STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2008 – 09)

SUBJECT CODE : MT/AC/MS34

B. Sc. DEGREE EXAMINATION, NOVEMBER 2009
BRANCH I - MATHEMATICS
THIRD SEMESTER

COURSE : ALLIED – CORE
PAPER : MATHEMATICS FOR COMPUTER SCIENCE - I
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A **(10 X 2 = 20)**

ANSWER ALL THE QUESTIONS

1. If p and q are distinct statements and the truth value of $p \wedge q$ is true. Which of the following are true?
   a) $(p \wedge q) \rightarrow p$ b) $(p \wedge q) \rightarrow q$
2. Define quantifier with an example.
3. Symbolize the following statements.
   a) all men are giants b) no men are giants
4. Define poset with an example.
5. State any two properties of lattices.
6. Define an atom of the lattice.
7. Define a regular graph with an example.
8. Define a connected graph with example.
9. Find $\frac{dy}{dx}$, where $y = x(x^2 - 1)(x^2 + 4)$.
10. Evaluate $\int \sin^2 3x \; dx$.

SECTION – B **(5 X 8 = 40)**

ANSWER ANY FIVE QUESTIONS

11. Check the validity of the following argument
    If I study, then I will not fail in mathematics
    If I do not play basketball, then I will study
    But I failed in mathematics

    Therefore I must have played basketball

12. (i) Define sub lattice
    (ii) Define distributive lattice
    (iii) Show that every chain is a distributive lattice

13. State and prove the De Morgan's laws for a Boolean Algebra B.

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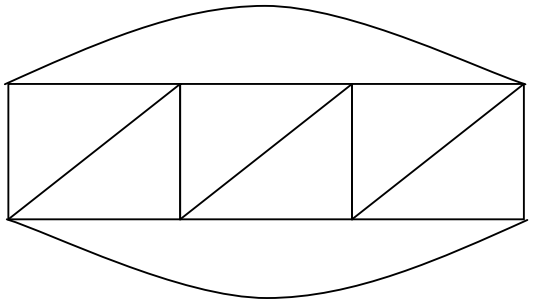
14. Show that K_5 is not planar.

15. (i) Write Kruskal's algorithm.
(ii) Apply Kruskal's algorithm to find the minimal spanning tree of the given graph.



16. (i) If $u=(x-y)(y-z)(z-x)$ show that $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}=0$.

(ii) Find the derivative of $y=\log(\tan e^{x})$.

17. (i) $\int \frac{dx}{1+\tan x}$ (ii) $\int \frac{dx}{x(x^3+1)}$

SECTION – C **(2 X 20 = 40)**

ANSWER ANY TWO QUESTIONS

18. (i) Draw the Hasee diagram for the lattice $P(\{1,2,3\},\subseteq)$
(ii) Express the polynomial $p(x_1,x_2,x_3)=x_1\vee x_2$ into sum of products canonical forms in variables x_1,x_2,x_3.
(iii) Show that $p\to q,\ r\to\neg q,\ r\Rightarrow\neg q$

19. (i) Define Euler and Hamiltonian graphs with examples.
(ii) Prove that a graph *G* is bipartite if and only if it contains no odd cycles
(iii) Let *G* be a graph with $n>1$ vertices then prove that the following statements are equivalent: a) *G* is a tree
b) *G* is acyclic with $n-1$ edges
c) *G* is connected with $n-1$ edges

20. (i) Evaluate: $\int \frac{3x\,dx}{1+2x^4}$
(ii) Evaluate: $\int \frac{(x+4)\,dx}{6x-7-x^2}$
(iii) Differentiate $y=\tan^{-1}[(a-x)/(1+ax)]$.
(iv) If $x(1+y)^{1/2}+y(1+x)^{1/2}=0$ prove that $\frac{dy}{dx}=\frac{-1}{(1+x)^2}$.

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