

Code No: RT21052

R13**SET - 1**

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE AND ENGINEERING
(Com. to CSE, IT, ECC)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

1. a) Explain free and bound variables of inference theory of predicate calculus with examples? (4M)
- b) Explain congruence modulo m ? (4M)
- c) Explain Antisymmetric , irreflexive properties of a relation with examples? (4M)
- d) Explain null graph ? (3M)
- e) Explain left cosets with example? (3M)
- f) Explain abelian group with example? (4M)

**PART -B**

2. a) Show that  $(\exists x) (P(x) \wedge Q(x)) \Rightarrow (\exists x) P(x) \wedge (\exists x) Q(x)$  (8M)
- b) Derive the following using CP rule if necessary (8M)  
 $P \rightarrow (Q \rightarrow R), Q \rightarrow (R \rightarrow S) \Rightarrow P \rightarrow (Q \rightarrow S)$
3. a) Write pseudo code for Euclidian algorithm? find GCD of 330,616 using Euclidian algorithm (8M)
- b) Prove that by mathematical induction  $2^n < n!$  for every positive integer greater than equal to 4? (8M)
4. a) Show by means of example for the sets  $A \times B \neq B \times A$  and  $(A \times B) \times C \neq A \times (B \times C)$  (8M)
- b) Let  $X = \{1, 2, 3, 4\}$  and  $R = \{ \langle x, y \rangle \mid x > y \}$  draw the graph of R and also give its matrix. (8M)
5. a) Show that a graph is connected if and only if it has a spanning tree? (8M)
- b) Explain kruskal's algorithm to find minimal spanning tree of a graph with suitable example? (8M)
6. a) Show that the order of each group of a finite group G is a divisor of the order of the group G. (8M)
- b) Explain multinomial theorem and find binomial coefficient of  $x^9 y^3$  in  $(3x + 4y)^{12}$  (8M)
7. a) Solve the following recurrence relation  $a_n = 5a_{n-1} + 6a_{n-2} = 0, n \geq 2$  by the generating function method with  $a_0 = 3, a_1 = 3$ . (8M)
- b) Explain Generating function and explain various operation on generating function (8M)