JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year I Semester Examinations, May/June - 2015
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) What is meant by Well-formed formula?
 b) Show that the truth values of the following formula is independent of its components. $(P \to Q) \rightleftharpoons (\daleth P V Q)$.
 c) Give a note on conjunctive norm form.   [5+5+5]

2.a) Show that $P \to S$ can be derived from the premises $\daleth P V Q, \daleth Q V R, R \to S$.
 b) Write each of the following in symbolic form
    i) All men are good   ii) No men are good
    iii) Some men are good   iv) Some men are not good.   [7+8]

3.a) Let $X=\{1,2,3....9\}$ and $R=\{(x,y)/x-y$ is divisible by $3\}$ in X. Show that R is an equivalence relation .
 b) What is a Lattice? Write its properties.   [8+7]

4.a) If G is a group such that $(ab)^m=a^m b^m$ for three consecutive integers and for all a, b $\in$ G. Show that G is abelian.
 b) Define semi group, sub group. Give one example of each.   [8+7]

5.a) State and explain Pigeon hole principle.
 b) A six person committee composed of Anu, Bhavani, Chaitra, Divya, Eswari, Farhath is to select a chair-person, secretary and treasurer.
    i) In how many ways can this be done?
    ii) In how many ways can this be done if either Anu or Bhavani must be chair person?
    iii) In how many ways can this be done if Eshwari must hold one of the officers?
                                                                                    [7+8]

6.a) Solve $a_n=a_{n-1}+3n^2+3n+1$ where $a_0 = 1$.
 b) Solve the recurrence relation $a_n = \sqrt{a_{n-1} + \sqrt{a_{n-2} + \sqrt{a_{n-3} + \sqrt{.....}}}}$ with $a_0 = 4$.
                                                                                    [7+8]

7.a) Discuss the following terms:
    i) Edge connectivity   ii) Vertex connectivity   iii) Cut vertex.
 b) Explain the properties of adjacency matrix of a simple graph. Quote suitable example.   [8+7]

8.a) Show that the following graph is not Hamiltonian.
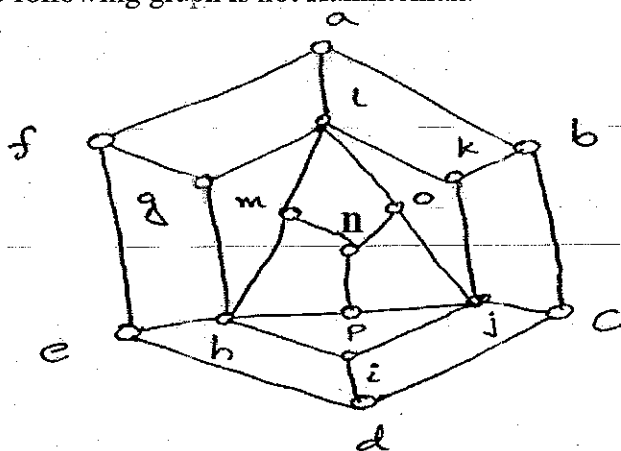
b) Discuss the rules helpful in finding the chromatic number of a graph G.   [7+8]

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