ASSIGNMENT : Relation & Functions

Q.1 Let n be a fixed +ve Integer. Define a relation R in Z as follows for all a,b ϵZ, aRb if and only if a-b is divisible by n. show that R is an equivalence relation. Also, give an example.

Q.2 Let A={1,2,3……….9} and R be the relation in AXA defined by (a,b) R (c,d) if a+d=b+c for (a,b) (c,d) in AXA. Show that R is an equivalence relation. Also find equivalence class [(2,5)]

Q.3 If N denotes the set of all natural numbers and R be the relation on NXN defined by (a,b) R (c,d) if ad(b+c)=bc(a+d). show that R is an equivalence relation.

Q.4 Show that relation R in set of Real Numbers defined as

a) R={(a,b) : a,b ϵR a$\le b^2$} (b) R={(a,b) : (a,b) ϵ R a$\le b^3$}

is neither reflexive, nor symmetric nor transitive.

Q.5 Let A={1,2,3} Define any two equivalence relation R_1 and R_2 and show that

(a) Intersection of two eq. relation on a set is also an equivalence relation.

(b) Union of any two equivalence relation on a set is not necessarily an equivalence relation.

(c) Inverse of an equivalence relation is also an equivalence relation.

Q.6 Show that the relation R in set A={1,2,3,4,5} given by R ={(a,b) : |a-b| is divisible by 2}

(a) is an equivalence relation.

(b) Also, find all the equivalence classes of R.

(c) Show that any two equivalence classes are either disjoint or Identical.

(d) Show that Union of all equivalence classes gives the whole set.

Q.7 Given a non-empty set X. Consider P(x), the power set of X. Define a relation in P(x) as for subsets A,B in P(x), ARB if ACB. Show that R is reflexive and transitive but not symmetric. Justify with an example. ie. R is also not an equivalence relation.