LIb

R09

Code No: 53022

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year I Semester Examinations, December-2014
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE, IT)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) If p, q, and r are any three statements, then using the truth table prove that,
$(p \wedge q) \vee r = (p \vee r) \wedge (q \vee r)$

b) Obtain the PDNF and PCNF for the following statement formula:
$(P \wedge Q) \vee (P \wedge R) \vee (Q \wedge R)$

2. Show that $(x)(p(x) \rightarrow Q(x)) \wedge (x)(Q(x) \rightarrow R(x)) (x)(P(x) \rightarrow R(x))$ using rules of inference.

3.a) Draw the Hasse Diagram of {P(A), }. Where A is any set what are the greatest and least elements? Explain how to find LUB and GLB using Hasse Diagram.

b) Let R = {(b, c), (b, e), (c, e), (d, a), (c, b), (e, c)} be a relation on the set A = {a, b, c, d, e}. Find the transitive closure of the relation R.

4. Given the algebraic system $\langle N, + \rangle$ and $\langle Z_4, +_4 \rangle$, where N is the set of natural numbers and + is the addition operation on N and Z_4 denote the set of equivalence classes generated as Z_4 = {[0], [1], [2], [3]} AND $+_4$ define an operation on Z_4 given by $[i] +_4 [j] = [(i+j) \pmod 4]$ for all i, j = 0, 1, 2, 3. Show that there exists a homomorphism from $\langle N,+ \rangle$ to $\langle Z_4,+_4 \rangle$.

5.a) How many permutations can be made with letters of the word ENGINEERING ?

b) In how many ways can four students be selected out of twelve students, if
i) two particular students are not included at all?
ii) two particular students are included?

6.a) Solve the recurrence relation $a_n - 7a_{n-1} + 10a_{n-2} = 0$ where $a_0 = 10$ and $a_1 = 41$.

b) Find a generating function for the recurrence relation $c_n = 3c_{n-1} - 2c_{n-2}$ for $n \geq 2$ given $c_1 = 5$, $c_2 = 3$.

7. Explain prim's and krushkal's algorithm with a suitable example.

8. Explain the following with suitable examples:
a) Hamiltonian Graph
b) Hamiltonian Circuit
c) Hamiltonian Path.

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