**SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY**

**COMPUTER ENGINEERING DEPARTMENT**

**DATA STRUCTURES (2130702)**

**Question Bank-Module Test**

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| **UNIT-1 INTRODUCTION TO DATA STRUCTURE** | | | | | | |
| **Sr. No.** | | **Question** | **Year** | | **No. of Occurrences** | |
| 1 | | Define data structure. List out types of Data Structure and explain them in brief./ Differentiate the following terms:  Primitive and Non Primitive Data structure  Linear and Non Linear Data structure. | December 2009/Rem May2011/ May 2012/ December 2010/ December 2011  Winter 2013/  Rem May 2011 | | 07 | |
| 2 | | Discuss best case, average case and worst case time analysis with example. | Winter 2014 | | 01 | |
| 3 | | What does abstract data type means? | December 2010 | | 01 | |
| **UNIT-2 LINEAR DATA STRUCTURE** | | | | | | |
| **STACK** | | | | | | |
| 4 | | Write an algorithm to implement PUSH, POP and CHANGE Operations on Stack./ Write an Algorithm to implement Stack Operations. | December-2016/December 2011/ Rem May2011 | | 3 | |
| 5 | | Convert infix expression into Prefix/Postfix format showing stack status after every step in tabular form.   1. (A + B) \* C – D ^ E ^ (F \* G) 2. (A+B)\*D+E/(F+G\*D)+C 3. A/B$C+D\*E/F-G+H 4. a – b / c \* d + e \* f / g 5. (( A –( B +C))\* D) $ ( E +F ) etc. | Summer 2015(New)/Winter 2013/June 2013/ December 2011/  June 2013/  Winter 2013/Winter- 2014/Summer 2015 | | 3 | |
| 6 | | What is recursion? Write a C program for GCD using recursion / Write a C Program for Factorial Number Using Recursion. | December 2010/ December 2010/ Rem May2011 | | 3 | |
| 7 | | Write an algorithm for evaluation of postfix expression and evaluate the following expressions showing every status of stack in tabular form.   1. 5 4 6 + \* 4 9 3 / + \* 2. 7 5 2 + \* 4 1 1 + / - 3. 2 $ 3 + 5 \* 2 $ 2 – 6 / 6 etc. | Winter 2014/  Summer 2016/  December 2009 | | 3 | |
| 8 | | Enlist and briefly explain various applications of stack. | December 2016/  June 2013 | | 2 | |
| **QUEUE** | | | | | | |
| 9 | | Write an algorithm to perform various operations (insert, delete and display) for simple queue. | December 2016/  Winter 2014/  Summer 2016 | | 3 | |
| 10 | | Compare Simple Queue vs Circular Queue. Write an algorithm/program to implement insert/delete operation into a Circular Queue using array representation of Queue | December 2011/ Rem May 2011/ Summer- 2015/Summer-2016/Summer 2016 | | 5 | |
| 11 | | Explain following:  (i) DQUEUE (ii) Priority Queue(iii) Circular Queue | December 2009/  Summer 2016 | | 2 | |
| 12 | | Consider the following queue, where queue is a circular queue having 6 memory cells.  Front=2, Rear=4  Queue: \_, A, C, D, \_, \_  Describe queue as following operation take place:  F is added to the queue  Two letters are deleted  R is added to the queue  S is added to the queue  One letter is deleted | December 2010 | | 1 | |
| **LINKED LIST** | | | | | | |
| 13 | | Compare Linked List and Array. | Summer 2016/  Winter 2014 | | 2 | |
| 14 | | Write ‘C’ functions / C Program (1) insert a node at the end (2) delete a node from the beginning (3) insert a node at the beginning (4) delete a node at the end of a Singly Linked List /Doubly linked list/ / Circular Linked list. | Summer 2015 / Summer- 2016/Winter- 2014/Winter 2013/  June 2013 | | 5 | |
| 15 | | Write an advantage of link list, doubly link list and circular link list. (ii) Explain – Why doubly linked lists are much more efficient with respect to deletions than singly linked lists? | December 2014/ December 2011/Rem May 2011/December-2010/Summer 2015 | | 5 | |
| 16 | | Write a Program to perform all (create, insert, delete, display) the operations in a Singly Linked List/Doubly Linked List/Circular linked list. | Summer 2016/Winter- 2016/Summer-2015/Winter 2014 | | 4 | |
