

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATION- 2023
B.Tech-I Semester (BT/BI)

COURSE CODE (CREDITS): 18B11MA112 (04)
COURSE NAME: BASIC MATHEMATICS-I
COURSE INSTRUCTORS: MDS

MAX. MARKS: 35

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q1. Solve the following system of linear equation

$$6x + y - 3z = 5$$

$$x + 3y - 2z = 5$$

$$2x + y + 4z = 8$$

(CO-1) [4]

Q2. Find the area of a triangle whose adjacent sides are given by the vectors $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$
and $\vec{b} = 2\hat{i} + 5\hat{j} + \hat{k}$.

(CO-2) [3]

Q3. Convert the complex number $\frac{1+3i}{1-2i}$ into $A + iB$ and find its polar form.

(CO-3) [3]

Q4 A travel agent surveyed 150 people to find out how many of them had visited the cities of Mumbai and Delhi. 47 people had visited Mumbai, 31 people had been to Delhi, and 15 people had visited both cities. Draw a Venn diagram to find the number of people who had visited:

(CO-4) [4]

- Mumbai or Delhi
- Delhi but not Mumbai
- only one of the two cities
- neither city

Q5. (a) Write Taylor's series expansion for $f(x) = e^{2x}$, about the point $x = 0$.

(CO-5) [3+3+3]

(b) Find $\frac{dy}{dx}$ for the following functions

(i). $y = (7x^3 - x^4)^7 + \tan(9 - \cos 2x)$.

(ii). $y = x^2(\log(2x - 1)) + \sin\left(\frac{x^2-1}{x^2+1}\right)$.

Q.6 Evaluate

(CO-6) [4+4]

(i). $\int \frac{3x+7}{(x+3)x(x-1)} dx$

(ii). $\int x^2 \cos x dx$, using integration by parts.

Q.7 Find the area of the shaded region in the first quadrant bounded by the x - axis and the graph of $f(x)$ as shown in the adjoining figure.

(CO-6) [4]

