Code No: X0522 **R07** SET - 1

II B. Tech I Semester Supplementary Examinations, Oct/Nov - 2016
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 80

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Obtain equivalent PDNF for the propositional function $\sim(P \vee Q) \leftrightarrow (P \wedge Q)$. (8M)
   b) Obtain PCNF for the Propositional function $(\sim P \vee Q) \rightarrow (P \leftrightarrow \sim Q)$. (8M)

2. a) Show that $P\rightarrow(Q\rightarrow R), Q\rightarrow(R\rightarrow S) \Rightarrow P\rightarrow(Q\rightarrow S)$. (8M)
   b) Using automatic theorem proving, show that (8M)
   $(P \vee Q) \wedge (Q\rightarrow R) \wedge (P\rightarrow M) \Rightarrow (R \vee M)$.

3. a) Draw the Hasse diagram for $X=\{2, 3, 6, 24, 36, 48\}$ and relation $\leq$ be such that $x\leq y$, if x divides y. (8M)
   b) Verify the following relation R on $X = \{1, 2, 3, 4\}$ is equivalence relation or not? Given $R = \{(1, 1), (1, 4), (4, 1), (2, 2), (2, 3), (3, 4), (3, 3), (3, 2), (4, 3), (4, 4)\}$. (8M)

4. a) Let $X = \{1, 2, 3, 4\}$ and $f : X\rightarrow X$ such that $f = \{(1, 2), (2, 3), (3, 4), (4, 1)\}$ and $F = \{f_0, f_1, f_2, f_3\}$, where $f_1 = f$, $f_2 = fOf$, $f_3 = f_2Of$ and f0 is identity function. Verify the algebraic system (F, O) is a group, where O is composition of functions. (8M)
   b) What is a permutation group? Explain with example. (8M)

5. a) In how many ways can 23 different books be given to 5 students so that 2 of the students will have 4 books each and the other 3 will have 5 books each. (8M)
   b) Using Multinomial theorem, expand $(2x-3y+4z)^3$? (8M)

6. a) Solve the recurrence relation $a_n- 7a_{n-1}+ 12a_{n-2} = 0$ for $n \geq 2$, $a_0=1$ and $a_1=2$. (8M)
   b) Solve the recurrence relation of Fibonacci series. (8M)

7. a) Prove that a connected plane graph with 7 vertices and degree (V) = 4 for each vertex V of G must have 8 regions of degree 3 and one region of degree 4. (8M)
   b) Discuss graph coloring problem with required examples. (8M)

8. a) Describe an algorithm to decide whether a graph is bipartite. (8M)
   b) State the Prims algorithm for Finding Minimal Spanning Tree. Explain it with an Example (8M)

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