

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

Subject: MATH-H-GE-T-03.

Full Marks - 10.

Answer any two

[5x2]

1. If $y = e^{m \sin^{-1} x}$, show that

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

2. Show that the points of the curve

$$y^2 = 4a(x + a \sin \frac{x}{a})$$

where the tangents are parallel to the x-axis lies on the parabola $y^2 = 4ax$

3. If p, p' be the radii of curvature at the ends of two conjugate diameters of an ellipse, prove that

$$(p^{\frac{2}{3}} + p'^{\frac{2}{3}})(ab)^{\frac{2}{3}} = a^2 + b^2$$

4. Find the asymptotes of the curve

$$a^2(x+y) = x^2 y^2$$

5. If $u = \tan^{-1} \left(\frac{x^2 + y^2}{x-y} \right)$, then prove that

$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$$