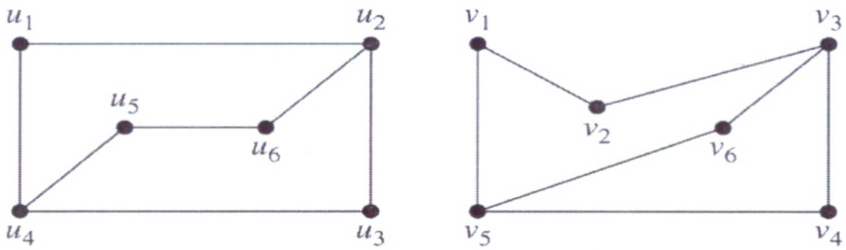

G *H*

b. State and prove Grinberg's theorem. **7M**

(or)

8. a. What is $\chi(Kn)$? Which graphs have chromatic number 1, 2, 3 & 4? **8M**

b. With an example, explain sum of degrees theorem. **7M**

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VR10

CS/IT 3003

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

Third Semester

DISCRETE MATHEMATICAL STRUCTURES

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

Part-A is compulsory

Answer One Question from each unit of Part-B

PART-A

10 x 1 = 10M

a. Show that the propositions $p \rightarrow q$ and $\neg p \vee q$ are logically equivalent.

b. Translate this statement into English, where C(x) is 'x is a comedian' and F(x) is 'x is funny' and domain consists of all people $\exists x(C(x) \rightarrow F(x))$

c. Find the value of each of these quantities
i) P (7, 3) ii) C (9, 5)

d. Write the generating function for the sequence 1, a, a^2, a^3, a^4,....

e. A person deposits \$1000 in an account that yields 9% interest compounded annually. Set up a recurrence relation for the amount in account at the end of 'n' years.

f. Define composite of relations with an example.

g. What is a POSET? Give an example?

h. Let G =(V, E) be an undirected graph. With 'e' edges, show that $2e = \sum deg(v)$

i. Define graph coloring and chromatic number. What is the chromatic number of a wheel?

j. Define transitive closure with an example.

PART-B

4 x 15 = 60M

UNIT-I

1\. a. Show that $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent by developing a series of logical equivalences. **7M**

b. Let L(x, y) be the statement "x likes y". Domain for x is students and domain for y is subjects in engineering. Use quantifiers to express each of the following statements.

i) Everybody likes maths

ii) There is a course which everybody likes

iii) There are courses which few students like **8M**

(or)

2\. a. Obtain the PDNF of the formula $p \rightarrow (p \wedge (q \rightarrow p))$. **7M**

b. Use De Morgan's laws to find the negation of each of the following statements.

i) Rita is rich and happy

ii) Jane will bicycle or run tomorrow **8M**

UNIT-II

3\. a. Find the coefficient of $x^5 y^8$ in $(x + y)^{13}$. **7M**

b. Solve the recurrence relation using generating functions $a_n - 5a_{n-1} + 6a_{n-2} = 2^n + n$ for $n>=2$, given $a_0 = 1$ and $a_1 = 1$ **8M**

(or)

4\. a. What is the solution of the recurrence relation $a_n = -a_{n-1} + 4a_{n-2} + 4a_{n-3}$ with $a_0 = 8$, $a_1 = 6$ and $a_2 = 26$? **8M**

b. How many integral solutions are there for $x_1 + x_2 + x_3 + x_4 + x_5 = 30$ Where $x_1>=2$, $x_2>=3$, $x_3>=4$, $x_4>=2$, $x_5>=0$? **7M**

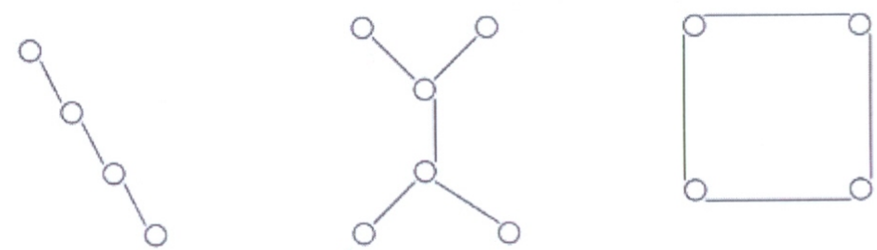
UNIT-III

5\. a. Consider the set A = {2, 7, 14, 28, 56, 84} and the relation $a \leq b$ if and only if a divides b. Give the Hasse diagram for the poset $(A, \leq)$. **8M**

b. Explain the need of Warshall's algorithm. Let A = {1, 2, 3, 4} and let R = {(1, 2), (2, 3), (3, 4), (2, 1)}. Find the transitive closure of R using Warshall's algorithm. **7M**

(or)

6\. a. What is a Lattice? Which of the following are lattices and why? **8M**



(a) (b) (c)

b. Explain concepts of Digraphs and Binary relations with examples in detail. **7M**

UNIT-IV

7\. a. Define whether the following graphs are isomorphic or not. Justify your answer. **8M**