



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – COMPUTER SCIENCE

THIRD SEMESTER – APRIL 2016

CS 3100 - MATHEMATICS FOR COMPUTER SCIENCE

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

Dept. No.

Max. : 100 Marks

SECTION – A

ANSWER ALL QUESTIONS:

(10 x 2 = 20)

1. Define transpose of A .
2. Write down the expansion for $\cos 3\theta$ in terms of $\cos \theta$.
3. Find the equation whose roots are $-1, -6, 2, -3$ if the roots of the equation $x^4 - 8x^3 + 7x^2 + 36x - 36 = 0$ are $1, -2, 3, 6$.
4. Write the one of the root, when the reciprocal equation is of odd degree with like signs for its coefficients.
5. State Euler's formula on homogeneous functions.
6. Write the reduction formula for $\int \sin^n x dx$.
7. List out any two properties of definite integral?
8. Evaluate $\left(x + \frac{1}{x}\right)^2$.
9. Write down the solution of $y = p(x - p) + 5$ in Clairaut's form.
10. Write Newton – Raphson formula to find the real roots of the equation $f(x) = 0$.

SECTION – B

ANSWER ANY FIVE QUESTIONS:

(5 x 8 = 40)

11. Find the eigen value and eigen vectors $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}$.
12. Show that $\frac{\sin 6\theta}{\sin \theta} = 35 \cos^5 \theta - 32 \cos^3 \theta + 6 \cos \theta$.
13. Solve $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$.
14. What is the radius of curvature of the curve $x^4 + y^4 = 2$ at the point $(1, 1)$.
15. Verify Euler's theorem when $u = x^3 + y^3 + z^3 + 3xyz$.
16. Evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} dy dx$.
17. Show that $\int_0^{\frac{\pi}{4}} \log(1 + \tan \theta) d\theta = \frac{\pi}{8} \log 2$
18. Solve $p^2 - 3p + 2 = 0$.

SECTION – C

ANSWER ANY TWO QUESTIONS:

(2 x 20 = 40)

19. Verify Cayley-Hamilton theorem and hence find inverse for $A = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$.

20. (a) Prove that $\sin^4 \theta \cos^2 \theta = \frac{1}{2^5} (\cos 6\theta - 2\cos 4\theta - \cos 2\theta + 2)$.

(b) Evaluate: $\int \frac{(3x+4)}{[(x-7)(2x+3)]} dx$. (10+10)

21. (a) Solve the equation $(D^2 - 2D + 1)y = 3e^x + 3$.

(b) Solve $p^2 + pq = z^2$. (15+5)

22. Evaluate $\int_0^{-1} \frac{1}{1+x} dx$ with $h = \frac{1}{6}$ using

- (i) Trapezoidal rule
- (ii) Simpson's one-third rule
- (iii) Simpson's three-eighth rule
