UG Odd Semester (CBCS) Exam., December—2016

COMPUTER SCIENCE

(3rd Semester)

Course No. : MCS–303 (C)

(Data and File Structures)

Full Marks : 75
Pass Marks : 30

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from eah Unit

UNIT—I

1. *(a)* What do you mean by abstract data type? 3

(b) Explain the representation of 2-D array in memory. 3

(c) Differentiate between malloc( ) and calloc( ). 4

(d) Write a function to create a copy of a single-link list. 5

2. *(a)* What is data structure? Compare between static and dynamic data structure. 1+3=4

(b) Write a short note on sparse arrays. 5

(c) What is the use of free( )? 2

(d) What are the advantages and disadvantages of linked list? 2+2=4

UNIT—II

3. *(a)* Write an algorithm to implement stack using queue. 5

(b) Convert the following infix expression to prefix expression : 5

A (B C) D / E

(c) Write a recursive function to find factorial of a number. 5

4. *(a)* Evaluate the following postfix expression using stack : 5

23 ^1 42 / 6 31 2 /

(b) Write an algorithm to check validity of an expression containing nested parentheses. 6

(c) Write a short note on priority queue. 4

UNIT—III

5. *(a)* Define height, path and degree of a tree. 3

(b) Prove that the minimum number of nodes possible in a binary tree of height h is equal to h. 3

(c) Construct a binary tree from the following traversal : 6

In-order : B D E A F G C

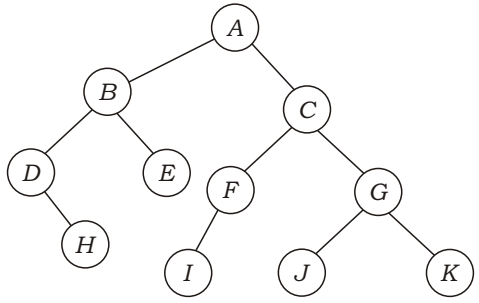
Pre-order : A D B E G F C

(d) Define AVL tree. 3

6. *(a)* What do you mean by complete binary tree? Give example. 1+1=2

(b) Write an algorithm of pre-order traversal of a tree. 5

(c) What is the post-order traversal of the following tree? 2



(d) Create a binary search tree from the following data : 6

45 32 70 67 21 85 92 40

UNIT—IV

7. *(a)* Write an algorithm for bubble sort. 5

(b) Compare between selection sort and insertion sort. 3

(c) What are the limitations of quicksort? 3

(d) Sort the following elements of array by merging : 4

25 20 34 13 19 5 21 89 3

8. *(a)* Write an algorithm of binary search. 5

(b) Sort the following elements of array by selection sort : 5

52 20 34 13 5 19 89 3 21

(c) Create a max heap from the following data : 5

25 35 18 9 46 70 48 23
78 12 95

UNIT—V

9. *(a)* What do you mean by connected graph? 3

(b) Write a short note on spanning tree. 5

(c) Apply depth-first search on the following graph taking, 0 as the starting vertex. 7

10. *(a)* What is directed graph? 2

(b) Write an algorithm of breadth-first search. 3

(c) What is hash function? Explain the chaining method to solve collision. 1+4=5

(d) Write a short note on indexed sequential file organization. 5

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