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

SUBJECT CODE : MT/AC/MT34

B. Com. DEGREE EXAMINATION, NOVEMBER 2010
COMMERCE
THIRD SEMESTER

COURSE : ALLIED – CORE
PAPER : MATHEMATICS FOR COMMERCE
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A **(10 X 2 = 20)**

ANSWER ALL THE QUESTIONS

1. If A and B are unitary matrices then prove that AB is also unitary matrix.
2. Prove that the matrix $\begin{pmatrix} cos\theta & -sin\theta \\ sin\theta & cos\theta \end{pmatrix}$ is orthogonal.
3. If A and B are both symmetric then prove that AB is symmetric if and only if A and B are commutative.
4. Form the equation one of whose roots is $\sqrt{5} + \sqrt{3}$.
5. Find the sum of cubes of the roots of the equation $x^4 + 2x + 3 = 0$.
6. From the following data find the missing value

x :	3	4	5	6
f(x):	4	13	-	43

7. State the Lagrange's inverse interpolation formula.
8. If $x = a(\theta - sin\theta)$ and $y = a(1 - cos\theta)$ find $\frac{dy}{dx}$.
9. Differentiate with respect to x of $(tanx)^{logx}$.
10. Evaluate $\int \frac{sin^{-1}x}{\sqrt{1-x^2}}\, dx$.

SECTION – B **(5 X 8 = 40)**

ANSWER ANY FIVE QUESTIONS

11. Find the eigen values and eigen vectors of the matrix $\begin{pmatrix} 8 & -4 \\ 2 & 2 \end{pmatrix}$.
12. Solve $6x^5 - x^4 - 43x^3 + 43x^2 + x - 6 = 0$.
13. Solve the equation $6x^3 - 11x^2 + 6x - 1 = 0$ given that the roots are in H.P.
14. Find by suitable interpolation formula the value of $f(2.5)$ from the following data.

x :	2	3	4	5
f(x) :	14.5	16.3	17.5	18

15. Fund the cubic polynomial which takes the following values .

x :	0	1	2	3
y :	1	2	1	10

..2

16. (i) Differentiate with respect to x. $tan^{-1}\left(\frac{cosx}{1+sinx}\right)$.

(ii) If $y = \sqrt{(sinx) + \sqrt{sinx + \sqrt{sinx + \cdots}}}$ then find $\frac{dy}{dx}$. (5+3)

17. Evaluate (i) $\int x^2\, tan^{-1}x\ dx$ (ii) $\int x\sqrt{x^2 + a^2}\ dx$ (4+4)

SECTION – C **(2 X 20 = 40)**

ANSWER ANY TWO QUESTIONS

18. a) Verify Cayley Hamilton theorem for the matrix.
$A = \begin{pmatrix} 1 & 2 & -2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{pmatrix}$. Hence find A^{-1}.

b) Express the matrix $\begin{pmatrix} 0 & 5 & -3 \\ 1 & 1 & 1 \\ 4 & 5 & 9 \end{pmatrix}$ as the sum of a symmetric and a skew-symmetric matrices. (15+5)

19. a) Solve the equation $2x^3 - x^2 - 22x - 24 = 0$ given that two of its roots are in the ratio 3:4.

b) Given that $-2 + \sqrt{-7}$ is root of the equation $x^4 + 2x^2 - 16x + 77 = 0$ solve it completely. (10+10)

20. a) Find $\frac{d}{dx}[tan^{-1}(tanh\, {}^{x}/_{a})]$

b) Evaluate $\int \frac{x^{24}}{x^{10}+1}\ dx$ (7+13)

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