| **UNIT-3 NON-LINEAR DATA STRUCTURE-Tree** | | | | | | |
| **TREE** | | | | | | |
| 17 | | Define following terms related to tree with example  (1) Binary tree  (2) Binary search tree  (3) Strictly binary tree  (4) Complete binary tree | Rem March 2010/  June 2013 | | 2 | |
| 18 | | Construct binary search tree for the following data  10,3,15,22,6,45,65,23,78,34,5  Find its inorder, preorder and postorder traversal. | 4-5 times with different data | | 4 | |
| 19 | | Write a short note on threaded binary tree. | December 2010/  Rem May 2011/  Winter 2013 | | 3 | |
| 20 | | Write an algorithm for binary search method and discuss its efficiency | Summer 2015(New)/  Winter 2014 | | 2 | |
| 21 | | Write recursive ‘C’ functions for (1) in-order (2) pre-order and (3) post-order traversals of binary search tree. | Summer 2015(New) | | 1 | |
| 22 | | Define height of the binary tree. Define height balanced tree with its advantages. Construct a height balanced binary tree (AVL tree) for the  following data  42,06,54,62,88,50,22,32,12,33 | 4-5 times with different data | | 4 | |
| 23 | | With figure, explain the following terms: (1) Depth of a tree (2) Sibling nodes (3) Strictly binary tree (4) Ancestor nodes (5) Graph (6) Minimum spanning tree (7) Degree of a vertex | December 2009/  Winter 2014 | | 2 | |
| **GRAPH** | | | | | | |
| 24 | | Discuss following with reference to graphs.  (i) Directed graph (ii) Undirected graph (iii) Degree of vertex (iv)Null graph (v) Multi graph (vi) Weighted graph (vii) Elementary path (viii) Descendent node | December 2009 | | 1 | |
| 25 | | Define the following term: Path, Cycle, Degree of vertex, Sibling, Height Balanced Tree, Strictly binary tree, in degree. | Winter 2013/  Winter 2014 | | 2 | |
| 26 | | How graph can be represented? Write an algorithm for Breadth First Search Traversal of a Graph | December 2011/ Winter 2013 | | 2 | |
| 27 | | Explain and differentiate BFS and DFS graph traversal method with suitable graph. | Winter 2014/  Winter 2013 | | 2 | |
| 28 | | Write Kruskal’s algorithm for minimum spanning tree and explain with an example. | Summer 2015(New)/  Winter 2016 (New) | | 2 | |
| 29 | | Write Prim’s algorithm for minimum spanning tree with an example | Summer 2016 | | 1 | |
| 20 | | Compare and contrast Prim’s and Kruskal’s algorithm with the help of an example | Winter 2014 | | 1 | |
| **UNIT-4 HASHING AND FILE STRUCTURES** | | | | | | |
| 31 | | What is Hashing? Explain various Hashing Functions | December 2009/ December 2010/ December 2011/Rem May 2011, Summer 2015,Winter-2014,Winter 2013 | | | 7 |
| 32 | | Describe various collision resolution techniques in hashing. | Summer 2015(New) | | | 1 |
| 33 | | Explain the terms: File, Field, Record, Database, Key | December 2009/ December 2010/  Winter 2014 | | | 3 |
| 34 | | Explain Sequential Files and Indexed Sequential Files Structures. | December 2009/ December 2010/ RemMay2011/  May 2012/  Summer 2015(New) | | | 5 |
| 35 | | Explain various multiple key access file organization in brief with advantages and disadvantages of each method. | December 2010/  Winter 2013 | | | 2 |
| **UNIT-5 SORTING AND SEARCHING** | | | | | | |
| 36 | Write a selection sort algorithm and also discuss its efficiency. | | | Winter 2014/  June 2016 | | 2 |
| 37 | Write a ‘C’ program for insertion sort and discuss its efficiency. | | | Summer 2015(New) | | 1 |
| 38 | Apply quicksort algorithm to sort the following data. Justify the steps. 42, 29, 74, 11, 65, 58 | | | January 2016 | | 1 |
| 39 | What is the time complexity of Quicksort algorithm in the worst case? | | | June 2016 | | 1 |
| 40 | What is the worst case time complexity of searching an element in a list? How? | | | January 2016 | | 1 |