DMGT MID-1 ASSIGNMENT QUESTIONS

Set-1

1. List all the Connectives with Truth tables
2. Explain about WFF ? and verify which of the following are WFF’s

a) p v q ∧r b) p→(q∧r) c) ~p↔(q v r) d) (p→q↔ r)) e) p v →q∧r

3) a) Obtain DNF of (~p→r) ∧ (p ↔ q)

b)Obtain PCNF of (p∧q) v (~p∧r)

4) a) Using Rule CP show that p→(q→r), q→(r→s) 🡺 p→(q→s)

b)Show that (x) [P(x) →Q(x)] ∧ ( x) [Q(x) →R(x)] 🡺 (x) [p(x)→R(x)]

5) a) Find all the subsets of sets A= { 0,₼} and B={0,{1,2}}.

b) Determine the sets A and B , given that A-B = {1,2,4}, B-A={7,8} and A U B = {1,2,4,5,7,8,9}.

Set-2

1) State all laws of logic and validate using truth tables

2) a) Show that (~p ∧ (~q∧r)) v(q∧r)v(p∧r) ≡ r without using truth table

b) ~(p↔q) ≡(p v q) ∧~( p∧q) using truth table

3) a) obtain CNF for (q→p)∧ (~p ∧ q).

b) obtain PDNF for ( p v r) ∧ (pv~q)

4) a) Show that A🡪(B🡪C),D🡪(B∧~C),A∧D are inconsistent

b) **∃** (x)[P(x)∧Q(x)]🡺 **∃** (x)P(x) ∧ **∃** (x) Q(x)

5) State the principle of inclusion and exclusion with an example.

Set -3

1) State duality law? Write the duals for the following?

a) (p v q) ∧ r d) p → q

b) (p ∧ q) v T e) p ↔ q

c) ~ (p v q) ∧ (p v ~ (q ∧ ~s)) f) p v q

2 a) Express (p ↓ q) in terms of ↑ only

b) Express (p ↑ q) in terms of ↓ only

c) Show that p ↓ (q ↓ r) ≡ ~p v (q v r)

3 a) Show that s v r is tautologically implied by p v q, (p → r), (q → s).

b) Show that ~p is valid inference from ~ (p ∧ ~q), ~q v r, ~r.

4 a) Using predicate logic; prove the validity of the following argument.

“Every husband argues with his wife”

x is a husband

Therefore, x argues with his wife.

b) Prove the principle of Mathematical induction that

P (n):

5 ) A computer company requires 30 programmers to handle system programming jobs, 40 programmers for application programming. If the company appoints 55 programmers to carry out the jobs, how many of these perform jobs of both types? How many handle only system programming jobs and only application programming jobs.

Set-4

1. Explain about tautology,contradiction and contingency with examples.
2. Write formulas which are equivalent to the formulas given below and which contain the connectives(∧) and (~) only.
3. ~ (P ↔ (Q →(r v p)))

b) ( (p v q) ∧ r ) →(p v r)

3)a) obtain CNF for (p→( q∧ r)) ∧ ( ~p → ( ~q ∧ ~r) ).

b) obtain PDNF for ( q v (p ∧ r)) ∧~(( p v r) ∧ q))

4) a) show the following using indirect method (s →~ q), (s v r), ~r, ~r ↔ q ⇒ ~p

b) prove by induction 1.2.3+2.3.4+3.4.5+………+n(n+1)(n+2) = n(n+1)(n+2)(n+3) ,for all n € N

5) Define set and write any 5 types of sets with examples.