

II B. Tech I Semester Supplementary Examinations, May/June - 2016
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE AND ENGINEERING
 (Com. to CSE, IT, ECC)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

PART-A

1. a) Prove that $\neg(p \vee q) \vee [(\neg p) \wedge q] \vee p$ is a tautology using truth table?
 b) Write the statement of Euler's theorem and explain with an example?
 c) Draw hasse diagram of $[P(\{a,b,c\}); \subseteq]$?
 d) What is Hamiltonian graph? Explain with an example?
 e) How many 2-digit or 3-digit numbers can be formed using digits **1, 4, 5, 6, 8 and 9** if no repetition is allowed?
 f) Explain the method of characteristic roots? (4M+3M+3M+4M+4M+4M)

PART-B

2. a) Verify the validity of the following argument: Lions are dangerous animals, There are lions, There are dangerous animals.
 b) What is meant by tautology, contradiction give some example formulas? (8M+8M)
3. a) Prove by mathematical induction that $6^{n+2} + 7^{2n+1}$ is divisible by **43** for each positive integer **n**?
 b) State and explain Euclidean algorithm with example? (8M+8M)
4. a) R is a reflexive relation on set **A**, prove or disprove **R.R⁻¹** is transitive?
 b) Find the transitive closure of **R** if
 (i) **R = {(a,b), (b,c), (c,d), (d,e)}** (ii) **R = {(a,a), (a,b), (b,c), (b,d), (d,c), (d,d)}** (8M+8M)
5. a) Write about Preorder, Postorder, Inorder traversals of tree with examples?
 b) Show that any graph with **4** or fewer vertices is planar? (8M+8M)
6. a) Explain the properties of **Cosets** with examples?
 b) Verify that **C(n+2, r) - 2C(n+1, r) + C(n, r) = C(n, r-2)** (8M+8M)
7. a) Solve the recurrence relation of the sequence of numbers **f_n = f_{n-1} + f_{n-2}, n ≥ 2**
 With the initial condition **f₀ = 1, f₁ = 1**.
 b) What is a Generating function and explain the operations on generating functions? (8M+8M)
