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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- October 2017
B.Tech (BI/BT) Ist Semester

COURSE CODE: 10B11MA112 MAX.MARKS: **25**
COURSE NAME: Basic Mathematics I
COURSE CREDITS: 4 MAX. TIME: **1.5 Hrs**

Note: All questions are compulsory. Carrying of mobile phone and calculator during examinations will be treated as case of unfair means. Marks are indicated in square brackets.

Q1.If $\vec{a} = 3\hat{\imath} - \hat{\jmath} + 2\hat{k}, \vec{b} = 2\hat{\imath} + \hat{\jmath} - \hat{k}, \vec{c} = \hat{\imath} - 2\hat{\jmath} + 2\hat{k}$

a) Show that $(\vec{a} \times \vec{b}) \times \vec{c} \neq \vec{a} \times (\vec{b} \times \vec{c})$ b) Find $\hat{a}$, $\hat{a}.\vec{c}$, $|\vec{b}|$ [3+2=5]

Q2.(a) Find the equation of circle, the coordinates of the end points of whose diameter are $(-1,2)$ *and* $(4,-3)$ [2]

(b) Find the equation of sphere with centre at $(1,0,-1)$ and radius equal to that of the sphere

$3x^2 + 3y^2 + 3z^2 - 2x + 4y - 6z = 1$ [2]

(c) Find the equation of line which passes through the points $(1,2)$ *and* $(3,4)$ [1]

Q3.(a) Find the square root of $5 + 12i$ [3]

(b) Simplify $Z = \frac{(2+3i)^2}{2-i}$, *then find* $\bar{Z}$ *and* $|Z|$ [3]

Q4.(a) Let $A = \{x: x \in N\}, B = \{x: x = 2n, n \in N\}$ *and* $C = \{x: x = 2n - 1, n \in N\}$ Where N is set of natural numbers. Find $A \cap B, A \cap C$ *and* $B \cap C$. [3]

(b) If $A = \{1,2,3\}, B = \{4\}, C = \{5\}$ *verify that* $A \times (B - C) = (A \times B) - (A \times C)$ [2]

Q5.In a survey of 25 students, it was found that 15 had taken mathematics,12 had taken physics and 11 had taken chemistry,5 had taken mathematics and chemistry,9 had taken mathematics and physics,4 had taken physics and chemistry and 3 had taken all the three subjects. Find the number of students that had [4]

a) Only chemistry, only mathematics, only physics

b) Physics and chemistry but not mathematics

c) Mathematics and physics but not chemistry

d) only one of the subject

e) At least one of the three subjects

f) None of the subjects

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