

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

**SUBJECT CODE : 11MT/AC/MT34**

**B. Com. DEGREE EXAMINATION, NOVEMBER 2014**  
**THIRD SEMESTER**

**COURSE : ALLIED – CORE**  
**PAPER : MATHEMATICS FOR COMMERCE**  
**TIME : 3 HOURS**

**MAX. MARKS : 100**

**SECTION – A**  
**ANSWER ALL THE QUESTIONS**

**(10 X 2 = 20)**

1. State Cayley-Hamilton's theorem.
2. Define symmetric matrix with an example.
3. If  $\alpha$  and  $\beta$  are the roots of  $2x^2 + 3x + 5 = 0$  find  $\alpha + \beta, \alpha\beta$ .
4. Solve the equation  $x^3 + 6x + 20 = 0$  one root being  $1+3i$ .
5. Find the missing term of the following table.

X	1	2	3	4
Y	1	4	?	16

6. State Gauss forward interpolation formula.
7. Differentiate  $(1+x^2)\tan^{-1}x$ .
8. If  $x = at^2, y = 2at$  find  $\frac{dy}{dx}$ .
9. Evaluate  $\int \frac{x^3}{\sqrt{1-x^8}} dx$ .
10. Evaluate  $\int \frac{x^2}{x+2} dx$ .

**SECTION – B**  
**ANSWER ANY FIVE QUESTIONS**

**(5 X 8 = 40)**

11. Find the Eigen values and Eigen vectors of the matrix  $\begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$ .
12. Form the equation with rational coefficients having  $1 + \sqrt{5}$  and  $1 + i\sqrt{5}$  as two of its roots.
13. Solve the equation  $x^3 - 12x^2 + 39x - 28 = 0$  whose roots are in A.P.
14. Find the value of y when x =10 from the following table

X	5	6	9	11
Y	12	13	14	16

15. If  $\alpha, \beta, \gamma$  are the roots of the equation  $x^3 - px^2 + qx - r = 0$  find the value of  
 (i)  $\sum \alpha^2$  (ii)  $\sum \alpha^3$
16. If  $y = \cosh^{-1}x$  then prove that  $y = \pm \log_e(x + \sqrt{x^2 - 1})$
17. Evaluate  $\int \frac{3x+1}{(x-1)^2(x+3)} dx$ .

**SECTION - C**  
**ANSWER ANY TWO QUESTIONS**

**(2 X 20 = 40)**

18. (a) Verify Cayley-Hamilton theorem for the matrix  $\begin{bmatrix} 8 & -8 & 2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$

(b) Solve  $x^5 + 4x^4 + x^3 + x^2 + 4x + 1 = 0$

19. (a) Find the value of  $y$  when  $x = 0.2$  from the following data

X	0	1	2	3	4	5	6
Y	176	185	194	203	212	220	229

- (b) Using Gauss's backward interpolation formula find the population for the year 1936 given that

Year	1901	1911	1921	1931	1941	1951
Population in thousand	12	15	20	27	39	52

20. (a) (i) Differentiate  $\tan^{-1} \left( \frac{\cos x}{1 + \sin x} \right)$  (ii) If  $y = x^{x^{\infty}}$ , find  $\frac{dy}{dx}$ .
- (b) (i) Evaluate  $\int \frac{2x+3}{x^2+x+1} dx$  (ii) Evaluate  $\int (\log x)^2 dx$

