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R13 Code No: 811AA JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD MCA I Semester Examinations, August - 2017 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE Max.Marks:60

Time: 3hrs

Note: This question paper contains two parts A and B. Part A is compulsory which carries 20 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 8 marks and may have a, b, c as sub questions.

PART - A

5×4 Marks = 20

1.a)	What do you mean by tautological implication? Give an example.	[4]
b)	Explain transitive closure property.	[4]
c)	Write about binomial and multinomial theorems.	[4]
d)	What are generating functions? Give an example.	[4]
e)	Write about binary trees.	[4]

PART - B

Express $P \rightarrow (\neg P \rightarrow Q)$ in terms of \uparrow only. 2.a) Define Universe of Discourse? Symbolize the given statement with and without b) using the set of positive numbers as the Universe of Discourse. Statement: "Given any positive integer there is a greater positive integer." [4+4]

OR

3. Give an over view of theory of inference for predictive calculus. [8]

 $S = \{1, 2, 3, 4\}$ and $A = S \times S$. Define a relation R on A by 4. (a, b) R (a', b') \Leftrightarrow a+b = a' +b'. a) Show that R is an equivalence relation. b) Compute A/R. [4+4]

OR

- Let (S,*) and (T,*') be Semi Groups. Show that the function f: $S \times T \rightarrow S$ defined 5.a) by f(s,t) = s is a Homomorphism of the Semi Group S×T onto the Semi Group **S**?
- Give an over view of lattice as an algebraic structures. [4+4]b)
- Explain pigeon hole principles and its applications. 6.a) Explain the principles of inclusion and exclusion. b) [4+4]OR
- Determine the coefficients of x^2y^3 and x^3y^2 in $(2x+3y)^{10}$. 7. [8]

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 5×8 Marks = 40

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[4+4]

- 8. What are characteristic roots? Explain how characteristics roots can be used in solving recurrence relation using examples. [8]
 OR
 9. Write short notes on how each of the following can be used in solving recurrence
 - Write short notes on how each of the following can be used in solving recurrence relation.
 - a) Function of sequences
 - b) Coefficients of generating functions. [4+4]
- 10. Explain the following with examples:a) Hamiltonian Graphsb) Planar graphs and multi –graphs.

OR

11. Write Kruskal's Algorithm and explain. Find the minimum cost spanning tree for the given graph? And calculate its minimum cost. [8]

