SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E – CSE
Title of the paper: Discrete Mathematics
Semester: V — Max.Marks: 80
Sub.Code: 411503-511503-611503 — Time: 3 Hours
Date: 27-04-2009 — Session: AN

PART – A (10 x 2 = 20)

Answer All the Questions

1. State the truth value of "If tiger have wings then the earth travels round the Sun".

2. Symbolise : For every x, there exists a y such that $x^2 + y^2 \geq 100$.

3. State Demorgan's law.

4. Define Equivalence Relation.

5. Define Subgroup.

6. Define a Monoid.

7. Prove $a \cdot (a+b) = a + (a \cdot b)$ in a Boolean algebra.

8. Define a Nand gate.

9. Define a Graph.

10. Define a Tree.

PART – B (5 x 12 = 60)

Answer All the Questions

11. Construct the truth table for

$(7P \Lambda (7Q \Lambda R) V (Q \Lambda R) V (P \Lambda R)$

(or)

12. Obtain the Disjunctive Normal form (DNF) and conjective Normal form (CNF) for

$[P \rightarrow (Q \Lambda R)] \Lambda (7P \rightarrow 7Q \Lambda 7R)]$.

13. Let R denotes a relation on the set of all Ordered pairs of positive integers by
(x,y) R (u,v) if and only if xv = yu,
Show that R is an equivalence Relation.

(or)

14. Let f(x) = x+2, g(x) = x – 2 and h(x) = 3x for $x \in R$, the set of real numbers. Find gof, fog, fof, gog, foh, hog, hof and fohog.

15. State and Prove Lagrange's Theorem.

(or)

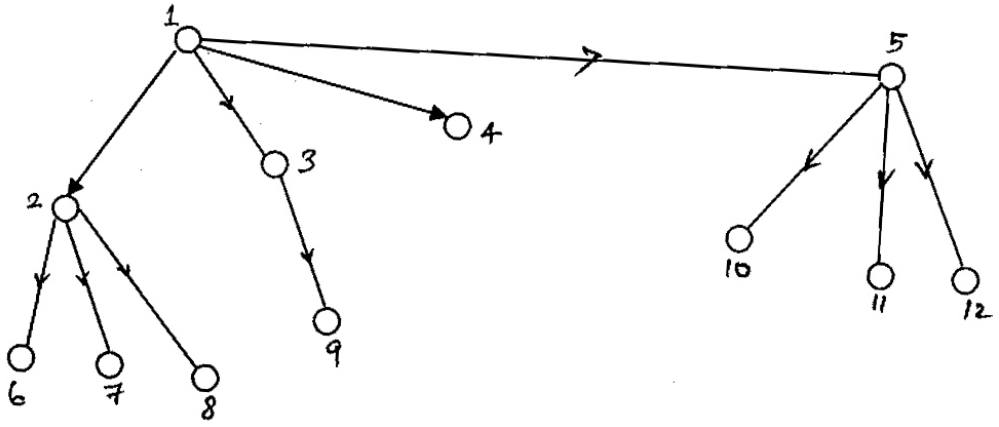
16. State and Prove Cayley's Theorem.

17. Solve $S(K) – 4S (k – 1) + 4S (k – 2) = 3K +2^k$, S(0) = 1, S(1) = 1.

(or)

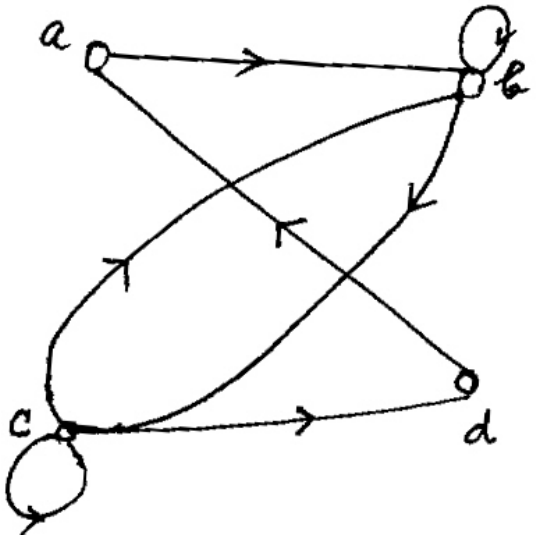
18. (a) Define Boolean Algebra. Is there a Boolean Algebra with five elements? Justify.
(b) Show that $2^n > n^3$ for $n \geq 10$ using induction principle.

19. Convert the following tree into a binary tree.



(or)

20. (a) Find the adjacency matrix of the given directed multi graph.



(b) Determine the given pair of graphs is Isomorphic.