



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. & B.C.A DEGREE EXAMINATION – COMPUTER SCIENCE & APPLI.

FIRST SEMESTER – APRIL 2016

MT 1103 - MATHEMATICS FOR COMPUTER SCIENCE

Date: 05-05-2016
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

Part A

Answer ALL questions:

(10 x 2 =20)

1. Define symmetric matrix.
2. Write down the expansion of $\cos 5\theta$ in terms of $\cos \theta$.
3. If α, β, γ are the roots of $2x^3 + 3x^2 + 5x + 6 = 0$, find $\alpha\beta$ and $\alpha\beta\gamma$.
4. Verify Euler's theorem for the function $u = x^3 + y^3 + z^3 + 3xyz = 0$.
5. Evaluate $\int x e^x dx$.
6. Evaluate $\int_0^{\frac{\pi}{2}} \sin^8 x \cos^6 x dx$.
7. Solve the differential equation $(D^2 - 4)y = 0$.
8. Solve $pq = 1$.
9. Write the formula for Simpson's 3/8 rule.
10. Write Regula- falsi method formula.

Part B

Answer any FIVE questions:

(5 x 8 = 40)

11. Find eigen values and eigen vector of the matrix $A = \begin{bmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$.
12. Show that $\frac{\sin 6\theta}{\sin \theta} = 32 \cos^5 \theta - 32 \cos^3 \theta + 6 \cos \theta$.
13. Solve $x^5 + 4x^4 + x^3 + x^2 + 4x + 1 = 0$.
14. What is the radius of curvature of the curve $\bar{x} + \sqrt{y} = 1$ at the point $(\frac{1}{4}, \frac{1}{4})$.
15. Evaluate $\int \frac{x^8}{x^6+1} dx$.
16. Evaluate: $\int \frac{5dx}{6x^2 - x - 1}$.
17. Solve $x(z^2 - y^2)P + y(x^2 - z^2)Q = z(x^2 - y^2)$.
18. Evaluate $\int_0^{10} \frac{1}{1+x^2} dx$ using Simpson's 1/3rd rule with $h = \frac{1}{6}$.

Part C

Answer any TWO questions:

(2 x 20 = 40)

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

(b) show that matrix $A = \begin{pmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{pmatrix}$ is orthogonal. (14+6)

20. (a) Evaluate: $\int \frac{2x+1}{x^2+3x+1} dx$.

(b) Evaluate: $\int_0^{\frac{\pi}{2}} \cos^n x dx$. (15+5)

21. (a) Solve the equation $(D^2 + 5D + 4)y = x^2 + 7x + 9$.

(b) Solve $p^2 + q^2 = npq$. (14+6)

22. (a) Solve $x^4 - x = 10$ upto 3 decimals by using Newton Raphson method.

(b) Evaluate $\int_0^{-1} \frac{1}{1+x^2} dx$ by using Trapezoidal rule with $h = \frac{1}{6}$. (12+8)
