

Nabadvip Vidyasagar College

B.A/B.Sc other than Mathematics (Honours) Internal Examination 2019-20
- 2020

Subject - Math-H-GE-T-01

Full Marks - 10

Answer any Two

[5x2 = 10]

1. Show that the radius of curvature at any point on the cardioid $r = a(1 - \cos\theta)$ is $\frac{2}{3} \sqrt{2ar}$

2. Find the asymptotes of

$$x^3 + x^2y - xy^2 - y^3 + x - y = 2$$

3. From any point P on the parabola $y^2 = 4ax$ perpendiculars PM, PN are drawn to the coordinate axes. Find the envelope of the line MN.

4. If $y = \cos(m \sin^{-1}x)$, then prove that

$$(1-x^2)y_{n+2} - (2n+1)xy_{n+1} + (n^2-x^2)y_n = 0$$

5. Let $v = \sin^{-1} \sqrt{\frac{x^{1/3} + y^{1/3}}{x^{1/2} + y^{1/2}}}$, prove that

$$x \frac{\partial v}{\partial x} + y \frac{\partial v}{\partial y} = -\frac{1}{12} \tan v$$