Total No. of Printed Pages:4

SUBJECT CODE NO:- H-364
FACULTY OF SCIENCE AND TECHNOLOGY
S.E. (CSE/IT)
Data Structures
(REVISED)

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 from section A and Q.No.6 from section B are compulsory.
2. Solve any two questions from each section from remaining questions.

Section A

Q.1 Solve any five: 10

a) What are primitive and non-primitive data structure?
b) Differentiate between static and dynamic memory allocation.

c) What will be the output of following program?

```
# include <stdio.h>
  int  main ()
   {
    int  arr [2][2][2]= {10, 2, 3, 4, 5, 6, 7, 8};
    int *p, *q;
    p = & arr [1] [1] [1];
    p = (int *) arr;
print f ("%d % d \ h" , * p, *q);
return O;
}
```

d) Which data structure is used to perform recursion? Give its definition.
e) What is linear queue? Write its disadvantage.
f) Design circular linked list for 4 nodes.
g) What are advantages of linked representation over sequential representation?

Q.2 a) Write C program to store information (name, roll no & marks) of 5 students using structure. 08

b) Write ADT Array. 07

Q.3 a) Convert given infix expression to postfix expression using stack 07
$A * (B + C * D) + E$

b) Write a program to implement queue using static array. 08

Q.4 a) Write C function to perform following operation on linear linked list. 08
i) Insertion of node at front of list
ii) Delete a node from list.

b) Define linked list. Explain types of linked list. 07

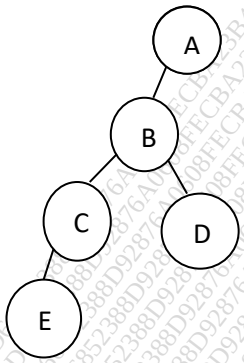
Q.5 a) Explain stack empty and stack full condition. Show the stack contents after each operation for the following sequence of PUSH & POP operation: 08
PUSH (10), PUSH (20), POP ( ), PUSH (30), PUSH (40), PUSH (50). Assume Max stack size =3.

b) Show how to represent polynomials using linked list. Perform addition of A and B. 07
$A = 10x^4 + x^2 + x + 5$
$B = x^3 + x + 2$

Section B

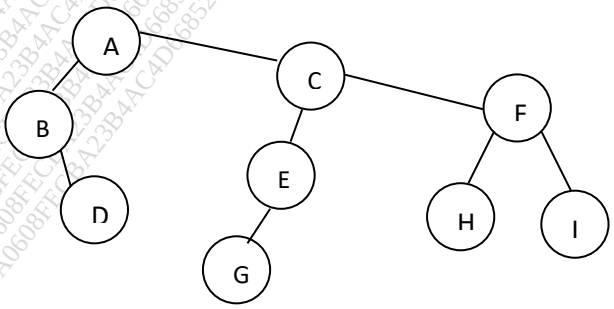
Q.6 Solve any five: 10

a) Give array representation of following binary tree



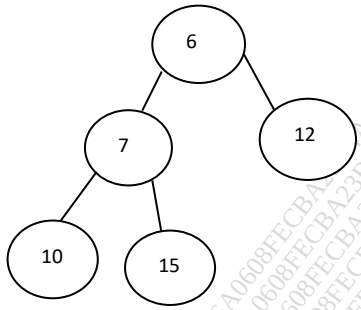
b) What are the major data structures used in following areas? Define them
i. Network data model.
ii. Hierarchical data model.

c) Traverse the tree in inorder and preorder.



d) Explain following graph terminology
   i. Cycle
   ii. Complete graph

e) Insert key 5 to the following min heap & do the necessary updations.



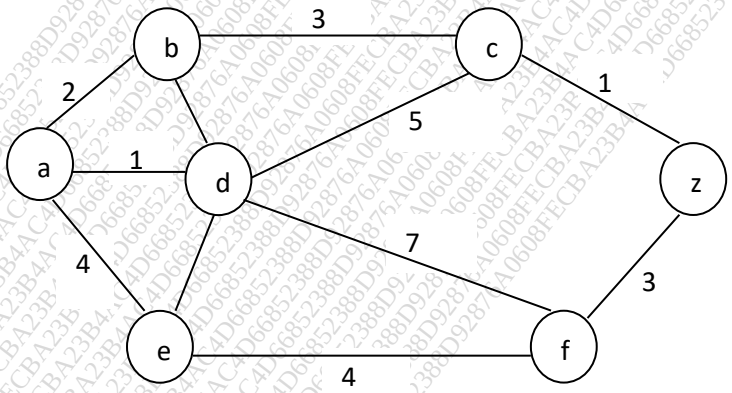
f) Differentiate between linear search and binary search.

g) Sorting is not possible by using which of the following method- insertion, selection, exchange, deletion? Justify your answer.

Q.7 a) Define binary search tree. Write a recursive function to search any key in BST. 08

b) Construct AVL tree for following sequence of keys: 3, 5, 11, 8, 4, 1, 12, 7, 2. 07

Q.8 a) Find shortest path from a to z. 08



b) Write C program to implement depth first search. 07

Q.9 a) Explain binary search method. Consider following list of keys: 08
15, 20, 25, 30, 35, 40, 45, 50
Search
i. $x = 25$
ii. $x = 60$
iii. $x = 40$

b) Apply insertion sort to arrange elements in ascending order 07
3, 7, 8, 5, 2,1, 9, 15, 4

Q.10 a) Write a program to implement selection sort. 07

b) Write a note on: 08
i. Graph representation technique
ii. Graph traversal technique