

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T-1, EXAMINATION- 2022

B. Tech. I Semester (BI/BT)

COURSE CODE (CREDITS): 18B11MA112 (04)

MAX. MARKS: 15

COURSE NAME: BASIC MATHEMATICS-I

COURSE INSTRUCTORS: MDS

MAX. TIME: 1:00 Hrs.

*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

Quest.(1) Express the matrix  $A = \begin{bmatrix} 4 & 2 & -1 \\ 3 & 5 & 7 \\ 1 & -2 & 1 \end{bmatrix}$  as sum of symmetric and a skew-symmetric matrix. [3] [CO-1]

Quest.(2) Find the values of  $a, b, c$  if the matrix

$$A = \begin{bmatrix} 0 & 2b & c \\ a & b & -c \\ a & -b & c \end{bmatrix}$$

satisfy the equation  $A^T A = I_3$ .

[3] [CO-1]

Quest.(3) Prove that

$$\begin{vmatrix} a & a+b & a+2b \\ a+2b & a & a+b \\ a+b & a+2b & a \end{vmatrix} = 9(a+b)b^2$$

[3] [CO-1]

Quest.(4) Solve the following system of linear equation

$$\begin{aligned} 3x + y + z &= 2 \\ 2x - 4y + 3z &= -1 \\ 4x + y - 3z &= -11 \end{aligned}$$

[4] [CO-1]

Quest.(5) Find a vector in the direction of vector  $\overrightarrow{AB}$ , which has a magnitude 7, where A and B are the points  $(2, 5, -3)$  and  $(2, 2, -7)$  respectively. [2] [CO-2]