Number of printed pages 01

Semester III (B.Tech)

Er. No. 20183098

Academic Year: 2021-22

Jaypee University of Engineering & Technology, Guna

T-2 (Odd Semester 2021)

18B11CI311 – DATA STRUCTURES

Maximum Duration: 1 Hour 30 Minutes

Maximum Marks: 25

Notes:

1. This question paper has **five** questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

Q1. Write the quick sort algorithm. Arrange the following elements in the ascending order using quick sort (show all the steps): **[05]**

8	13	7	0	8	18	1	6	5	1

Q2. **(a)** Describe asymptotic notations big-O, big-Ω and big-θ with suitable examples. **[03]**

(b) Solve the following recurrence relation using back-substitution method: **[02]**

$$T(n) = \begin{cases} 1 & for\ n = 1 \\ 2T\left(\frac{n}{2}\right) + n & for\ n > 1 \end{cases}$$

Q3. **(a)** Differentiate between array and linked list with suitable examples. **[02]**

(b) Write an algorithm to reverse the singly linked list. **[03]**

Q4. **(a)** Explain the concept of circular linked list with possible supported operations. **[02]**

(b) Write an algorithm to insert a new node at specified location in doubly linked list. **[03]**

Q5. Illustrate the concept of stack data structure. Write the efficient algorithms to implement following operations using array: **[05]**

Push(): Adds an item in the stack

Pop(): Removes an item from the stack.

ReturnTop(): Returns top element of stack

Print(): Prints all the elements of stack

Marking Scheme

Q:1 2 marks for Algo, 3 marks for passes

Q:2 a) 3 marks for explaining all 3

b)

Q:3 a) 2 marks for writing 4 differences

b) 3 marks for correct algo. (No step marking)

Q:4 a) 2 marks for all possible op's
b) 3 marks for correct algo

Q: 5 1 marks for definition & 4 for 4 operations