B. Tech
1st year

Univ. Roll No: .....

First Term Examination, 2017-18

Course: B.Tech Year: I Semester: I

Engineering Mathematics I (AHM- 1201)

Time: 1 Hr. **Total Marks: 15**

Note: Attempt ALL questions.

Section A **(2x3=6)**

Q.1 Expand $e^x \sin y$ in powers of x and y as far as the terms of third degree.

Q.2 Find the asymptotes of the $y^3 - x^2y + 2y^2 + 4y + 1 = 0$.

Q.3 Given the curve: $\frac{y^2}{x^2} = \frac{(3a-x)}{(a+x)}$

(i) Check the symmetry of the above curve about both the axes.

(ii) Find the point of intersection of the above curve with coordinate axes.

Section B **(3x3=9)**

Q.1 (i) If $u = \frac{x+y}{x-y}$ *and* $v = \frac{xy}{(x-y)^2}$ then show that u and v are not independent. Also find the relation between them.

(ii) If $u = \frac{yz}{x}, v = \frac{zx}{y}, w = \frac{xy}{z}$ then calculate Jacobian of u, v and w with respect to x, y and z.

Q.2 (i) If $u = x^4 log \frac{\sqrt[3]{y} - \sqrt[3]{x}}{\sqrt[3]{y} + \sqrt[3]{x}}$ then find $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$

(ii) If $u = F\left(\frac{y-x}{yx}, \frac{z-x}{zx}\right)$ then show that:

$$x^2\frac{\partial u}{\partial x} + y^2\frac{\partial u}{\partial y} + z^2\frac{\partial u}{\partial z} = 0$$

Q.3 A sheet of poster has its area 18 m^2. The margin at the top and bottom are 75 cm and at the sides 50 cm. What are the dimensions of the poster if the area of the printed space is maximum.