

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**B.Tech II Year I Semester Examinations, March - 2017**  
**MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE**  
(Common to CSE, IT)

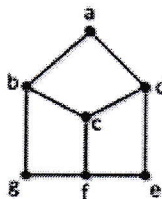
Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

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- 1.a) Explain about CNF and DNF.
- b) Determine whether the following is a tautology or not. [7+8]  
 $Q \rightarrow (P \wedge \neg P) \rightarrow R \rightarrow (P \wedge \neg P) \Rightarrow P \rightarrow Q$
- 2.a) What are the two rules of inference? Explain with example.
- b) Show that  $P \vee Q$  follows from  $P$  using automatic theorem proving. [7+8]
- 3.a) With suitable examples explain the equivalence relations.
- b) Describe primitive recursive function with suitable example. [7+8]
- 4.a) Discuss about the general properties of algebraic systems.
- b) Illustrate semigroup homomorphism with an example. [7+8]
- 5.a) Define permutations. How many permutations of the letters ABCDEFGH contain the string ABC?
- b) State and explain Binomial Theorem. [8+7]
- 6. Solve the recurrence relation  $a_n - 7a_{n-1} + 10a_{n-2} = 0$  for  $n \geq 2$ . [15]
- 7.a) Define Graph? Explain the Adjacency Matrix representation of a graph.
- b) With example explain Breadth First Search algorithm to produce a spanning tree from a simple graph. [7+8]
- 8.a) Prove that there is no Hamiltonian cycle in the following graph.



- b) Give a brief note on Chromatic Numbers. [8+7]

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