LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

DEGREE EXAMINATION – **COMPUTER APPLICATIONS & C OMP. SCI.**

SECOND SEMESTER – APRIL 2015

MT 2101 - MATHEMATICS FOR COMPUTER APPLICATIONS
MT 2100 - MATHEMATICS FOR COMPUTER SCIENCE

Date : Dept. No. Max. : 100 Marks
Time :

Part A

Answer ALL questions: **(10X2 =20)**

1. Find the eigen values of the matrix $A = \begin{bmatrix} 6 & 10 \\ 14 & 25 \end{bmatrix}$.
2. Write down the expansion of $\cos 3\theta$ in terms of $\cos\theta$.
3. Solve the equation $x^3 + 6x + 20 = 0$, one of the roots being 1+3i.
4. Write the formula for radius of curvature in Cartesian form.
5. Evaluate $\int (2x+1)^3 dx$.
6. Evaluate $\int_0^2 y^2 dy$
7. Find complementary function for $(D^2 + 4D + 4)\, y = 0$.
8. Solve $pq = 1$.
9. Write the formula for Regula-Falsi method to find the real roots of the equation $f(x) = 0$.
10. Write the formula for Simpson's $3/8^{th}$ rule.

Part B

Answer any FIVE questions: **(5 x8 = 40)**

11. Find the eigen values of $A = \begin{bmatrix} 2 & 2 & 0 \\ 2 & 1 & 1 \\ -7 & 2 & -3 \end{bmatrix}$.
12. Show that $\frac{\cos 7\theta}{\cos\theta} = 64\cos^6\theta - 112\cos^4\theta + 56\cos^2\theta - 7$.
13. If $u = sin^{-1}\left(\frac{x^3+y^3}{x+y}\right)$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$.
14. What is the radius of curvature for the curve $\sqrt{x} + \sqrt{y} = 1$ at the point $\left(\frac{1}{4}, \frac{1}{4}\right)$.
15. Evaluate $\int \frac{dx}{2x^2 + 3x - 5}$.
16. Evaluate $\int x^3 e^{2x} dx$.
17. Solve $p^2 + q^2 = npq$.
18. Find the first derivative of $f(x)$ at $x = 1.5$ using Newton's forward - interpolation formula.

x	1.5	2.0	2.5	3.0	3.5	4.0
$f(x)$	3.375	7.000	13.625	24.000	38.875	59.000

Part C

Answer any TWO questions: **(2 x 20 = 40)**

19. Verify Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence find its inverse.

(20)

20. a) Evaluate: $\int \frac{3x+4}{(x-7)(2x+3)}dx$.

b) Evaluate: $\int_0^1 \int_x^{\sqrt{x}} (x^2+y^2)dydx$.

(10+10)

21. (a) Solve $6x^5 - x^4 - 43x^3 + 43x^2 + x - 6 = 0$.

(b) Solve the equation $\left(D^2 - 2D + 2\right)y = e^x x^2$.

(10+10)

22. (a) Evaluate $\int_0^{10} \frac{1}{1+x^2}dx$ using trapezoidal rule with $h = 1$.

(b) Find by Newton - Raphson method, the real root of $x^3 - 3x - 5 = 0$, correct to three decimal places, where the root lies between 2 and 3. (10+10)

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