

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**



**B.Sc.DEGREE EXAMINATION –COMPUTER SCIENCE**

**SECOND SEMESTER – APRIL 2018**

**MT 2100– MATHEMATICS FOR COMPUTER SCIENCE**

Date: 28-04-2018

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

**PART-A**

**Answer ALL the questions:**

**(10 x 2=20)**

1. Define Skew Symmetric matrix with an example.

2. Find the Eigen values of  $A = \begin{pmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{pmatrix}$ .

3. If  $\alpha$  and  $\beta$  are the roots of  $2x^2 + 3x + 5 = 0$ , find  $\alpha + \beta$ ,  $\alpha\beta$ .

4. Expand  $\cos n\theta$  in terms of  $\cos \theta$ .

5. Find real and imaginary part of  $\sin(x + iy)$ .

6. Determine the quadratic equation having  $2 - \sqrt{3}$  as a root.

7. Solve the equation  $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = 0$ .

8. Evaluate:  $\int_0^a \int_0^b (x^2 + y^2) dx dy$

9. Find an iterative formula to  $\sqrt{N}$ , where N is a positive integer.

10. Write Simpson's  $\frac{3}{8}$  rule.

**PART-B**

**Answer any FIVE questions:**

**(5 x 8=40)**

11. Find the Eigen values of the matrix  $A = \begin{pmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{pmatrix}$ .

12. Prove that  $\sin^5 \theta = \frac{1}{16} [\sin 5\theta - 5 \sin 3\theta + 10 \sin \theta]$ .

13. Find  $n^{\text{th}}$  derivative of  $\frac{x^2 - 4}{(x+1)(x+4)}$ .

14. Diminish the roots of  $x^4 - 5x^3 + 7x^2 - 4x + 5 = 0$  by 2 and find the transformed equation.

15. (i) Evaluate  $\int \frac{x}{x+5} dx$ .

(ii) Evaluate  $\int_0^{\frac{\pi}{2}} \sin^8 x \cos^6 x dx$ . (4 + 4)

16. Solve the equation  $(D^2 + 4D + 5)y = e^{2x} + x$ .

17. Solve (i)  $pq = 1$  (ii)  $z = px + qy + pq$ . (4 + 4)

18. Determine the root of  $\sin x = 1 - x$  using Newton Raphson method.

**PART-C**

**Answer any TWO questions:**

**(2 x 20=40)**

19. Find  $A^{-1}$  if  $A = \begin{pmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{pmatrix}$ , using Cayley – Hamilton theorem.

20. (i) Solve the equation  $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$ .

(ii) If  $u = \sin^{-1} \left( \frac{x^2 + y^2}{x + y} \right)$ , show that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \tan u$ . (10+10)

21. (i) Evaluate  $\int_0^{2a} \int_0^{\sqrt{2ax-x^2}} xy dy dx$ .

(ii) Solve  $(D^2 + 5D + 4)y = x^2 + 7x + 9$ . (6+14)

22. Evaluate  $\int_0^1 \frac{1}{1+x} dx$  correct up to 3 decimal places using trapezoidal rule and

Simpson's rule. Where  $h = 0.5$ ,  $h = 0.25$  and  $h = 0.125$ .

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