**15MA302 DISCRETE MATHEMATICS : ASSIGNMENT PROBLEMS**

**(Common to ECE and CSE)**

1. Construct an argument using rules of inference to show that If Arun studies well, then either Balu or Chandru will pass DM, If Balu pass DM then Arun will not study well. If Dravid pass DM then Chandru will not pass DM. Therefore If Arun study well, Dravid will not pass DM.
2. Use mathematical induction to prove that 8*n* – 3*n* is divisible by 5, for *n* ≥ 1.
3. Show that is a valid conclusion from the premises and)
4. Determine the compound proposition is Tautology or Contradiction.
5. Let A = {1, 2, 3, 4, 5}. Determine the truth values of the following statements

(i) (ii) 

1. Prove that , , C by (i) Direct method (ii) Indirect method and (iii) using CP rule.
2. Prove that using indirect method.
3. Show that the premises “One student in this class knows how to write programs in JAVA” and “Everyone who knows how to write programs in JAVA can get a high-paying job” imply the conclusion “Someone in this class can get a high-paying job”.
4. Show that the following set of premises is inconsistent. “If Rama gets his degree, he will go for a job. If he goes for a job, he will get married soon. If he goes for higher study, he will not get married. Rama gets his degree and goes for higher study”.
5. Let A ={1,2,3,4,5,6} with subsets B1 ={1,3,5 and B2 ={1,2,3}. Write the minsets of A and partition of generated by minsets.
6. Define closure of a relation. Find reflexive, symmetric and transitive closure of

R ={(1,2),(2,2), (2,3), (3,2), (4,1), (4,4)} defined on A= {1, 2, 3, 4}.

1. Prove that the relation Congruence modulo m over the set of positive integers is an equivalence relation.
2. If R is the relation on the set of positive integers such that (a, b) ∈ R if and only if a2 + b is even, Prove that R is an equivalence relation
3. Let A={1,2,3,4}and R= {(1,2), (2,3), (3,4), (2,1)} using Warshall’s algorithm find the transitive closure
4. Prove that, in a group of 6 people atleast 3 are mutual friends or atleast 3 are mutual strangers.
5. Obtain the Hasse diagram of where X = {a, b, c}.
6. Draw the Hasse diagram for the posetwhere ≤ is the relation is a divisor of.
7. If seven colours are used to paint 50 bicycles the show that atleast 8 bicycles is of same colour.
8. If f : X → Y and g : Y → Z and both are invertible functions then prove that 
9. State and prove necessary and sufficient condition for a function f is said to be invertible.
10. If f: Z → W is defined by prove that f is one to one and onto and hence find f-1.