JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1, EXAMINATION- October-2018

B.Tech. I Semester (BI/BT) Dr. Mandeep Singh

COURSE CODE: 18B11MA112 / 10B11MA112 (Backlog) MAX. MARKS: 25

COURSE NAME: BASIC MATHEMATICS-I

COURSE CREDITS: 04 MAX. TIME: 1:30 Hrs.

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

Quest (1) (a) Solve the system of linear equation **[CO-1] [3+2]**

$$x + 3y + 4z = 8$$
$$2x + y + 2z = 5$$
$$5x + y + z = 7$$

(b) If $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & -1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ show that $A^{-1} = A^2$.

Quest (2) If the lines $y = 2x + 1$ and $y = 3x + 4$ are equally inclined to the line $y = mx + 2$, find the value of m. **[CO-2] [4]**

Quest (3) Find the vector and cartesian equations of the plane which passes through the point (3, -2, 4) and perpendicular to the vector $2\,\hat{\imath} + 3\,\hat{\jmath} + 5\,\hat{k}$. **[CO-2] [3]**

Quest (4) Find the vector and cartesian equation of the sphere whose centre is $(8, 3, 5)$ and which passes through the point $(-4, -2, 5)$. **[CO-2] [3]**

Quest (5) Express the complex number $-5 + 5\,i$ in polar form. **[CO-3] [3]**

Quest (6) Express $\left(\frac{1}{1-2i} + \frac{3}{1+i}\right)\left(\frac{3+4\,i}{2-4i}\right)$ in the form of $a + ib$. **[CO-3] [4]**

Quest (7) If $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{2,4,6,8\}$ and $B = \{2,3,5,7\}$. Verify that **[CO-4] [3]**

(a) $(A \cup B)' = A' \cap B'$

(b) $(A \cap B)' = A' \cup B'$