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| **Name:**<br>**Enrolment No:** | UPES<br>UNIVERSITY WITH A PURPOSE |

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**
**End Semester Examination, May 2021**

**Course: Data Structures** **Semester: II**
**Program: B.Tech (Cyber Law)** **Time 03 hrs.**
**Course Code: CSEG 1011** **Max. Marks: 100**
**Instructions:**

**SECTION A**

**1. Each Question will carry 5 Marks**
**2. Instruction: Complete the statement / Select the correct answer(s)**

| S. No. | | Marks | CO |
|---|---|---|---|
| Q 1 | #include<stdio.h><br>main()<br>{<br>int a[]={1,2,3,4,5};<br>printf("%d%d%d%d%d",*a,*(a+0),*(0+a),a[0],0[a]);<br>}<br>Output of the following code will be<br>a. 1 2 3 4 5<br>b. 5 4 3 2 1<br>c. 0 1 2 3 4<br>d. 1 1 1 1 1 | **5** | **CO1** |
| Q 2 | void abc(struct node *new1){<br>temp = head;<br>if(head == NULL)<br>head = new1;<br>else{<br>while(temp->next!= NULL)<br>temp = temp->next;<br>new1->prev = temp;<br>temp->next = new1;<br>} }<br>In the above function what the program want to do ?<br>a). deletion from the end<br>b). insertion from the beginning<br>c). insertion from the end<br>d). deletion from the end | **5** | **CO1** |
| Q 3 | Let the following circular queue can accommodate maximum six elements with the following data Front = 2 and Rear = 4<br>queue = _____; L, M, N, ___, ___<br>What will happen after ADD O operation takes place?<br>a) Front = 2 Rear = 5<br>queue = _____; L, M, N, O, ___ | **5** | **CO2** |

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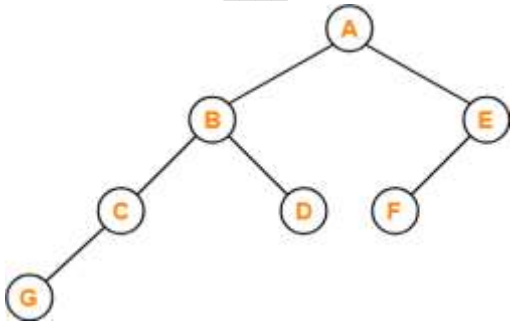
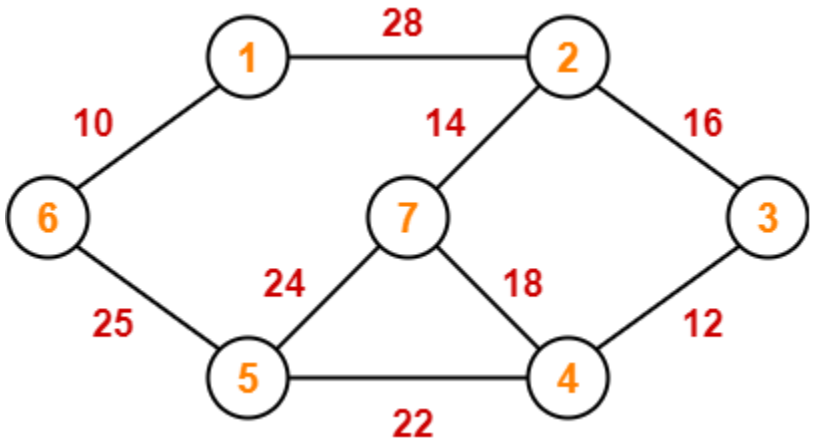
|---|---|---|---|
| | b) Front = 3 Rear = 5<br>queue = L, M, N, O, ___<br>c) Front = 3 Rear = 4<br>queue = _____; L, M, N, O, ___<br>d) Front = 2 Rear = 4<br>queue = L, M, N, O, ___ | | |
| Q 4 | If the binary tree in figure is traversed in inorder, then the order in which the nodes will be visited is ____?<br>  <br><br>a). FEGCBDBA<br>b). GCBDAFE<br>c). GCDBFEA<br>d). FDEGCBA | **5** | **CO3** |
| Q 5 | The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. What will be the value of 5th index ? If the index starts from 0<br>a). 23<br>b). 5<br>c). 15<br>d). 3 | **5** | **CO3** |
| Q 6 | Consider a complete graph G with 3 vertices. The graph G has ____ spanning trees. | **5** | **CO1** |
| **SECTION B**<br>**Each question will carry 10 marks**<br>**Instruction: Write short / brief notes** | | | |
| Q 1 | What is Data Structure? How many types of DS are there? Write down the application of Data structures? | **10** | **CO1** |
| Q 2 | What are circular linked list? WAP to Convert a singly linked list to circular linked list.<br>**OR**<br>What is Double-ended queue? Write functions for following operations?<br>i) Insert at back<br>ii) Delete from back<br>iii) Insert at front | **10** | **CO2** |
| Q 3 | Convert A+ (B * C – (D / E ^ F) * G) * H into postfix form showing stack status. Now add “)” at the end of expression A+ (B * C – (D / E ^ F) * G) * H) and also Push a “(“on Stack. | **10** | **CO3** |

<table>
<tr><td>Q 4</td><td>A file contains the following characters with the frequencies as shown. If Huffman Coding is used for data compression, determine Huffman tree whose edges are assigned with binary values. Write code for each word.<br><br><table><tr><th>Characters</th><th>Frequencies</th></tr><tr><td>a</td><td>10</td></tr><tr><td>e</td><td>15</td></tr><tr><td>i</td><td>12</td></tr><tr><td>o</td><td>3</td></tr><tr><td>u</td><td>4</td></tr><tr><td>s</td><td>13</td></tr><tr><td>t</td><td>1</td></tr></table></td><td>10</td><td>CO2</td></tr>
<tr><td>Q 5</td><td>Construct an AVL Tree with following data: 10 15 9 12 13 79 45 36 22.</td><td>10</td><td>CO3</td></tr>
<tr><td colspan="4">SECTION-C<br>Instruction: Write long answer.</td></tr>
<tr><td>Q 1</td><td>Suppose you have the following hash table, implemented using linear probing. The hash function we are using is the identity function, h(x) =x.<br><table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>9</td><td>18</td><td></td><td>12</td><td>3</td><td>14</td><td>4</td><td>21</td><td></td></tr></table><br>In which order could the elements have been added to the hash table? There are several correct answers, and you should give all of them. Assume that the hash table has never been resized, and no elements have been deleted yet<br>OR<br>Construct the minimum spanning tree (MST) for the given graph using Prim’s Algorithm<br> 
</td><td>20</td><td>CO4</td></tr>
</table>