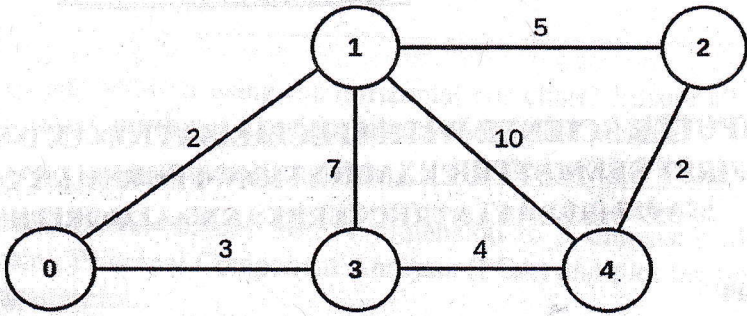


V	<p>a. Illustrate the working of Prim's algorithm using the following graph.</p> 	6																		
	<p>b. Write an algorithm to find all pairs shortest paths in a graph.</p>	4																		
VI	<p>Encode the character sequence AHCDB using Huffman codes & character frequency table given below.</p> <table border="1" data-bbox="352 866 1289 1005"> <tr> <th>Character</th> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td>F</td> <td>G</td> <td>H</td> </tr> <tr> <th>Frequency (%)</th> <td>24</td> <td>4</td> <td>7</td> <td>3</td> <td>25</td> <td>10</td> <td>6</td> <td>21</td> </tr> </table>	Character	A	B	C	D	E	F	G	H	Frequency (%)	24	4	7	3	25	10	6	21	10
Character	A	B	C	D	E	F	G	H												
Frequency (%)	24	4	7	3	25	10	6	21												
VII	<p>I. Write the procedure of insertion of values into a B-Tree with the help of suitable diagrams. Make suitable assumptions regarding the initial state of the tree and the maximum number of values a tree node can hold.</p>	10																		

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M.Sc. COMPUTER SCIENCE WITH SPECIALISATION IN DATA SCIENCE
FIRST SEMESTER EXAMINATION, FEBRUARY 2022
20-359-0103 DATA STRUCTURES AND ALGORITHMS

Time : 3 Hours

Maximum Marks:50

(Answer ANY FIVE questions)
 Each question carries EQUAL Marks

QUESTIONS		MAR KS													
I.	Write an algorithm to evaluate a postfix expression, reading from a list. Also analyse the time complexity of your algorithm.	10													
II.	Write an algorithm to perform insertion and deletion on a singly linked list of integers in which the elements appear in increasing order.	10													
III.	a. A hash table has 11 indexes and it uses linear probing for collision resolution. Show the insertion of the following elements into the hash table; 20, 22, 31, 15, 42, 21, 11, 15. Assume that the hash table is initially empty and let the original hash function be $h(x)=x \bmod 11$.	4													
	b. The array representation of a max-heap is as follows. <div style="text-align: center;"><table><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7</td></tr><tr><td></td><td>50</td><td>30</td><td>15</td><td>19</td><td>20</td><td>10</td></tr></table></div> <p>Sort the elements without using another array. Show the status of the array after every iteration.</p>	0	1	2	3	4	6	7		50	30	15	19	20	10
0	1	2	3	4	6	7									
	50	30	15	19	20	10									
IV	Find the shortest distances from P to all the other vertices in the following graph using Dijkstra's algorithm. Show the shortest distance array after every iteration. <div style="text-align: center;"></div>	10													