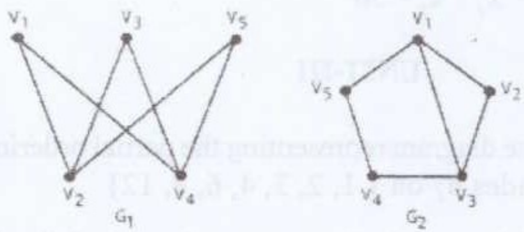
UNIT-IV

7. a. Verify whether the following two graphs are isomorphic or not. **8M**



b. What is the chromatic number of the complete graph K_n, path P_n and cycle C_n? **7M**

(or)

8. a. Explain Euler and Hamiltonian circuits in detail with an example. **8M**

b. Draw K_4 and K_6 graphs. Are they planar? For which values of n do you think K_n is planar? **7M**

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CS/IT 3003

II/IV B.Tech. DEGREE EXAMINATION, JANUARY, 2014

Third Semester

DISCRETE MATHEMATICAL STRUCTURES

Time : 3 hours ***Max. Marks : 70***

Part-A is compulsory

Answer One Question from each Unit of Part-B

PART-A

10 x 1 = 10M

a. Write the inverse and converse of 'Students score good marks whenever they study'.

b. Define Product-Of-Sums expansion.

c. Define Contradiction. Give an example.

d. What are the number of distinguishable permutations of the letters in the word BANANA?

e. Write the generating function for the series $x + 2x^2 + 3x^3 + 4x^4 + \ldots$

f. What is the explicit formula for Tn if the sequence defined by the following recurrence relation is $T_n = nT_{n-1}$ with initial condition $T_1 = 7$?

g. When is a lattice called complete?

h. How many edges are there in an undirected graph with two vertices of degree 6, four vertices of degree 5 and the remaining four vertices of degree 4?

i. Define circuit and path with examples.

j. State Euler's formula for connected planar graph.

PART-B

4 x 15 = 60M

UNIT-I

a. Without using truth tables, find the PDNF form for $(\neg p \rightarrow q) \wedge (q \leftrightarrow p)$ **7M**

b. Let Q(x, y) be the statement 'x has sent an e-mail to y', where the domain for x and y consists of all students in your class. Express each of these quantifications in English. **8M**

i) $\exists x\ \forall y\ Q(x, y)$ ii) $\exists y\ \forall x\ Q(x, y)$

iii) $\forall y \exists x\ Q(x, y)$ iv) $\forall x \exists y Q(x, y)$

(or)

a. Using truth table show that
$\neg (p \vee (q \wedge r) \leftrightarrow ((p \vee q) \wedge (p \rightarrow r))$ **7M**

b. Translate each of the following statements into symbols, using Quantifiers, Variables and Predicate symbols **8M**

i) Not all birds can fly

ii) There is a student who likes mathematics but not history

UNIT-II

a. Find the coefficient of x^{10} in $(1 + x + x^2 + \ldots)^2$ **7M**

b. Using generating function, solve the recurrence relation $a_k = 3a_{k-1}$, $k = 1, 2, 3, \ldots$ and the initial condition $a_0 = 2$ **8M**

(or)

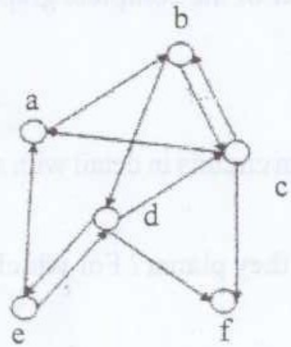
4. a. What is the solution of the recurrence relation $a_n = 6a_{n-1} - 9a_{n-2}$ with $a_0 = 1$ and $a_1 = 6$? **8M**

b. Find the number of non-negative integral solutions to $x_1 + x_2 + x_3 + x_4 + x_5 = 50$ **7M**

UNIT-III

5. a. Draw the Hasse diagram representing the partial ordering $\{(a, b) \mid a \text{ divides } b\}$ on $\{1, 2, 3, 4, 6, 8, 12\}$ **8M**

b. Obtain the incidence and adjacency matrix of the following graph **7M**



(or)

6. a. Consider the poset $(\{1\}, \{2\}, \{4\}, \{1, 2\}, \{1, 4\}, \{2, 4\}, \{3, 4\}, \{1, 3, 4\}, \{2, 3, 4\}, \leq)$

i) Find the maximal elements

ii) Find the minimal elements

iii) Is there a least element? **8M**

b. Give an example of a relation on a set that is

i) both symmetric and anti-symmetric

ii) neither symmetric nor anti-symmetric **7M**