UNIT-I

GROUP - I

TOPIC - RELATION

1 MARKS QUESTION

1. If A & B are any two non-empty sets, then a subject of A X B is called ....
2. If (x, x) Є R for each element x Є A then the relation R in A is ....
3. If x R y=>yRx ∀x,y Є A,then the relation R in A is..............
4. If (x,y) € R and (y, z) Є R ∀ x, y,Z←A then the relation R in A is.................
5. Write the domain of the Relation
   R = {(-1, 1), (1,1), (2, 4) (-3, 5)}
6. Find the range of relation
   R = {(2, 3), (-1, 2), (0, 1), (4, 5)}
7. If r = $\left\{X, \frac{1}{X}\right\}$: x Є N and $1 \le x \le 4$) . List the elements of R.
8. If A = {1, 2}. How many equivalence relation on set A is possible ?
9. The relation R :{1, 2, 3} →{1, 2, 3} given by R = {(1, 1), (2,2), (3, 3), (1, 2), (2, 3)} is ………………
10. If A = {a, b, c} and R is a relation in A given by
    R = {(a, a) (a, b) (a, c) (b, a) (c, a)}
    Whether R is symmetric or not.
11. Whether the relation R in the set {1, 2, 3) given by R = {(1, 2), (2, 1)} is transitive or not.
12. The relation R in the set A of human brings in a town at a particular time is given by
    R= {(x, y) Є AXA : x is brotherof Y}. Is it symmetric ?
13. If A = {1, 2,3, 4,6} and let R be a relation on a defined by
    R = {(a, b) :a Є A, b € A and a divides b}. List the elements of R.
14. Let R = {(a, a^3) : a is a prime number less than 10}. Find R.
15. If R_1 and R_2 are reflexive relation in a set A, then $R_1 \cap R_2$ is.................... relation.
16. If A = {1, 3, 5}, B = {9, 11} and let R = {(a, b) ∈ A X B : a - b is odd}. Write the relation R.
17. If A = {a, b, c}. How many equivalence relation on the set A is possible.
18. The relation R in the set A of human beings in a town at a particular time given by
    R = {(x, y) : x and y work at the same place} of what type ?
19. If A={3,5,7} and B= {2,4,9} and R is a relation from A to B given by a ≤ b for all a ∈ A and b Є B.
    write R as a set of ordered pair.
20. How many number of equivalence relations are there on the set {3, 4, 5} containing {3, 4} and {4, 3} ?

4 MARKS QUESTIONS

1. Let L be the set of all lines in a place and R be the relation in L defined as R={(L_1, L_2) : L_1 is perpendicular to L_2}. Show that R is symmetric but not transitive.
2. Show that the relation R in the set A= {1,2,3,4,5,6}. Defined as R ={(x, y) :y is divisible by x} is (i) transitive (ii) not symmetric.
3. Let R be the relation in the set A = {1, 2,3, 4} - defined by R = {1,2), (2,2), (1, 1), (4, 4), (1, 3), (3, 3), (3, 2)}. Show that R is (i) reflexive (ii) transitive
4. Show that the relation R = {a, b) : a > b} on N is (i) transitive (ii) not reflexive
5. On the set S of all real numbers. Define a relation R = {(a, b) : 1+ab>0}. Show that R is (i) reflexive (ii) not transitive
6. On the set of all real numbers, define a relation R = {a, b) : a<b^2}. Show that R is (i) not symmetric (ii) not transitive
7. Let A= {1,2,3,4,5,6}. Consider a relation R on A, defined by R= {(a, b) :b =a+1}. Show that R

is (i) not symmetric (ii) not transitive

8. Show that the relation R in the set {1,2,3} given by R = {(1, 1),(2,2),(3,3),(1,2),(2,3)} is (i) not symmetric (ii) not reflexive
9. Give an example of a relation which is (i) symmetric (ii) not transitive
10. Give an example of a relation which is (i) symmetric (ii) not reflexive
11. Give an example of a relation which is (i) transitive (ii) not reflexive
12. Show that the relation R in **R** defined as R={(a,b) : a≤b} is (i)transitive (ii)not transitive
13. Show that the relation R on a set A= {1,2,3,4,..........,14} defined as R={(x,y) :3x-y=0} is neither reflexive nor symmetric
14. Show that the relation R in the set N of natural number defined as R= {(x, y):y=x+5 and x <4} is (i) not reflexive (ii) transitive
15. Give an example of a relation which is (i) reflexive (ii) transitive

6 MARKS QUESTIONS

1. Let A be the set of all lines in xy - plane and R be a relation in A, defined by R = {(L1, L2) : L1 || L2}
   Show that (i) R is reflexive
   (ii) R is symmetric
   (iii) R is transitive
   (iv) Find the set of all lines related to the line y = 3x + 5
2. Show that the relation R in the set A = {x ϵ z : 0≤x≤12} given by .
   R = {(a, b) : |a – b| is a muttipte of 4} is
   (i) reflexive
   (ii) symmetric
   (iii) transitive
   (iv) Find the set of all elements related to 1
3. Let s be the set of all points in a plane and let R be a relation in s defined by
   R = {(A, B) : δ(A, B) < 2 units}, where δ (A, B) isthe distance between points A & B.
   Show that (i) R is reflexive
   (ii) R is symmetric
   (iii) R is not transitive
4. Let R ={(a, b): a, b ∈ Z and (a-b) is divisible by 5}. Show that R is an equivalence relation on Z.
5. Show that the relation R defined in the set A of all polygons as
   R= {(P1,P2): P1 & P2 have same number of slides) is an equivalence relation. What is the set of all elements in A related to the right angle triangle T with sides 3, 4 and 5 ?
6. Let N be the set of all natural number and let R be a relation on N X N defined by
   (a, b) R (c, d) ad = bc $\Longleftrightarrow$
   Show that R is an equivalence relation.
7. Show that the relation R on N X N defined by (a, b)R (c, d)$\Longleftrightarrow$ a +d = b+c is an quivalence relation.
8. Let A be the set of all triangles in a plane. Show that the relation R = {(Δ1,Δ2) : Δ1~ Δ2} is an equivalence relation.
9. show that the relation R in the set A = {1,2,3,4, 5} given by R = {(a, b : |a – b| is even} is an equivalence relation.
10. Show that the relation R in the set Z of integers given by
    R = {(a, b) : 2 divides a - b} is an equivalence relation.
    Or
    Let R={(a,b) :a=b2,a,be N}
    Show that (i) R is not reflexive
    (ii) R is not symmetric
    (iii) R is not transitive