Que 1: Let A={1,2,3,4}

a) Check whether the following relation  $R=\{(1,1),(2,2),(3,4),(4,2)\}$  is reflexive, symmetric or transitive.

b) Write an equivalence relation on A with minimum number of elements.

## c) Show that a relation on A having 5 elements cannot be an equivalence relation. *Marks :(6)*

**Ans:** a) R is not reflexive since (3,3) is not an element of R. It is not symmetric since (3,4) belongs to R, but (4,3) does not belong to R. It is not transitive since (3,4) and (4,2) belong to R, but (3,2) does not belong to R.

b)  $R = \{(1,1), (2,2), (3,3), (4,4)\}$ 

c) Let R be a relation with 5 elements. If R is reflexive, then 4 of its elements will be of the form (a,a) and the fifth element must be of the form (a,b), So R is not symmetric and hence it is not an equivalence relation.

### Que 2: Let A= {1,2,3,4,5,6} and R is a relation on A as R={(x,y): y divides x}

### a) Show that R is reflexive and transitive, but not symmetric

# b) Write another set B with 4 elements on which the above relation R is an equivalence relation. *Marks :(4)*

**Ans:** a) R is reflexive since a divides a for all. R is transitive since c divides b and b divides a implies c divides a.

2 divides 4, but 4 does not divide 2. Therefore R is not symmetric.

### b) $B = \{2,3,5,7\}$

i.e, set of any 4 co-prime numbers.