

B.E. Third Semester (Computer Engineering) (C.B.S.)
Programming Methodology & Data Structure

P. Pages : 3

Time : Three Hours



NKT/KS/17/7250

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Assume suitable data whenever necessary.
 9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain the various sections involved in a simple C program. 5
- b) Explain following with example : 8
- i) Algorithm
 - ii) Flowchart
 - iii) Structured programming

OR

2. a) What do you mean by recursion? Write a program calling a recursive function to find the sum of digits. 7
- b) Show the memory representation to store ID - array containing 10 float elements. Also, write a program to get the sum of elements in an array. 6
3. a) Find the output of the following program : 5
- ```
main ()
{
static int d [] = {2, 11, 8, 4, 3, 9, 120, 5};
int j, *k;
k = & d[4] - 4;
for (j = 0; j <= 4; j++)
{
printf ("%d", *k);
k++;
}
}
```
- b) List the storage classes available in C language. And explain each storage class implementation with suitable 'C' program and show its output, after using storage class. 9

**OR**

4. a) Write a 'C' program using pointer, which calls a function used to reverse a string entered by the user. Write user defined function to print the reverse of a string. **6**
- b) Define a structure called football that will describe the following information :  
player\_name, team\_name, goals using football, declare an array player with 25 elements.  
Write a 'C' program to read information about all 25 players and print a teamwise list containing names of players with their status about goals done. **8**
5. a) What do you mean by data structure? List the various data structures and write one advantage and disadvantage of each data structure. **6**
- b) Write the necessary condition for binary search. And write a recursive function which implements binary search concept. **7**

**OR**

6. a) Sort the following elements using **8**  
i) Merge sort  
ii) Bubble sort  
23, 20, 27, 46, 96, 41, 99, 25
- b) What do you mean by hashing? Write about different hashing techniques and explain one hashing technique with example. **5**
7. a) Write a 'C' function or algorithmic pseudo code to perform the following operations on singly linked list : **9**  
i) Adding an element at the beginning.  
ii) delete an element from the end of the list.  
iii) compute the length of the list after performing adding and deleting an element.
- b) What do you mean by dynamic memory allocation? Write one example which shows dynamic memory allocations in 'C' language. **4**

**OR**

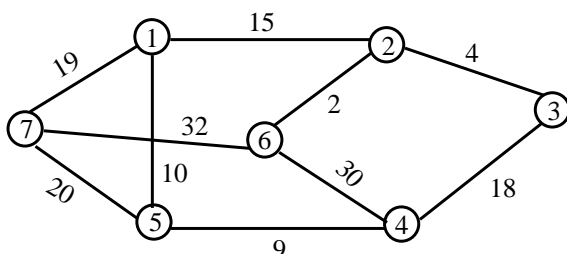
8. a) Evaluate following postfix expression  $BD * G + CE + /$  the values of B, D, G, C and E are 2, 3, 4, 5 and 6 respectively. **6**
- b) Write the application of Queues. And also write the C program to implement the add and delete operation on queues. **7**
9. a) Write algorithmic pseudocode or 'C' program to perform following operations on doubly linked list : **7**  
i) adding an element into DLL.  
(at the end)  
ii) deleting an element from the end of the doubly linked list.
- b) Write a 'C' program to sort the elements stored in a singly linked list and display the elements of linked list before and after sorting. **7**

**OR**

10. a) What do you mean by sparse matrix? Write a program to read the elements of sparse matrix and display them, and implement it using singly linked list. 7
- b) What is the difference between singly linked list and circular linked list? What are the advantages of circular linked list over singly linked list? Write a function to create nodes in circular linked list. 7
11. a) Construct the binary trees for the following : 8
- 1) 51, 54, 61, 66, 81, 91, 101, 121, 126, 141, 151 (Inorder)  
91, 66, 51, 61, 54, 81, 121, 101, 151, 141, 126 (Preorder)
- 2)  $U * V + W/Y + Z$  (inorder)  
 $UV * W + YZ + /$  (postorder)
- b) Define expression tree. Draw an expression tree for the given algebraic expression : 5  
 $4 \wedge 2 * 5 + 8 - 90$

OR

12. a) For the graph given below find 8
- i) minimum cost spanning tree using Kurshal's algorithm.  
ii) Adjacency matrix.  
iii) Degree of each node.



- b) Write a 'C' function to implement BFS. 5

\*\*\*\*\*

