

**B. Com. DEGREE EXAMINATION, NOVEMBER 2013**  
**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. Show that the matrix  $\begin{pmatrix} 0 & 1+i \\ -1-i & 0 \end{pmatrix}$  is skew symmetric.
2. State Cayley Hamilton theorem.
3. Solve the equation  $x^2 + 6x + 20 = 0$ , one root being  $1+3i$ .
4. If  $\alpha, \beta, \gamma$  are the roots of the equation  $x^3 - px^2 + qx - r = 0$ . Find the value of  $\sum \alpha^2$ .
5. Define interpolation.
6. Write Newton's forward interpolation formula.
7. Find  $\frac{dy}{dx}$  if  $xy + x^2 = 5$ .
8. If  $x = at, y = \frac{a}{t}$ , find  $\frac{dy}{dx}$ .
9. Evaluate  $\int \frac{(1+\sqrt{x})^n dx}{\sqrt{x}}$ .
10. Evaluate  $\int x \log x dx$ .

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

11. Find the eigen value and eigen vectors of the matrix  $\begin{pmatrix} 4 & 1 \\ 3 & 2 \end{pmatrix}$ .
12. Solve the equation  $3x^3 - 26x^2 + 52x - 24 = 0$  whose roots are in G.P.
13. Find the value of  $y$  at  $x = 21$  from the following data using a suitable formula.

X	20	23	26	29
Y	.342	.3907	.4384	.4848

14. Find  $\frac{dy}{dx}$  if  $x = \frac{3at}{1+t}$  and  $y = \frac{3at^2}{1+t^3}$ .
15. Evaluate  $\int \frac{x^2 + 2x + 5}{x^2 + 1} dx$
16. Solve the equation  $x^4 + 2x^3 - 16x^2 - 22x + 7 = 0$  given that one of whose roots is  $2 - \sqrt{3}$ .
17. Find the value of  $y$  at  $x = 9.5$  from the following data using Lagrange's interpolation formula.

X	7	8	9	10
Y	3	1	1	9

**SECTION – C**  
**ANSWER ANY TWO QUESTIONS**

(2 X 20 = 40)

18. a) Using Cayley Hamilton theorem, Find the inverse of the matrix  $\begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$

b) Solve the equation  $x^5 + 4x^4 + x^3 + x^2 + 4x + 1 = 0$ .

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) Apply Gauss's forward central difference formula and estimate  $f(32)$  from the following table.

X	25	30	35	40
Y	.2707	.3027	.3386	.3794

20. a) (i) Find  $\frac{dy}{dx}$  if  $y = (\sin x)^x + a^x$ .  
 (ii) Find  $\frac{dy}{dx}$  if  $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \dots \infty}}$ .

b) (i) Evaluate  $\int \frac{(x^2 + 4x)(2x - 3)}{x^3} dx$ .

(ii) Evaluate  $\int \frac{\sin^2 x}{1 + \cos x} dx$ .

