JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3, EXAMINATION- MAY-2018
B.Tech. II Semester (BI/BT)

COURSE CODE: 10B11MA212

COURSE NAME: BASIC MATHEMATICS-II

COURSE CREDITS: 04

MAX. MARKS: 35

MAX. TIME: 2:00 Hrs.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Quest 1 (a) Test the convergence of the series

$$\sum_{n=1}^{\infty} \frac{n^2}{(3n+1)(3n+4)(3n+7)}$$

(b) If $u = e^{xyz}$, find the value of $\frac{\partial^3 u}{\partial x \partial y \partial z}$ [2+3] [CO-1, CO-2]

Quest (2) (a) (i) Find the order and degree of the following differential equation

$$\left[1 + \left(\frac{dy}{dx}\right)^2\right]^3 = \left(\frac{d^3y}{dx^3}\right)^5$$

(ii) Solve $\frac{dy}{dx} = e^{2x-3y} + 4x^3 e^{-3y}$

(b) Solve $x^2 \frac{d^2y}{dx^2} + 4x \frac{dy}{dx} + 2y = x$ [1+1.5+2.5] [CO-3, CO-4]

Quest (3) (a) Find the number of students from the following data who secured marks less than 45

Marks	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
No. of students:	35	48	70	40	22

[5] [CO-6]

Quest (4) Using Simpson's $\frac{3}{8}$ rule and taking $h = \frac{1}{6}$, evaluate [5] [CO-6]

$$\int_{0}^{1} \frac{dx}{1+x^2}$$

Quest (5) Calculate median and mode of the following data relating to weight of 120 articles:

Weight (in grams)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No. of articles	14	17	22	26	23	18

[5] [CO-5]

Quest (6) Calculate the mean and standard deviation for the following table giving the age distribution of 542 members:

Age (in years)	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
No. of Members	3	61	132	153	140	51	2

[5] [CO-5]

Quest (7) Using Newton- Raphson method, find the real root (between 0 and 1) of the equation $3x - \cos x - 1 = 0$, correct up to 3 decimal places.

[5] [CO-6]