**Code No.: IT15211S**

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

**BE (IT) II Yr I-Sem (Suppl) Examination May/Jun 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 poset and give an example (3)

2. The number of distinguishable permutations of the letters in the word BANANA are

\_\_\_\_\_\_\_\_\_\_ (2)

3. List any four generating functions (2)

4. P→Q is logically equivalent to \_\_\_\_\_\_\_\_\_\_ (2)

5. Define fallacy with an example (3)

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

7. Differentiate between permutation and combination? (2)

8. Define trivial graph with an example. (3)

9. Define symmetric and reflexive properties? (3)

10. Define Isomorphism with an example. (3)

**Section-B (50 Marks)**

11. (a) State DeMorgan’s law. Prove it using the truth table. (6)

(b) For each of the following functions, determine whether it is one-to-one and determine

its range (4)

i) f : z → z ; f(x) = 2x+1 ii) f : Q → Q ; f(x) 2x+1

iii) f : z → z ; f(x) x3 – x iv) f : R → R ; f(x) = ex

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12. (a) Given n pigeons to be distributed among k pigeonholes. What is a necessary and

sufficient condition on n and k that, in every distribution, at least two pigeonholes must

contain the same number of pigeons? (3)

(b) Prove the proposition that in a room of 13 people, 2 or more people have their birthday

in the same month (3)

(c) Show that n 3 + 2n is divisible by 3 (4)

13. (a) Find a recurrence relation for the number of ways to arrange flags on a flagpole n feet

tall using 4 types of flags: red flags 2 feet tall, white, blue and yellow flags each are one

foot tall (5)

(b) Let L be a bounded distributive lattice. Show that if a complement exists it is unique (5)

14. (a) What are the different types of quantifiers? Explain in brief (5)

(b) Show that () (P(x) Q(x)) (x) P(x) (x) Q(x) (5)

15. (a) Explain principle of Inclusion - Exclusion (3)

(b) In a survey of 85 people it is found that 31 like to drink milk 43 like coffee and 39 like

tea. Also 13 like both milk and tea, 15 like milk and coffee, 20 like tea and coffee and 12

like none of the three drinks. Find the number of people who like all the three drinks.

Display the answer using Venn Diagram (7)

16. (a) Simplify the Boolean function (6)

F(w,x,y,z) = ∑(0, 1, 2, 3, 4, 6, 8, 9, 12, 13, 14)

(b) Define Chromatic number with an example (4)

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

tree with an example (10)