G.N. National Public School, Gorakhpur

TOPIC :- RELATIONS CHAPTER TEST-01 MAX. MARKS - 32

CLASS - XII

TIME :- 1:30 hrs

SECTION-A :- (1 mark Questions)

Fill in the Blanks :-

(1). The Relation R defined on the set $A = \{1,2,3\}$ given by $R = \{(1,2),(2,1)\}$ is neither _____ nor _____.

Objective Type :-

(2). If Relation R is defined as aRb iff "a is the father of b" Then R is (a). Reflexive (b) Symmetric (c). Transitive (d). None of These.

(3). If $R = \{(a,b) : |a+b| = [a+b)\}$ is a Relation defined on a set $A = \{-1,0,1\}$, (where $|\cdot|$ represents Absolute Value) Then, Relation R is (a). Reflexive (b) Symmetric (c). Transitive (d). None of These

(4). Which of the following is an Equivalence Relation?
(a) is father of (b) is Less Than (c) is Congruent to (d). is an Uncle of.

(5). If $R = \{(a,b) : a+b = 4, \forall\ a,b \in N\}$ is a Relation defined on N, then Relation R is
(a). Symmetric (b) Reflexive (c) Transitive (d). Equivalence Relation.

(). Let $A = \{a,b,c\}$ and the Relation R be defined on A as $R = \{(a,a),(b,c),(a,b)\}$. Then, the Minimum Number of Ordered Pairs to be added in R to make the Relation R Reflexive and Transitive is
(a) 2 (b). 3 (c) - 4 (d). 5

SECTION-B :- (2 mark Questions)

Let R be an Equivalence Relation defined on the set $A = \{0,1,2,3,4,5\}$ given by $R = \{(a,b) : 2 \text{ divides } (a-b), \forall\ a,b \in A\}$ Find [0] and [1].

Let $A = \{1,2,3,4\}$. Define a Relation R on A which is Reflexive and Transitive but not Symmetric.

Determine which of the following Relations are Equivalence Relations defined on N? Also, determine the type of Relation for each of the Relation given as :-

(i). $\{(x,y) : x \text{ is greater than } y, \forall\ x,y \in N\}$

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(9). Contd.....

(ii). $\{(x,y) : x+y=10, \forall\ x,y \in N\}$

(iii). $\{(x,y) : xy$ is Square of an Integere, $\forall\ x,y \in N\}$

(iv). $\{(x,y) : x$ is Wife of $y\}$

SECTION-C :- (4 marks Questions)

(10). Determine whether the Relation R_1 defined on the set of all Real Nos. R as $R_1 = \{(a,b) : (a-b+\sqrt{3}) \in S$, where S is the set of all Irrational Numbers, $\forall\ a,b \in R\}$ is Reflexive, Symmetric and Transitive. Also, whether R_1 is an Equivalence Relation on R. Justify with reasons.

(11). Let $A = \{1,2,3,---,8,9\}$ and R be the Relation defined in the set AXA given as $(a,b)R(c,d) \Leftrightarrow a+d = b+c$, $\forall$ (a,b) and $(c,d) \in N \times N$. Prove that R is an Equivalence Relation defined on the set A.

SECTION-D :- (6 marks Questions)

(12). Let $A = \{x \in Z : 0 \le x \le 12\}$. Show that the Relation R defined on the set A as $R = \{(a,b) : |a-b|$ is Divisible by 4, $\forall\ a,b \in A\}$ is an Equivalence Relation on A.

Find the set of all elements related to 1.

Also, find [2].

(13). If N denotes the set of all Natural Nos. and Let R be a Relation defined on NXN as $(a,b)R(c,d) \Leftrightarrow ad(b+c) = bc(a+d)$, $\forall$ (a,b) and $(c,d) \in N \times N$.

Show that R is an Equivalence Relation defined on NXN ?