

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I-Semester (Main), Examinations, November / December 2012

Subject: Discrete Structures

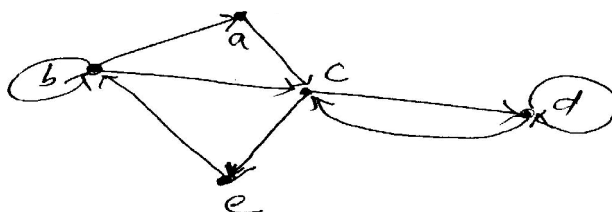
Time: 3 Hours

Max. Marks: 75

Note: Answer all questions from Part-A and Answer any five from Part-B

Part – A (25 Marks)

1. Show that SVR is tautologically implied by $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$
2. Define symmetrical difference of two sets A and B. Explain the concept with an example
3. Define the equivalence relation.
4. Let 'n' books be distributed to 'n' students. Suppose that the books are returned to the students again later on. In how many ways can the books be distributed so that no student will get the same book twice.
5. Write generating function for the number of ways of selecting r balls from 3 red balls, 5 blue balls, 7 white balls.
6. Describe compound interest problem in terms of recurrence relations. [i.e. use recurrence relation to express the said problem].
7. Define a sub group.
8. State Euler's theorem.
9. Define Planar graph.
10. Find the spanning tree for the following graph.



Part-B (5 x 10 = 50 marks)

11. a) Obtain the principal conjunctive normal form of the formula S given by $(7P \rightarrow R) \wedge (P \equiv Q)$
 b) Show that $(x) (P(x) \rightarrow Q(x)) \wedge (x) (Q(x) \rightarrow R(x)) \Rightarrow (x) (P(x) \rightarrow R(x))$
12. Let R denote a relation on the set of ordered pairs of positive integers such that $(x,y) R (U, V)$ iff $xv = yu$. Show that R is equivalence relation
13. If $f : X \rightarrow Y$ and $g : Y \rightarrow Z$ and both f and g are onto, show that gof is also onto. Is gof one-to-one if both g and f are one-to-one.
14. State and Prove Fermat's Theorem.
15. Solve the recurrence relation $a_n - 7a_{n-1} + 10a_{n-2} = 0$ for $n \geq 2$
16. a) Use Grinberg's Theorem to show that there are no planar Hamiltonian graph with regions degree 5,8,9 with exactly one region of degree 9
 b) What is the Chromatic number of $K_{4,4}$
17. Write short notes on any two
 - a) Minimum spanning tree obtained by BFS.
 - b) Pascal Identity
 - c) Pigeonhole Principle
