STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2011 – 12)

SUBJECT CODE : 11MT/AC/MT34

B. Com. DEGREE EXAMINATION, NOVEMBER 2012
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. Prove that the matrix $A=\begin{bmatrix} \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \end{bmatrix}$ is orthogonal.
2. Find the eigen values of $\begin{bmatrix} a & h & g \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$.
3. Form the equation one of whose roots is $\sqrt{5}+\sqrt{3}$.
4. If α, β, γ are the roots of the equation $x^3-6x^2+11x-6=0$, Find the value of $\sum\alpha^2$.
5. What is a) Interpolation b) Extrapolation
6. State the Newton's backward difference interpolation formula for interpolation.
7. Differentiate $\sin^{-1}\left(\sqrt{x}\right)$.
8. If $x=a\sec\theta$ and $y=b\tan\theta$ find $\frac{dy}{dx}$.
9. Integrate: $\int e^{sin^2x+\cos x}(\sin 2x-\sin x)\,dx$.
10. Integrate: $\int \frac{dx}{\sqrt{4-9x^2}}$.

SECTION – B **(5 X 8 = 40)**
ANSWER ANY FIVE QUESTIONS

11. Show that every square matrix *A* can be uniquely expressed as a sum of a symmetric matrix and a skew symmetric matrix.
12. Find the characteristic roots and characteristic vectors of the matrix $\begin{bmatrix} 3 & 2 \\ 2 & 3 \end{bmatrix}$.
13. Solve the equation $x^4+2x^3-4x^2-22x+40=0$ given that its roots are in A.P.

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14. Use Lagrange's interpolation formula to find the value of y when $x = 2$ from the table given below.

x	0	1	3	4
y	- 12	0	6	12

15. Apply Gauss forward interpolation formula to estimate $f(32)$ from the following table.

x	25	30	35	40
$f(x)$	0.2707	0.3027	0.3386	0.3794

16. Find $\frac{dy}{dx}$ when $x = \frac{2t}{1+t^2}$ and $y = \frac{1-t^2}{1+t^2}$

17. Integrate (i) $\int \frac{x^3}{\sqrt{1-x^8}} dx$ (ii) $\int \sqrt{1+x-2x^2}\, dx$

SECTION – C (2 X 20 = 40)
ANSWER ANY TWO QUESTIONS

18. (a) Verify Cayley – Hamilton theorem for the matrix $\begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$ and hence find A^{-1}.

(b) Solve the equation $4x^4 - 20x^3 + 33x^2 - 20x + 4 = 0$ (10+ 10)

19. (a) Solve the equation $x^4 - 4x^3 + 8x + 35 = 0$, given that $2 + i\sqrt{3}$ is a root.

(b) Using an appropriate formula for interpolation find the premium payable at 28 years of age for a life insurance policy from the following data. (10+ 10)

Age in years	25	30	35	40	45	50
Premium in Rs.	230	260	300	350	420	510

20. (a) Differentiate: (i) $\log \sec^{-1}(x^4)$ (ii) $\sinh^{-1}\left(\frac{3x}{4}\right)$

(b) Integrate: (i) $\int \frac{e^x}{e^{x/2} - 1} dx$ (ii) $\int \frac{x + \sin x}{1 + \cos x} dx$ (10+ 10)

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