**Code No. IT 14211**

**CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (Autonomous)**

**B E/B Tech (IT) II Yr I - Sem (Main) Examination Dec 2014/Jan 2015**

**DISCRETE STRUCTURES**

**Time : 3 hours Max Marks : 75**

**Note:**Answer all questions from **Section-A** at one place in the same order

Answer any **five** questions from **Section-B**

**SECTION-A (25 Marks)**

1. Define complete lattice and give an example. (3)

2. Explain pigeon hole principle (2)

3. In how many ways can a president and vice president be chosen from a set of 30 candidates? (3)

4. Is P Q~ P Qa tautology or a fallacy? (2)

5. Define contingency with a truth table? (2)

6. Define Distributive law and give its truth table? (3)

7. Write all different quantifiers for P(x,y): x teaches y (3)

8. Define planar graph? (2)

9. Define Hamiltonian circuit and Euler path. (2)

10. Disprove the statement that “every positive integer is the sum of atmost two squares and a

cube of non-negative integers. (3)

**SECTION-B** **(50 Marks)**

11. (a) Show that S R is tautologically implied by P QP RQ S. (5)

(b) Express the following statement as a disjunction (in DNF) (5)

also using quantifiers:

***There does not exist a woman who has taken a flight on every airline in the world.***

**PTO**

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12. (a) Let L be a distributive lattice. Show that if there exists an ‘a’ with (3)

a x a y and a x a y, then x y.

(b) Find the coefficient of X20 in ( X3 + X4 + X5 +......... . )5 (7)

13. (a) Solve the recurrence relation (5)

T(k) = 2 T(k -1), T(0) =1.

(b) What is the principle of inclusion and exclusion? Determine the number of integers (5)

between 1 and 250 that are divisible by any of the integers 2, 3, 5 and 7.

14. (a) The graph Cn, n ≥ 3 consists of n vertices and n edges making a cycle. For what value of n

is Cn a bipartite graph? Draw the bipartite graph of Cn to justify your answer. (5)

(b) Let R be the relation on the set of ordered pairs of positive integers such that

a, b, c, dR if and only if ad = bc. Determine whether R is an equivalence relation or

a partial ordering. (5)

15. (a) Briefly explain Prim’s algorithm with an example. (6)

(b) Explain chromatic number of a graph with an example. (4)

16. (a) Show that the relation R on a Set A is symmetric if R = R-1, where R-1 is the (5)

inverse relation

(b) Consider the set A = {2, 7, 14, 28, 56, 84} and the relation a  b if and only if a 5 divides

b. Give the Hasse diagram for the poset (A,  ). (5)

17. What do you mean by a minimal spanning tree? Explain DFS method for finding a spanning

tree with an example. (10)