LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.SC. & B.C.A. DEGREE EXAMINATION – **COMPUTER SCIENCE & APPLI.**

FIRST SEMESTER – NOVEMBER 2016

MT 1103 / MT 2100 / MT 2101 – MATHEMA. FOR COMPU. SCIENCE & APPLI.

Date: 15-11-2016 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

Part A

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

1. If 2 and 8 are the Eigen values of $A=\begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix}$ then find the third Eigen value.
2. Write down the expansion of $\cos 6\theta$ in terms of $\cos\theta$.
3. If α and β are the roots of $2x^2 + 3x + 5 = 0$, find $\alpha+\beta$ and $\alpha\beta$.
4. Verify Euler's theorem for the function $u = x^2 + y^2 + 2xy$.
5. Diminish the roots of $x^4 - 5x^3 + 7x^2 - 4x + 5 = 0$ by 2 and find the transformed equation.
6. Evaluate $\int x^2 e^{4x} dx$.
7. Evaluate $\int_0^{\frac{\pi}{2}} \sin^{10} x \, dx$.
8. Form the partial differential equation by eliminating the arbitrary constants from $z = (x^2 + a)(y^2 + b)$.
9. Find the complementary function for $(D^2 + 2D + 1)\, y = 0$.
10. Write the formula for Simpson's 3/8 th rule.

Part B

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

11. Test the consistency of the following system of equations and if consistent solve $2x - y - z = 2;\ x + 2y + z = 2;\ 4x - 7y - 5z = 2.$
12. If $u = \sin^{-1}\left(\frac{x^2 + y^2}{x + y}\right)$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$.
13. Solve $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$.
14. What is the radius of curvature of the curve $\sqrt{x} + \sqrt{y} = 1$ at the point $(\frac{1}{4}, \frac{1}{4})$.
15. Evaluate $\int \frac{5dx}{6x^2 - x - 1}$.

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

17. Find the general solution of $x(z^2-y^2)p+y(x^2-z^2)q=z(y^2-x^2)$.

18. Solve $x^3-3x+1=0$ upto 3 decimals by using Regula-flasi method.

Part C

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

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

20. a) Evaluate $\int \frac{x^2+2x+5}{x^2+1}dx$.

b) Using reduction formula evaluate $\int \sin^7 x\,dx$. **(13+7)**

21. (a) Solve the equation $\left(D^2+5D+4\right)y=x^2+7x+9$.

(b) Solve $p^2+q^2=npq$. **(14+6)**

22. (a) Find by Newton- Raphson method, the real root of $x^3-2x-5=0$, correct to three decimal places.

(b) Evaluate $\int_0^{10} \frac{1}{1+x^2}dx$ by using Trapezoidal rule with $h=1$. **(14+6)**

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