JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-1 EXAMINATION- February -2018
B. Tech (2nd Semester)

COURSE CODE: 10B11MA212 **MAX. MARKS: 15**

COURSE NAME: Basic Mathematics-II

COURSE CREDITS: 04 **MAX. TIME: 1 HR**

Note: All questions are compulsory. Carrying of mobile phone during examination will be treated as case of unfair means. Marks are indicated below each question

Quest 1 Discuss the convergence of the series

$$2x + \frac{3}{8}x^2 + \frac{4}{27}x^3 + \cdots\cdots + \frac{(n+1)}{n^3}x^n + \cdots\cdots.$$

[3 Marks]

Quest 2 If $u = \log\left(\frac{x^2+y^2}{\sqrt{x}+\sqrt{y}}\right)$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \frac{3}{2}$.

[3 Marks]

Quest 3 Expand $f(x,y) = 21 + x - 20y + 4x^2 + xy + 6y^2$, in Taylor's series of maximum order about the point (-1, 2).

[3 Marks]

Quest 4 The position vector of a moving particle is

$$\overrightarrow{r(t)} = (\cos t + \sin t)\hat{\imath} + (\sin t - \cos t)\hat{\jmath} + t\hat{k}.$$

Determine the velocity and acceleration at $t = \frac{\pi}{2}$. Find also the magnitude of the velocity and acceleration of the particle at any time t.

[3 Marks]

Quest 5 Find the unit normal vector to the surface $xy^2 + 2yz = 8$, at the point (3, -2, 1).

[3 Marks]