R13

Code No: 811AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, June/July - 2018
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) Find the disjunctive Normal form of ~(p(q∧r)). [4]
b) Discuss about Semi-group Homomorphism with example. [4]
c) How many ways can we get sum of 4 or 8 when two distinguishable dice are rolled? How many ways can we get an even sum? [4]
d) Find the generating function of $(n-1)^2$. [4]
e) Draw the binary tree whose level order indices are { 1,2,4,5,8,10,11,20 }. [4]

PART - B

5 × 8 Marks = 40

2. Define Well Formed Formula. Explain about Tautology with example. [8]

OR

3. Show that R∧(P ∨Q) is a valid conclusion from the premises P∨Q, Q→R, P→M and ¬M. [8]

4. Let A be a given finite set and ρ (A) its power set. Let ⊆ be the inclusion relation on the elements of ρ (A). Draw Hasse diagram of ⟨ ρ (A), ⊆ ⟩ for
a) A={a}; b) A={a,b}; c) A={a, b, c}; d) A= {a, b, c, d} [8]

OR

5. Let a={1,2,3,4} and f and g are functions from A to A given by f= {(1,4), (2,1), (3,2), (4,3)} and g= {(1,2),(2,3),(3,4),(4,1)} prove that f and g are inverse of each other. [8]

6. Find the number of permutations of the letters of the word MASSASAUGA
a) In how many of these, all four A's are together?
b) How many of these of them begin with S? [4+4]

OR

7. Explain multinomial theorem and find binomial coefficient of $x^9 y^3$ in $(3x + 4y)^{12}$.[8]

8. Discuss about method of characteristic roots with an example. [8]

OR

9. Find a general expression for a solution to the recurrence relation
$a_n-5a_{n-1}+6a_{n-1}=n(n-1)$ for $n\geq 2$ [8]

10. Explain kruskal's algorithm to find minimal spanning tree of a graph with suitable example. [8]

OR

11. What is the chromatic number of the following?
a) C_n b) K_n c) $K_{m,n}$ d) Tree with n vertices. [8]