SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
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COIMBATORE-641 035, TAMIL NADU

DEPARTMENT OF MATHEMATICS

23MAT101 –MATRICES AND CALCULUS

UNIT III – DIFFERENTIAL CALCULUS

PART A QUESTIONS

1. Find the curvature of the curve $2x^2 + 2y^2 + 5x - 2y + 1 = 0$.
2. Find the radius of curvature at (x, y) for the curve $a^2y = x^3 - a^3$.
3. Find ρ for the curve $y = c\log\sec\left(\frac{x}{c}\right)$ at any point (x, y).
4. Find the radius of curvature of the curve $y = \log\sin x$ at $x = \frac{\pi}{2}$.
5. If $= x + 3x^2 - x^3$, find ρ at $x = 0$.
6. Write the formula for centre of curvature and the equation of the circle of curvature.
7. Find the radius of curvature at $\left(1, \frac{1}{2}\right)$ on the curve $2y = x(1 - x + x^2)$
8. Find the radius of curvature at (c, c) on the curve $= c^{n}$.
9. Find the envelope of family of straight lines $= mx + \frac{a}{m}$, m being the parameter.
10. Find the envelope of $y = mx + \sqrt{a^2m^2 + b^2}$ where m is a parameter.
11. Find the envelope of $\frac{x\cos\theta}{a} + \frac{y\sin\theta}{b} = 1$, '$\theta$' being the parameter.
12. For the curve $x^{n} = 2c(y - c)$ find the radius of curvature at $(0, c)$.
13. Find the envelope of $(x - u)^2 + (y - u)^2 = 2u$, u being the parameter.
14. Find the points on the parabola, $y^{n} = 4x$ at which radius of curvature is $4\sqrt{2}$.
15. Give the radius of curvature of the curve given by $x = 3 + 2\cos\theta$, $y = 4 + 2\sin\theta$.