May 2024

B. Tech. (ECE) (Sixth Semester)

Data Structure (OEL-602)

Time : 3 *Hours*]   [*Maximum Marks* : 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Define a function. Is it necessary for it to return a value to the calling statement ?

                                                   1.5

   (b) What primitives/constructs are used to implement conditional statements ?   **1.5**

   (c) What do you mean by data structure ? **1.5**

   (d) Are matrices and arrays same ? Can these be used interchangeably ?   **1.5**

   (e) What is a queue ? Name the types of queues.

                                                   1.5

   (f) How are multidimensional arrays represented ?   **1.5**

(g) How are graph and tree different, if at all ? **1.5**

(h) Distinguish between data and information. **1.5**

(i) Define a Set. What values the membership of a set can take ? **1.5**

(j) What do you mean by Recursion ? **1.5**

Part B

2. (a) How to design and develop an algorithm ? What use can be made of accumulators and counters ? **10**

(b) Define complexity of algorithm, how is this complexity interpreted and measured ? **5**

3. (a) How is address calculation effected of a location in arrays ? **3**

(b) Compare and contrast any *three* sorting algorithms, citing strengths and limitations of each. **12**

4. (a) What is the use/application of stacks ? Does the application. Where in the memory is the stack usually reserved/stored ? **5**

(b) Define different types of queues. Explain their applications. **10**

5. (a) Define pointer variables. Write a small representative program or pseudocode to demonstrate the use of pointers. **6**

(b) Elaborate the concept of linked list. Also state what do you understand by circular linked list and doubly linked list. What operations are possible on linked lists ? **9**

6. (a) How is file organization handled ? **5**

(b) Define different operations on binary trees. **5**

(c) Draw a typical binary tree type and implement the same in array form. **5**

7. Write a short technical note on BFS & DFS. **15**