LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **COMPUTER SCIENCE**

SECOND SEMESTER – **APRIL 2016**

MT 2100 / CS 2100 - MATHEMATICS FOR COMPUTER SCIENCE

Date: 26-04-2016 Dept. No. Max. : 100 Marks
Time: 01:00-04:00

Part A

Answer ALL questions: **(10 x 2 =20)**

1. Define skew symmetric matrix.
2. Write down the expansion of $\cos 5\theta$ in terms of $\cos\theta$.
3. Solve the equation $32x^3 + 48x^2 + 22x - 3 = 0$ whose roots are in AP.
4. Verify Euler's theorem for the function $u = x^2 + y^2 + 2xy$.
5. Evaluate : $\int x e^{2x}\, dx$.
6. Evaluate: $\int_0^{\pi/2} \sin^7 x \cos^5 x \, dx$.
7. Solve the differential equation $(D^2 + 2D + 5)y = 15$.
8. Solve $p^2 + q^2 = npq$.
9. Write the formula for Simpson's 1/3 rule.
10. Write the Newton Raphson formula.

Part B

Answer any FIVE questions: **(5 x 8 = 40)**

11. Test the consistency and hence solve $x + y + z = 6$; $x + 2y - 2z = -3$; $2x + 3y + z = 11$.
12. Express $\cos 7\theta$ interms of $\cos\theta$.
13. Increase the roots of the equation $3x^4 + 7x^3 - 15x^2 + x - 2 = 0$ by 7 and find the transformed equation.
14. What is the radius of curvature of the curve $\sqrt{x} + \sqrt{y} = 1$ at $(\frac{1}{4}, \frac{1}{4})$.
15. Solve $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$.
16. Evaluate $\int \sin^7 x \, dx$ by using reduction formula.
17. Solve the equation $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = x^2 + 3$.
18. Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ by using Trapezoidal 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) Prove that $cos^5 x = \frac{1}{10}(cos5\theta + 5cos3\theta + 10cos\theta)$. **(14+6)**

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

(b) Evaluate: $\int_0^{\frac{\pi}{2}} \cos^n x \, dx$ and find the value when $n = 7$. **(14+6)**

21. (a) Solve the equation $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 4y = x^2 + 7x + 9$.

(b) Solve $z = px + qy + pq$. **(14+6)**

22. (a) Evaluate $\int_0^6 \frac{dx}{1+x^2} dx$ by using Simpson's 1/3rd and 3/8th rule with $h = \frac{1}{6}$.

(b) Solve $x^3 - 2x - 5 = 0$ upto 3 decimals by using Regula-flasi method. **(12+8)**

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