Write a function for insertion & deletion in a circular queue. **7**

<div align="center">OR</div>

8. a) Write a program to concatenate two linked list. **6**

    b) Write a node structure of linked list in C also write a function to count the number of nodes in the list. **7**

9. a) Write a 'C' program to find the sum of each node value in as integer circular double linked list. **7**

    b) What is sparse matrix? How do your represent a sparse matrix. **6**

<div align="center">OR</div>

10. a) Writ a 'C' program to create a double linked list in ascending order of inserted value. **7**

    b) Explain the concept of circular linked list Also given the advantages and disadvantages. **6**

11. a) Short the following elements using heap sort. **6**
    96   99   107   26   12   11   92   10   25   51

    b) Write a function to find out the maximum and the minimum element in a binary search tree. **7**

<div align="center">OR</div>

12. a) Describe DFS algorithm. Find out the DFS traversal of the following graph starting at node A. **8**
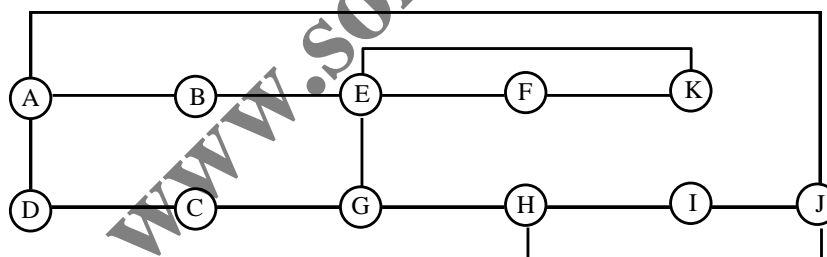
    b) Draw a serval graphs for each graph answer the following questions. **5**
    a)   acyclic   b) directed   c) Simple   e) order of the graph   f) indegree, out degree and degree of graph.

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