R13

Code No: 811AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, August - 2017
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Time: 3hrs   **Max.Marks:60**

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

5 × 8 Marks = 40

2.a) Express $P \rightarrow (\neg P \rightarrow Q)$ in terms of $\uparrow$ only.
  b) Define Universe of Discourse? Symbolize the given statement with and without
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]

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

OR

5.a) Let $(S,*)$ and $(T,*')$ be Semi Groups. Show that the function f: $S \times T \rightarrow S$ defined
by f(s,t)= s is a Homomorphism of the Semi Group $S \times T$ onto the Semi Group
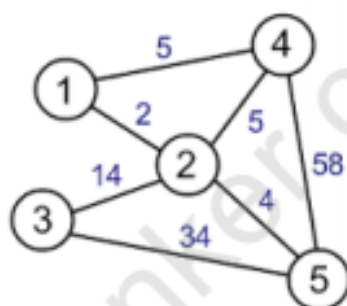S?
  b) Give an over view of lattice as an algebraic structures.   [4+4]

6.a) Explain pigeon hole principles and its applications.
  b) Explain the principles of inclusion and exclusion.   [4+4]

OR

7. Determine the coefficients of x^2y^3 and x^3y^2 in $(2x+3y)^{10}$.   [8]

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 relation.
a) Function of sequences
b) Coefficients of generating functions.   [4+4]

10.   Explain the following with examples:
a) Hamiltonian Graphs
b) Planar graphs and multi –graphs.   [4+4]

OR

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

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