



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.C.A. DEGREE EXAMINATION – COMPUTER APPLICATIONS

SECOND SEMESTER – APRIL 2016

MT 2101 - MATHEMATICS FOR COMPUTER APPLICATIONS

Date: 26-04-2016
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

Part A

Answer ALL questions:

(10X2 =20)

1. Define Skew symmetric matrix and give an example.
2. Find the characteristic equation of $A = \begin{bmatrix} 1 & 2 \\ -3 & 4 \end{bmatrix}$.
3. If α and β are the roots of $2x^2 + 3x + 5 = 0$, find $\alpha + \beta, \alpha\beta$.
4. Evaluate $\int_0^{\frac{\pi}{2}} \cos^8 x \, dx$.
5. Evaluate. $\int \frac{1}{(5x+3)^2} \, dx$.
6. Evaluate $\int xe^x \, dx$.
7. Find complementary function for $(D^2 + 5D + 6)y = 0$.
8. Derive the partial differential equation by eliminating the arbitrary constants from $z = (x+a)(y+b)$.
9. Write any two properties of definite integrals.
10. Write the formula for Simpson's 1/3rd rule.

Part B

Answer any FIVE questions:

(5 x8 = 40)

11. Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \\ 2 & 3 & 1 \end{bmatrix}$.
12. Show that $\frac{\sin 6\theta}{\sin \theta} = 32 \cos^5 \theta - 32 \cos^3 \theta + 6 \cos \theta$.
13. Evaluate $\int_0^1 \int_{x^2}^{\sqrt{x}} (x+y) \, dy \, dx$.
14. What is the radius of curvature for the curve $x^4 + y^4 = 2$ at the point (1,1).
15. Evaluate $\int \frac{10 \, dx}{6x^2 - x - 1}$.
16. Diminish the roots of $2x^5 - x^3 + 10x - 8 = 0$ by 5 and find the transformed equation.
17. Solve $xp + qy = z$.
18. Given $z = \sin(3x + 2y) + e^{xy}$ prove that $\frac{\partial^2 z}{\partial x \partial y} = \frac{\partial^2 z}{\partial y \partial x}$.

Part C

Answer any TWO questions:

(2 x 20 = 40)

19. Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 2 \\ 1 & 0 & 2 \end{bmatrix}$ and hence find its inverse.

(10+10)

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

b) Verify Euler's theorem for the function $u = x^2 + y^2 + 2xy$.

(15+5)

21. (a) Solve $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$.

(b) Solve the equation $(D^2 + 6D + 9)y = e^{2x}$.

(10+10)

22. (a) Evaluate $\int_1^5 \sqrt{1+x^2} dx$ using trapezoidal rule with $n = 8$.

(b) Use Newton - Raphson method to evaluate $\sqrt{12}$ with the initial condition $x_0 = 3$ correct to four decimal places.

(10+10)
