University Roll No. : | | | | | | | | | |

FIRST Term Odd Semester Examination, 2018-19

B.Tech. (I Year) – Semester – I

Subject: - Engineering Mathematics I (BMAS 0101)

Time: 1 Hour **Max. Marks: 15**

Section-A

Note: ***Attempt ALL Questions.*** **(2×3=6 marks)**

Q.1 (a) If $u(x,y)=\sin^{-1}\frac{x}{y}+\tan^{-1}\frac{y}{x}$, Using Euler's theorem, prove that

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

(b) Find the asymptotes' parallel to the axes for the curve $x^2y^2=a^2(x^2+y^2)$

Q.2 Expand $e^x \cos y$ in powers of x and y as far as terms of third degree.

Q.3. (a) If $x^y+y^x=c$, find $\frac{dy}{dx}$ using partial derivatives.

(b) Discuss the nature of double points at origin to the curve $y^2(a+x)=x^2(3a-x)$.

Section–B

Note: ***Attempt ALL Questions.*** **(3 × 3 = 9 marks)**

Q.1. The pressure P at any point (x, y, z) in space is $P=400xyz^2$. Find the highest pressure at the surface of a unit sphere $x^2+y^2+z^2=1$

Q.2. If $u=x+y+z$, $v=x-y+z$ and $w=x^2+y^2+z^2-2yz$, prove that u, v, w are not Independent .Also Find the relation between them.

Q.3 If $x^x y^y z^z=a$ Show that at x = y = z, $\frac{\partial^2 z}{\partial x \partial y}=-(x\log ex)^{-1}$; 'a' is a constant.