B.Sc. I - B-127 Calculus - Topic. Differential Calculus

Q.1 Find the envelope of the family of straight lines $\frac{ax}{\cos\theta} - \frac{by}{\sin\theta} = a^2 - b^2$, where θ is the parameter.

Q.2. Find the envelope of the family of straight lines $x\cos\alpha + y\sin\alpha = 9$, α is the parameter, Interpret the result geometrically.

Q.3. Find the asymptotes of the curve $y^2(a^2 - x^2) = x^4$.

Q4. Find all the asymptotes of the curve $(y+x)^2(x+2y+2) = x+3y+2$.

Q5. Define point of inflexion. Find all points of inflexion on the curve $y = 3x^4 - 4x^3 + 1$.

Q6 Define singular points and Show that the origin is a node on the curve $x^3 + y^3 - 3axy = 0$

Q.7 Determine the existence and nature of the double points on the curve $y^2 = (x-2)^2(x+1)$.

Q.8 Find the nature of origin on the curve $x^4 + y^3 + 2x^2 + 3y^2 = 0$

Q9. Trace the curve $y^2(2a - x) = x^3$

Q.10 Trace the curve $x^3 + y^3 = 3axy$.

Q.11 Trace the curve $r = a(1 - \cos\theta)$.

Q.12. Trace the curve $r = a\cos 2\theta$.

Q.13 Trace the curve $y^2(a+x) = x^2(a-x)$.

Q.14 Trace the curve $x = a(t + \sin t)$, $y = a(1 - \cos t)$, where $-\pi \le t \le \pi$.

Q.15. Find all asymptotes of the curve

$$\frac{a^2}{x^2} - \frac{b^2}{y^2} = 1.$$

Q.16 Find envelope of family of curves $\frac{x}{a} + \frac{y}{b} = 1$, a, b are two parameters and connected by the relation $ab = c^2$, c is a constant.