



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.C.A. DEGREE EXAMINATION – COMPUTER APPLICATION

SECOND SEMESTER – APRIL 2014

MT 2101 - MATHEMATICS FOR COMPUTER APPLICATIONS

Date : 07/04/2014
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

SECTION- A

Answer all the questions

10 x 2 = 20

1. If $A = \begin{bmatrix} 3 & 1 & -1 \\ 0 & 1 & 2 \end{bmatrix}$, find AA' .
2. Write the expansion of $\tan n\theta$.
3. If α, β, γ are the roots of the $2x^3 + 3x^2 + 5x + 6 = 0$, find $\alpha\beta$ and $\alpha\beta\gamma$.
4. State Euler's theorem on homogeneous function.
5. Evaluate $\int \sqrt{1+3x} dx$.
6. Evaluate $\int_0^{\pi/2} \sin^{10} x dx$.
7. Write the general solution of $p^2 + q^2 = npq$.
8. Find the complimentary function of $(D^2 + 1)y = 0$.
9. Write Regula – Falsi formula to find the real roots of the equation $f(x) = 0$.
10. Define Numerical Differentiation.

SECTION- B

Answer any five questions

5 x 8 = 40

11. Find the rank of the matrix $\begin{pmatrix} 1 & 1 & -3 & -1 \\ 4 & -2 & 6 & 8 \\ 15 & -3 & 9 & 21 \end{pmatrix}$.
12. Prove that $\frac{\cos 5\theta}{\cos \theta} = 1 - 12 \sin^2 \theta + 16 \sin^4 \theta$.
13. Solve $6x^5 + 11x^4 - 33x^3 - 33x^2 + 11x + 6 = 0$.
14. If $u = \sin^{-1} \left(\frac{x+y}{\sqrt{x}+\sqrt{y}} \right)$, prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \frac{1}{2} \tan u$.
15. Evaluate $\int \frac{x^{17}}{x^{14}+4} dx$.
16. Evaluate $\int_0^{-2a} \int_0^{-\sqrt{2ax-x^2}} xy dy dx$.
17. Find the solution of $px^2 + qy^2 = z^2$.
18. Find the root of the equation $x^3 - 5x + 3 = 0$ by Newton – Raphson method.

SECTION – C

Answer any two questions:

2 x 20 = 40

19. (a) Verify Cayley – Hamilton theorem and hence find A^{-1} for the matrix $A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$.
(b) Prove that $\sin^4 \theta \cos^2 \theta = \frac{1}{2^5} [\cos 6\theta - 2 \cos 4\theta - \cos 2\theta + 2]$. (14+6)
20. (a) Solve the equation $6x^6 - 35x^5 + 56x^4 - 56x^2 + 35x - 6 = 0$.
(b) Find the radius of curvature for the curve $y^2 = x^3 + 8$ at $(-2, 0)$. (14+6)
21. (a) Evaluate $\int \frac{x}{(1+x)(x^2+1)} dx$.

(b) Solve $\frac{3x+1}{2x^2-x+5} dx$.

(6+14)

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

(b) Apply Simpson's one-third rule to evaluate the approximate values of the following integral: $\int_0^{+4} e^x dx$.

(12+8)