Bachelor of Science (B.Sc. I.T.) Semester–III Examination

DATA STRUCTURES

Paper–II

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) All questions are compulsory and carry equal marks.

(2) Illustrate your answer with neat and labelled diagram wherever necessary.

EITHER

1. (a) What is link list ? Explain memory representation of link list. 5

(b) Write an algorithm to delete first node of single link list. 5

OR

(c) Explain double link list. Give its advantages as compared to single link list. 5

(d) Write an algorithm to traverse a single link list. 5

EITHER

2. (a) Consider the following stack of characters where STACK is allocated N = 8 memory cells :

STACK : A, C, D, F, K, —, —, —

(Note :- denote empty memory cell)

- POP (STACK, ITEM)
- POP (STACK, ITEM)
- PUSH (STACK, L)
- PUSH (STACK, S)
- PUSH (STACK, P)

View the STACK status. 5

(b) Write a recursive algorithm to find n^{th} term of Fibonacci series :

0, 1, 1, 2, 3, 5, 8, 13, ----- 5

OR

(c) Translate infix expression into equivalent prefix and postfix expression :

A * (B + D) / E – F * (G + H / K) 5

(d) Discuss Tower of Hanoi problem. 5

EITHER

3. (a) Consider the following Queue where QUEUE allocated 6 memory cells. FRONT = 2, REAR = 5

____, Nagpur, Pune, Mumbai, Akola, ____

- Two cities are added
- Three cities are deleted
- Two cities are added

View the QUEUE operation. 5

(b) Explain Big–O notation and efficiency of an algorithm. 5

OR

(c) What is Hashing ? Explain different hashing methods with suitable example. 5

(d) Write an algorithm for Insertion sort. 5

EITHER

4. (a) What is Graph ? Explain representation of graph in memory using link representation. 5

(b) A binary tree T has g nodes. The inorder and preorder traverse of T

Inorder : E, A, C, K, F, H, D, B, G

Preorder : F, A, E, K, C, D, H, G, B

Draw binary tree T. 5

OR

(c) Define tree. Write an algorithm for preorder traversal of Binary tree. 5

(d) A Graph G is stored in memory as follows :

NODE	A	B		E		D	C	
NEXT	7	4	0	6	8	0	2	3
ADJ	1	2		5		7	9	

START = 1 AVAILN = 5

DEST	2	6	4		6	7	4		4	6
LINK	10	3	6	0	0	0	0	4	0	0
	1	2	3	4	5	6	7	8	9	10

AVAIL = 8

Draw the Graph G. 5

5. Attempt **all** :

(a) Define UNDERFLOW and OVERFLOW in link list. 2½

(b) Define Polish notation with suitable example. 2½

(c) Write short note on Collision resolution technique. 2½

(d) Define complete Binary tree. 2½