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GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI
DEPARMENT OF INFORMATION TECHNOLOGY
Course Name: Discrete Mathematics Graph Theory
CLASS TEST – II

Course Code :(CSU303) **Duration : 1 hr** **Marks : 15**

Solve any three questions of following each with Five marks

Q1.Given S= {1,2,3,4} and a relation R on S defined by
R= {<1,2>, 4,3>,<2,2>,<2,1>,<3,1>}
Show that R is transitive. find a relation R is subset of R_1 such that R_1 is transitive can you find another relation R_2 which is transitive such that R_2 is subset of R.

Q.2. Given S = {1,2,3,4,.....10} and a relation R on S where
R= { <x,y> | x + y = 10}
What are the properties of relation R?

Q3 . let X = {1,2,3,..... 10}
R= { <x,y> | x – y is divisible by 4}
Show whether R denotes equivalence relation or not? Also draw graph and matrix of R.

Q.4. What do you mean by symmetric difference? Explain symmetric difference with the help of following example.
Given A= {2,3,4,5,6,7,8} , B={1,2,3,4,8,9}, and C ={2,3,4,5,6,7},find A+B,B+C,A+B+C and (A+B)+(B+C).

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Solve Any Three Questions each with 5 marks.

Q1. What do you mean by symmetric difference? Explain symmetric difference with the help of following example.

Given A= {2,3,4,5,6,7,8}, B={1,2,6,7},and C={2,3,4,5,6} find $\bar{A}$+B,B+C,A+$\bar{B}$+C and (A+B)+(B+C).

Q2. Two equivalence relation R and S are given by their relation matrices M_R and M_S .show that RoS is not an equivalence relation.

$$M_R = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad M_S = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}$$

Obtain equivalence relations R_1 and R_2 on {1,2,3} such that $R_1 o R_2$ is also an equivalence relation.

Q3. Explain various properties of relations with the help of example and find the properties of given S= {1,2,.....,12} and a relation R on S where R={<x,y> | x+y =12}.

Q4. What do you mean by composition of binary relation? Let R and S be two relations on a set of positive integers I:

R = {2x, 10x} S = {2x, 15x} Find R°S, R°R, R°R°R and R°S°R