Total No. of Questions – [06]   Total No. of Printed Pages: 02

G.R. No.	

paper code: U 239 – 145 (ESE)

DECEMBER 2019 ENDSEM
S. Y. B.TECH. (INFORMATION TECHNOLOGY) (SEMESTER – III)
COURSE NAME: FUNDAMENTALS OF DATA STRUCTURES
COURSE CODE: ITUA21185
(PATTERN 2018)

Time: [2 Hours]   [Max. Marks: 50]

(*) Instructions to candidates:
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed.
4) Assume suitable data where ever required.

Q.1)   Attempt any **one**
   a) Write a C routine for comparison of two Strings using   [4]
      Pointers.
   b) Explain function pointer /pointer to function. Write C   [4]
      code to add two matrix using function pointer.

Q.2)   Attempt any **one**
   a) Explain the Following terms with suitable examples   [4]
      (any **Two**)
         1. Data Structures
         2. Linear Data Structures
         3. Non Linear Data Structures
         4. Ephemeral Data structures
   b) Write importance of time complexity of algorithm. How   [4]
      it is calculated? Explain with suitable example.

Q.3)   Attempt any **one**
   a) Write pseudo code for recursive binary search.   [6]
      Calculate its time complexity. Is the time complexity
      same as non-recursive binary search? If yes, state
      your observation about recursive algorithm and time
      complexity.
   b) Consider the following set of numbers. Sort it using   [6]
      selection and bubble sort. Write Pass wise output, and
      time complexity after sorting. (45,56,67,89,100)

Q.4)   Attempt any **one**
   a) Explain linear data structure using Sequential   [10]
      organization ? Limitations of sequential organization ?

      Write possible way to represent 1 variable and 2
      variable polynomial using sequential organization?

b) Write Pseudo code to find Fast Transpose of the sparse matrix . Write its time complexity, space complexity, disadvantages over simple sparse transpose . [10]

Consider a two dimensional array of Mat[20*4] and its base address is 2000 , 16 bit addressing scheme . Find the address of Mat[10,2] using row major and column major address

Q.5) Attempt any **one**

a) Define and show node structure of Singly linked list(SLL) . Write C code to insert a node at first, delete a node from last in SLL. [13]
Discuss Concept of GLL and its node structure. Write application of GLL. Draw GLL for given list : (a,(a,b),b,c,d,(e,f)) .

b) Compare doubly linked list over singly linked list. Write display reverse operation for doubly linked list and singly linked list. [13]
Write C code to insert a node in already sorted linked list. Show pictorial representation before and after insertion.

Q.6) Attempt any **one**

a) Write an algorithm to convert infix expression to postfix expression. Execute your algorithm to convert the given infix expression (a+b*c^3-f) to postfix expression. Show the stack content during conversion. [13]
Write in detail ADT for Simple Queue. Explain the Limitations of Simple Queue with example.

b) State the Advantages of Circular Queue over Ordinary (simple) Queue? Write any two applications of Queue? Write C function to add and delete an element in circular Queue. [13]
Evaluate the following expression show stack content
ab+cd-/e*, a=2,b=4,c=5,d=10,e=4
What will be the content of stack after evaluation of – operation?

Pa 2 of 2