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**B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019**

Second Semester

**CS16202 – PROGRAMMING AND DATA STRUCTURES I***(Common to CS and IT)***(Regulation 2016)****Time: Three Hours****Maximum : 100 Marks**

Answer ALL questions

**PART A - (10 X 2 = 20 Marks)**

|   | CO | RBT |
|---|----|-----|
| 1. What are the advantages of using pointers?                             | 1  | E   |
| 2. What are recursive functions? Give examples.                           | 1  | R   |
| 3. Illustrate self referential structures with examples.                  | 2  | U   |
| 4. Give the syntax for file read and write functions in C.                | 2  | R   |
| 5. List few applications of singly linked list.                           | 3  | AP  |
| 6. What are the advantages of doubly linked list over singly linked list? | 3  | E   |
| 7. List few applications of queues.                                       | 4  | AP  |
| 8. Evaluate the following postfix expression<br>$92 + 3 * 3 /$            | 4  | E   |
| 9. Differentiate linear and binary search.                                | 5  | U   |
| 10. What is extendible hashing?   | 5  | R   |

**PART B - (5 X 16 = 80 Marks)**

11. (a) (i) Write a program to find the factorial of a number using recursion. (8) 1 U
- (ii) Write a program to design simple calculator using functions. (8) 1 U
- (OR)**
- (b) (i) Write a program to find the transpose of the given matrix. (8) 1 U
- (ii) Write a program to concatenate two strings without library functions. (8) 1 U

12. (a) Create a structure for customers in a bank with the following information, account no., balance and name. Write a program to print the customer details, implement withdrawal and deposit functions. **(16) 2 U**

**(OR)**

- (b) Create a structure for student information with name, roll number, department and year of joining. Write a program to print the names of students joined in a particular year and to print the data of students whose roll numbers are given. **(16) 2 U**

13. (a) How Singly linked list overcomes the limitation of array? With suitable algorithms explain the delete and search operations on singly linked list. **(16) 3 AN**

**(OR)**

- (b) Write the algorithm to insert, delete and print elements in doubly linked list. **(16) 3 AN**

14. (a) Why circular queues are required? Explain Enqueue and Dequeue operations in circular queue. **(16) 4 AN**

**(OR)**

- (b) What are stacks? Explain the push and pop operations using linked implementation of stack. **(16) 4 AN**

15. (a) What is need for Hashing? Explain various hashing techniques with example for each. **(16) 5 AN**

**(OR)**

- (b) Sort the following numbers using Quick sort **(16) 5 AN**  
145, 25, 9, 11, 35, 49, 63, 78, 299, 34.  
Explain with suitable algorithm