



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.SC. & B.C.A. DEGREE EXAMINATION – COMP. SCI. & COMP. APPLICATION
MT 2101/MT 2100/ MT 1103- MATHEMATICS FOR COMPUTER APPLICATIONS

Date: 25-04-2017
01:00-04:00

Dept. No.

Max. : 100 Marks

Part A

Answer ALL questions:

(10X2 = 20)

1. Find the characteristic equation of $A = \begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$.
2. Write the expansion of $\sin(n\theta)$.
3. If α and β are the roots of $2x^2 + 3x + 5 = 0$, find $\alpha + \beta, \alpha\beta$
4. Evaluate $\int_0^{\pi} \sin^{10} x \, dx$.
5. State Euler's theorem on homogeneous function.
6. Evaluate $\int \sqrt{3+2x} \, dx$.
7. Find the complementary function for $(D^2 + 1)y = 0$.
8. Form a partial differential equation by eliminating arbitrary constants from the equation,
 $z = ax + by + a^2 + b^2$.
9. Find the first and second order partial derivatives for $z = x^2 + y^2 - 3xy$.
10. Write the formula for Trapezoidal rule.

Part B

Answer any FIVE questions:

(5 x 8 = 40)

11. Verify Cayley-Hamilton theorem for the matrix,
$$\begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$$
12. Show that $\frac{\sin 6\theta}{\sin \theta} = 32 \cos^5 \theta - 32 \cos^3 \theta + 6 \cos \theta = 0$.
13. Diminish the roots of $x^4 - 5x^3 + 7x^2 - 4x + 5 = 0$ by 2 and find the transformed equation.
14. What is the radius of curvature for the curve $y^2 = x^3 + 3$ at the point $(\frac{1}{4}, \frac{1}{4})$.
15. Evaluate $\int \frac{dx}{2x^2 + 3x - 5}$.
16. Evaluate $\int x^3 \cos x \, dx$.
17. Solve $z = p^2 + q^2$.

18. A function $f(x)$ is given by the following table. Find $f(0.2)$ by using Newton's forward interpolation formula.

x	0	1	2	3	4	5	6
$f(x)$	176	185	194	203	212	220	229

Part C

Answer any TWO questions:

(2 x 20 = 40)

19. Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 2 & 2 & 0 \\ 2 & 1 & 1 \\ -7 & 2 & -3 \end{bmatrix}$

(20)

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

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

(10+10)

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

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

(10+10)

22. (a) Apply Simpson's $\frac{3}{8}$ rule to evaluate $\int_0^2 \frac{dx}{1+x^3}$ correct to 2 decimal places by dividing the range into 8 equal parts.

(b) Use Newton - Raphson method to find the real root of $x^3 - 2x + 0.5 = 0$, with the initial condition $x_0 = 0$ correct to four decimal places.

(10+10)

\$\$\$\$\$\$\$\$