9228

[This question paper contains 2 printed pages]
Unique Paper Code : 2513012003
Name of the Course : B.Sc.(H) Electronics (DSE)
Name of the Paper : Mathematical Foundation for Computing
Semester : III
Duration : 3Hr.
Maximum Marks : 90

Instructions for Candidates

1. There are seven questions in all, out of which you have to attempt any five questions
2. All questions carry equal marks
3. Sub-parts can be given
4. The first question is Compulsory

Q1. (a) How many 5-digit numbers are possible that are greater than 40000, with the digits 1, 2, 3, 4, and 5? (3)
(b) Compare Combinations and Permutations with appropriate examples. (3)
(c) Find the generating function of the sequence 1, 3, 3^2, 3^3..... (3)
(d) What is a recurrence relation and give an example? (3)
(e) Briefly write about the properties of trees. (3)
(f) Find the negative of $p \rightarrow q$

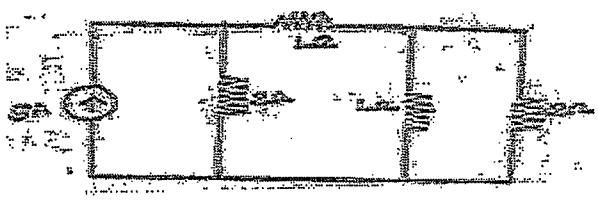
Q2. (a) Prove that $(P \uparrow Q) \rightarrow R$ and $(P \wedge Q) \wedge R$ are logically equivalent. (10)
(b) Identify whether $(P \vee Q) \vee \sim R$ is a tautology or not. (8)

Q3. (a) State and explain the Binomial theorem with an example. (9)
(b) Suppose 14 students in a class appear at a university examination. Prove that there are at least two among them whose seat number differs by a multiple of 13. (9)

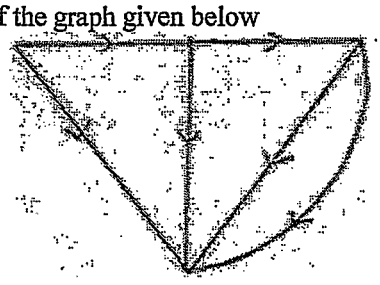
Q4. (a) Solve the recurrence relation $a_n-6a_{n-1}+8a_{n-2}=9$, $n>=2$, $a_0=10$, $a_1=25$ by using the generating function. (9)
(b) Solve the recurrence relation $a_n-2a_{n-1}+8a_{n-2}=0$ $n>=2$, $a_0=5$, $a_1=31$ (9)

Q5. (a) Find the coefficient of x^2y^3z in the expansion of $(x + y + z)^6$. (10)
(b) Differentiate between PDNF and PCNF with two examples. (8)

Q6. (a) Explain the following term
(i)Planar Graph (ii) Non-Planar Graph (iii) cutset (iv) tieset (6)
(b) Find the cutset matrix of the circuit given below (6)



(c) Find the tieset matrix of the graph given below (6)



Q7. (a) Use the Quine-McCluskey method for (12)
f(a, b, c, d)=Σm(0, 1, 5, 6, 8, 9, 11,13) + Σd(7, 10,12) to

1. Complete the Quine-McCluskey table and identify all the prime implicants.
2. Use the prime implicant chart to determine a minimum Sum-of-Products (SOP) expression for the function.

(b) Reduce the given function F(A,B,C,D)= Σ (1,2,3,5,8,10,11,12) using Karnaugh Map method (6)