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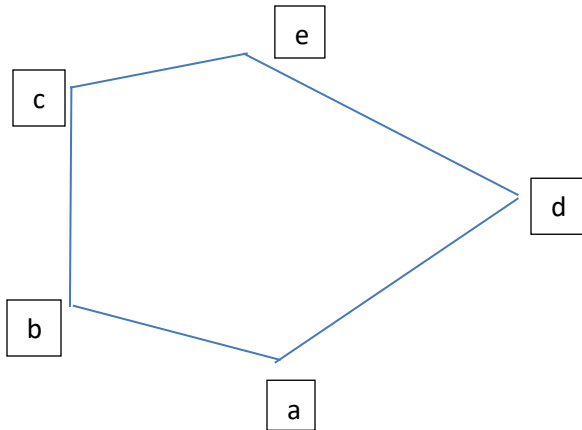
Class: -F.Y.B.Sc C.S	Subject: - Discrete Mathematics
Semester:- I	Course code: -USCS105
Exam Event:- Additional Exam Summer 2024 (FH)	Marks: -75
Date: - 26/03/2024	Duration: - 02:30 Hours

- N.B. –**
- 1 – All questions are compulsory.
 - 2 – All questions have internal choice.
 - 3 – Figures to the right indicate full marks.

Q1. Answer the following question. (Any 4 out of 6)

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1. If $f(x)=X+9$ and $g(x)=X^2+6$ Find $f(g(x))$, $g(f(x))$ for $X=1$ and $X=2$.
2. Consider the recurrence relation $a_n=a_{n-1}+4a_{n-2}$ with $a_{11}=5$ and $a_{12}=9$ and Find a_{10} and a_{13} .
3. To check if every pair of element like ab , bc and so on has least upper bound and greatest lower bound.



4. Let $A= \{1,2,3,4\}$ and $R= \{<1,2>, <2,3>, <3,4>\}$ Find R Find transitive closure and draw its Graph.
5. Find the first 6 terms of sequence define by the following recurrence relation $a_n=a_{n-1}+8a_{n-2}$.
6. Explain Types of Function with their example

Q2. Answer the following question. (Any 4 out of 6)

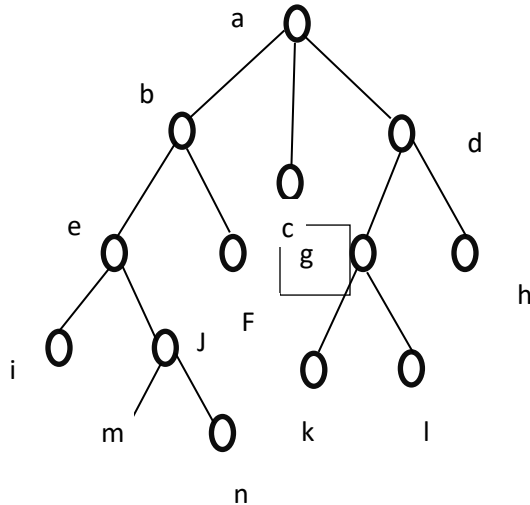
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1. Each user on a computer system has a password which is 8 to 9 characters where each character an upper-case letter or a digit each password must contain at least 1 digit. How many possible passwords are there?
2. Explain Finite Automata with inputs with their example.
3. Find the coefficient of $x^4y^2z^4$ in the expansion of $(x + 2y + 3z)^{10}$.
4. How many ways are there to select a 12st price, 2nd price and 3rd price winner from 100 different people who have enter to the contest.
5. How many different string can be made by recording the letter of the word ‘CLASSROOM’?
6. Show that if there are 30 students in a class then at least 2 have last name that being in with the same letter.

Q3. Answer the following question. (Any 4 out of 6)

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1. Definition of tree and properties of tree graph.
2. Explain Algorithm for deleting in a Binary search tree.
3. What is path connectivity.
4. Explain Representation of graph and their observation.
5. Explain Types of Graph with their example.
6. In which order does a preorder transversal visit the vertices in the ordered rooted tree T shown in Figure.



Q4. Answer the following question. (Any 5 out of 6)

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1. Explain preorder and post order transversal.
2. Explain Binomial theorem, Multinomial theorem and Pascal's identity.
3. Explain the Algorithm-Bubble sort.
4. Explain Basic of Counting Principle.
5. Let A and B be the set such that $|A|=6$ AND $|B|=10$ Find the no. of function from A to B and B to A.
6. Draw all non-isomorphic trees on 6 vertices.