



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.C.A. DEGREE EXAMINATION – COMP. APPLICATION

FIRST SEMESTER – APRIL 2014

MT 1103 - MATHEMATICS FOR COMPUTER APPLICATION

Date : 28/03/2014
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

Part A

Answer ALL questions:

(10 x 2 = 20)

1. If A be any matrix, then prove that AA' are symmetric matrix.
2. Prove that $\cos h^2 x - \sin h^2 x = 1$.
3. If 1, 2, 3, 6 are the roots of the equation $x^4 - 12x^3 + 47x^2 - 72x + 36 = 0$, find an equation whose roots are $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{6}$.
4. Find the first order partial derivatives for $z = x^2 + y^2 - 3xy$.
5. Integrate $x^2(1-x)^2$ with respect to x .
6. State any two properties of definite integral.
7. Solve $4p^2 - 8p + 3 = 0$.
8. Find the general solution of Clairaut's equation $y = px + ap^{-1}$.
9. State the Trapezoidal rule.
10. Write Simpson's $\frac{1^{rd}}{3}$ rule.

Part B

Answer any FIVE questions:

(5 x 8 = 40)

11. Find the rank of the matrix $A = \begin{pmatrix} 1 & 2 & 5 \\ 2 & 3 & 4 \\ 3 & 5 & 7 \end{pmatrix}$.
12. Prove that $\frac{\sin 7\theta}{\sin \theta} = 7 - 56 \sin^2 \theta + 112 \sin^4 \theta - 64 \sin^6 \theta$.
13. Solve $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$.
14. If $u = \tan^{-1} \left(\frac{x^2 + y^2}{x + y} \right)$ show that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin u \cos u$.
15. Integrate $\frac{x^{24}}{x^{10} + 1}$ with respect to x .
16. Evaluate the double integral $\iint_R (4 - x^2 - y^2) dx dy$ if the region R is bounded by the straight lines $x = 0, x = 1, y = 0$, and $y = \frac{3}{2}$.
17. Solve the equation $(D^2 + 4D + 5)y = e^{2x} + 3$.
18. Solve $x = y + a \log p$.

Part C

Answer any TWO questions:

(2 x 20 = 40)

19. Verify Cayley – Hamilton theorem for $A = \begin{pmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & 7 \end{pmatrix}$. Hence find its inverse.

20. (a) Express $\cos^5 \theta \sin^3 \theta$ in terms of sines of multiples of θ .

(b) Find the radius of curvature of the curve $x^3 + y^3 = 3axy$ at the points $(\frac{3a}{2}, \frac{3a}{2})$.

(10+10)

21. Solve $x^6 + 2x^5 + 2x^4 - 2x^2 - 2x - 1 = 0$.

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

(b) Prove that $\int_0^{\pi/4} \log(1 + \tan \theta) d\theta = \frac{\pi}{8} \log 2$. (12+8)