

Code: 9F00104

MCA - I Semester Supplementary Examinations, August/September 2012

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(For students admitted in 2009, 2010 & 2011 only)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Obtain the disjunctive normal form for $P \wedge (P \rightarrow Q)$.
(b) Explain about different types of statement connections with an example for each.
(c) Discuss about well formed formulas. List out all the steps required for a statement to be a well formed formula.
- 2 (a) Show that $R \wedge (P \vee Q)$ is a valid conclusion from the premises $P \vee Q$, $Q \rightarrow R$, $P \rightarrow M$ and $\neg M$.
(b) What is meant by proof of contradiction? Explain the concept with an example.
- 3 (a) Explain about the properties of a binary relation in a set with suitable example.
(b) Define a poset. Let $X = \{2, 3, 6, 8\}$ and let \leq be the relation "divides" on X . Prove that $\langle X, \leq \rangle$ is a poset.
- 4 (a) Write about general properties of an algebraic system.
(b) With an example, explain the concept of homomorphism and isomorphism.
- 5 (a) State and prove the binomial theorem.
(b) In how many ways can 7 women and 3 men be arranged in a row if the three men must always stand next to each other?
- 6 Solve $a_n - 6a_{n-1} = 0$ for $n \geq 1$ and $a_0 = 1$, using generating functions.
- 7 (a) Explain different representations of graphs.
(b) What is a spanning tree? Explain any two ways for finding out spanning tree of a given graph with examples.
- 8 (a) Explain about multigraphs and Euler circuits with examples.
(b) How many different Hamiltonian cycles are there in K_n , a complete graph with n vertices?
