

Code No: X0522

R07

SET - 1

II B. Tech I Semester Supplementary Examinations May – 2013
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
(Com. to CSE, IT)

Time: 3 hours

Max. Marks: 80

Answer any **FIVE** Questions

All Questions carry **Equal** Marks

1. Explain in detail about the Logical Connectives with Examples? (16M)
2. a) Show that $r \rightarrow s$ can be derived from the premises $p \rightarrow (q \rightarrow s)$, $\neg r \vee p$, q ?
b) Prove that the Following argument is valid. ? $p \rightarrow q$, $\neg(q \vee r)$, $\neg p$ (8M+8M)
3. a) Define Relation? List out the Operations on Relations?
b) Let the Relation R be $R = \{(1,2), (2,3), (3,3)\}$ on the set $A = \{1,2,3\}$. What is the Transitive Closure of R? (8M+8M)
4. a) Define Binary Operation? List out the properties of Binary operations?
b) Prove that the Cancellation laws hold good in a group G? (8M+8M)
5. a) A palindrome is a word that reads the same forward or back word. How many nine letter Palindromes are possible?
b) How many different six digit numbers can be formed from the digits 0,1,2,3,4 and 5? (8M+8M)
6. Solve the Recurrence Relation $2u_{n+1} - u_n = 2$? (16M)
7. a) Define Graph? Show that a vertex whose degree is one is called a pendent vertex?
b) Show that the number of odd degree Vertices in a graph is always even? (8M+8M)
8. a) Define Graph? List out the Operations on Graphs?
b) Explain about Chromatic numbers? (8M+8M)

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Answer any **FIVE** Questions

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1. a) Define Well Formed Formula? Explain about Tautology with example?
b) Prove that $P \wedge (q \vee r) \Leftrightarrow ((P \wedge q) \vee (P \wedge r))$ is a Tautology? (8M+8M)
2. Test the Validity of the Following argument. (16M)
If you work hard, you pass. You did not pass. Therefore you did not work hard.
3. a) Define Equivalence relation? If $A = \{1, 2, 3, 4\}$ is a Relation R from A to A . $R = \{(1,1), (1,2), (2,1), (2,2), (2,4), (3,3), (4,4)\}$. Find whether R is an Equivalence relation?
b) Let R be the Relation $R = \{(x,y) / x \text{ divides } y\}$. Draw the Hasse diagram? (8M+8M)
4. a) Prove that a group consisting of Three elements is an abelian group?
b) Let $G = \{-1, 0, 1\}$. Verify that G forms an abelian group under addition? (8M+8M)
5. a) How many ways can you arrange 9 different books, such that a special book is on 4th place?
b) How many Positive Integer solutions will be therefore $x+y+z=100$? (8M+8M)
6. Solve the recurrence relation $u_{n+2} = u_{n+1} + u_n$, $u_2 = 1$, $u_3 = 2$. ? (16M)
7. Show that if the number of vertices of a connected graph a is n and the number of edges m and the region r , then $r+n-m=2$? (16M)
8. A Traveler wants to visit a number of Cities. Can atour be found which visits each city only once. Find a Tour which starts at A goes each road exactly once and ends back at A .? (16M)

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SET - 3

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SET - 4

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Max. Marks: 80

Answer any **FIVE** Questions

All Questions carry **Equal** Marks

1. a) Find the disjunctive Normal form of $\sim(p \rightarrow (q \wedge r))$?
b) Find the PDNF of $(\sim p \leftrightarrow r) \wedge (q \leftrightarrow p)$? (8M+8M)
2. a) Prove that the sum of two odd integers is an even integer?
b) Prove that $|x+y| \leq |x| + |y|$? (8M+8M)
3. Prove that (S, \leq) is a Lattice where $S = \{1, 2, 5, 10\}$ and \leq is for divisibility. Prove that it is a Distributive Lattice? (16M)
4. a) Prove that the order of a^{-1} is same as the order of a ?
b) Prove that if the order of ‘a’ is ‘n’ then $a^m = e$ if and only if n divides m? (8M+8M)
5. a) In how many ways can you select at least one king ,if you choose five cards from a deck of 52 cards?
b) There are 35 students and 04 teachers. In how many ways every student shakes hand with other students and all the teachers. (8M+8M)
6. Solve the Recurrence Relation $u_n + 5u_{n-1} + 6u_{n-2} = 3n^2 - 2n + 1$? (16M)
7. a) A complete binary tree has 25 leaves. How many vertices does it have?
b) Explain about DFS? (8M+8M)
8. Show that the maximum number of edges in a complete bi partite graphs with n vertices is $n^2/4$? (16M)