Code No. 6206

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I-Semester (Main) Examination, November/December, 2009

Subject : DISCRETE STRUCTURES

Time : 3 Hours] [Max. Marks : 75

Note : Answer *all* questions from **Part - A**. Answer *any five* questions from **Part - B**.

PART - A (25 Marks)

1. Give an example of three sets, W,X,Y such that $W \subseteq X$ and $X \subseteq Y$ but $W \not\subset Y$. 2

2. Show that $(\neg p \vee q) \wedge (p \wedge (p \wedge q)) \Leftrightarrow (p \wedge q)$. 3

3. If there are 12 pairs of different coloured socks in a laundry bag. At most how many socks should be drawn to get a matched pair. 2

4. Give an example of antisymmetric relation. 3

5. Write a Recurrence Relation to find a factorial of a given number. 2

6. Find the number of integral solutions to the equation 3
$x_1 + x_2 + x_3 + x_4 + x_5 = 30$ for $x_i \geq 1$ for $i = 1, 2, 3, 4, 5$.

7. What is meant by Homomorphism ? 2

8. Define a Group. 3

9. What is a chromatic number ? Give the Chromatic number for a wheel graph. 3

10. Define Minimum Spanning Tree. 2

Contd...2

PART - B (50 Marks)

11. (a) Obtain converse, Inverse, contrapositive for $\forall x\ [p(x) \rightarrow q(x)]$.

(b) If m is an even integer, prove that $m+7$ is odd.

12. Find the number of integers between 1 and 1000 inclusive, which are divisible by none of 5, 6 or 8.

13. Solve the recurrence Relation :

$F_{n+2} = F_{n+1} + F_n$ where $n \geq 0$

$F_0 = 0$; $F_1 = 1$.

14. (a) What is a Semi - Group ? Explain its properties under Homomorphism.

(b) Explain the principle of Hamming code.

15. (a) Find the transitive closure of directed graph given by relation $R = \{(a, b)\ (b, a)\ (b,c)\ (c, a)\ (c, d)\ (d, a)\}$ on set $A = \{a, b, c, d\}$.

(b) Define cut set and Tie set with example.

16. (a) Find the Co - efficient of x^5 in $(a-2x)^{-7}$.

(b) Show that any graph with 4 or fewer vertices is planar.

17. (a) Count the number of integral solutions to $x_1 + x_2 + x_3 = 20$ with $2 \leq x_1 \leq 5$, $4 \leq x_2 \leq 7$, $-2 \leq x_3 \leq 9$.

(b) Prove that a tree with n vertices has exactly $(n-1)$ edges.

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