PVP 14

Code: IT1T4

I B.Tech - I Semester – Regular Examinations - January 2015

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) Write the truth table for $p \rightarrow (p \vee q)$.
   b) Construct the truth table for NOR function.
   c) Write the Opposite of $p \rightarrow q$.
   d) Symbolize the statement " No dogs are intelligent" and "All babies are illogical".
   e) Define Planar graph.
   f) Define Chromatic number.
   g) How many different license plates are there that involve 1, 2 or 3 letters followed by 4 digits.
   h) How many different outcomes are possible from tossing 10 similar dice?
   i) Write the generating function for the sequence defined by $a_r = (-1)^r 3^r$.
   j) Solve the recurrence relation $a_n = a_{n-1} + n^2$ where $a_0 = 7$.
   k) Find the coefficient of X^{10} in $\frac{1}{(1-X)^3}$.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Construct the truth table for $\{[(p \vee q) \rightarrow r] \wedge (\neg p)\} \rightarrow (q \rightarrow r)$. 8 M

   b) Find the disjunctive normal form of the compound proposition $\{q \vee (p \wedge r)\} \wedge \neg\{(p \vee r) \wedge q\}$. 8 M

3. a) Prove or disprove the validity of the following argument:
   All men are fallible.
   All kings are men.
   Therefore, all kings are fallible.
   8 M

   b) Prove by Mathematical Induction that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for each positive integer n. 8 M

4. a) Find the Transitive closure of 'R' if R={(a,a), (a,b), (b,c), (b,d), (d,c), (d,d)}. 8 M

   b) A complete graph K_n, is planar iff $n \leq 4$. 8 M

5. a) How many integral solutions are there of

$x_1 + x_2 + x_3 + x_4 = 20$

if $1 \leq x_1 \leq 6,\quad 1 \leq x_2 \leq 7,\quad 1 \leq x_3 \leq 8,\quad 1 \leq x_4 \leq 9$?

8 M

b) i) How many 5-card hands consists only of hearts?

ii) How many 5-card hands consists of cards from a single suit?

8 M

6. Solve the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = n(n-1)$ for $n \geq 2$.

16 M