Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

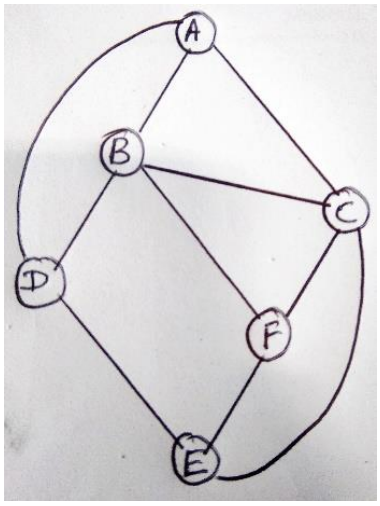
MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
DECEMBER 2021-JANUARY 2022
SUBJECT: DATA STRUCTURES AND ALGORITHMS (ECE - 4070)

TIME: 3 HOURS **MAX. MARKS: 20**

Instructions to candidates
- Answer **ALL** questions.
- Missing data may be suitably assumed.

Q. No.	Questions	M*	C*	A*	B*
1A.	Create a class called **DISTANCE** which has the private members to store kilometres, meters and centimetres. Include member functions *get_dist(), print_dist()* and *add_dist()* to perform read, display and add different distances of same type. Write a complete C++ program to create an array of pointers to store **"N"** DISTANCE objects. Use pass by reference using pointers to pass objects to member functions to perform defined tasks.	4	1	1, 2, 3, 4, 18	3
1B.	Consider the graph shown in Figure 1C. The Depth First Search algorithm is implemented using Queue data structure. The source vertex is "A" and lexicographic ordering is assumed for the edges emanating from each vertex. Determine the sequence of search algorithm and also trace the queue status after every steps.  **Figure. 1C**	3	5	1, 2, 4, 6, 18	4
1C.	A source generates a message symbols with certain frequencies are given in the table: Symbols: a, f, l, o, r, t Frequency: 7, 8, 5, 3, 9, 4	3	4	1, 2, 3, 4, 6, 12, 18	4

	Construct Huffman tree and tabulate the prefix code for each symbol. Encode the message "floor for rat" using Huffman tree. Also find the efficiency of Huffman coding against the fixed length coding.				
2A.	Write a complete interactive program to perform product of two polynomials and display the result using doubly linked list	4	3	1, 2, 3, 4, 18	3
2B.	Write a complete interactive program by defining the class STACK which can reverse a string by appropriate use of push, pop and detecting the stack errors.	3	2	1, 2, 3, 6, 18	3
2C.	Given the following list of numbers: [21, 1, 26, 45, 29, 28, 2, 56, 80, 70] Perform merge sort by tracing each step.	3	5	1, 2, 3, 6, 18	4

M*--Marks, C*--CLO, A*--AHEP LO, B* Blooms Taxonomy Level