PVP 14

Code: IT1T4, IT2T7RS

I B.Tech - I Semester – Regular / Supplementary Examinations November 2017

DISCRETE MATHEMATICS
(INFORMATION TECHNOLOGY)

Duration: 3 hours | Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22 M

1.
- a) Check whether PV[~(P $\wedge$ Q)] is Tautology.
- b) Prove that (P $\rightarrow$ ~Q) $\Leftrightarrow$ (Q $\rightarrow$ ~P).
- c) Symbolize the statement "There exists a positive integer that is even".
- d) Write down the negative of "All even numbers are multiples of 4".
- e) Show that the complement of an element of a distributive lattice is unique.
- f) Draw the diagram of the graph G=(V, E) where V={A,B,C,D}, E={(A, B),(A, C),(A, D),(C, D)}.
- g) How many vertices and how many edges are there in the complete bipartite graph $K_{7,11}$.
- h) Find the number of permutations of letter of the word MISSISSIPI.
- i) A woman has 11 close relatives. In how many ways can she invite 5 of them to a dinner.

j) Find the generating function of the sequence 0,1,-2, 3, -4, ………………..

k) Solve the recurrence relation $a_n + a_{n-1} - a_{n-2} = 0$ for $n \geq 2$ given that $a_0 = -1, a_1 = 8$.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2.a) Obtain the principal disjunctive normal form of (~P)VQ.

8 M

b) Prove that [PVQV(~P $\wedge$ ~Q $\wedge$ R)] $\Leftrightarrow$ (PVQVR). 8 M

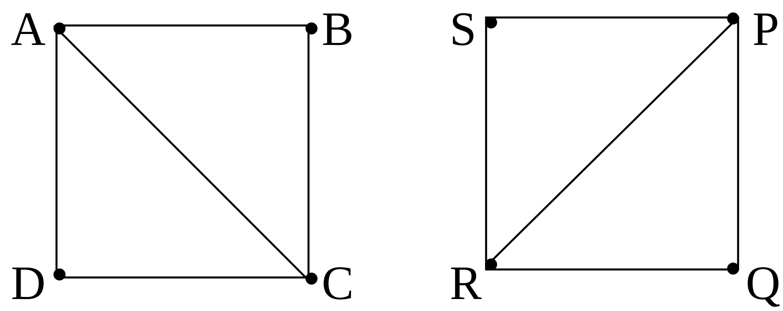
3.a) Test whether the following is a valid argument:

If Sachin gets century, then he gets free car.

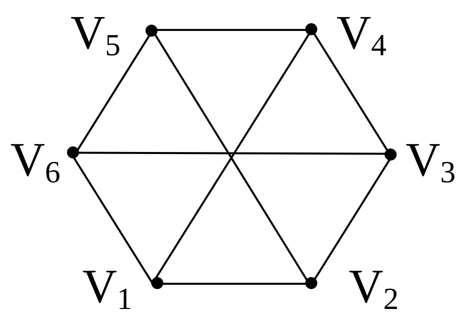
Sachin gets free car. 8 M

b) Let A={1,2,3,4,6} and 'R' is a relation on 'A' defined by aRb if and only if 'a' is a multiple of 'b'. Represent the relation R as a matrix and draw its digraph. 8 M

4.a) Show that the following graphs are Isomorphic. 8 M



b) Find the chromatic number of the following graph. 8 M



5.a) In how many ways can 7 women and 3 men be arranged in a row if 3 men must always stand together? 8 M

b) Prove the following identities:

i) C (n+1, r)=C (n. r-1)

ii) C (m+n, 2) = C (m, 2) + C (n, 2) +mn 8 M

6. Solve the recurrence relation by using characteristic roots $a_n + 4a_{n-1} + 4a_{n-2} = 8$ for $n \geq 2$ given that $a_0 = 1$ and $a_1 = 2$. 16 M