(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 154204 Roll No.

B.TECH.

Theory Examination (Semester-II) 2015-16

ELEMENTARY MATHEMATICS-II

Time : 3 Hours ***Max. Marks : 100***

Section-A

Q1. Attempt all section. All section carries equal marks. Write answer of each questions in short. (2×10=20)

(a) Express the following complex number in the form of $a + ib$, $(5i)\left(-\frac{3}{5}i\right)$.

(b) Solve-the linear inequality $4x + 3 < 5x + 7$.

(c) Find the value of n for ${}^nC_7 = {}^nC_5$.

(d) Find the n^{th} term of an A.P. 5, 8, 11, ...

(e) Find the slope of line passing through the points (3,-2) and (-1, 4).

tively. Find its direction cosine.

(j) Find the equation of plane with intercepts 2, 3 and 4 on the x, y and z axis respectively.

Section-B

Q2. Attempt any five questions from this section. (5×10=50)

(a) Solve the following system of inequalities by graphical method.

$2x+y \geq 6,\ 3x+4y \leq 12$.

(b) Find the number of arrangements of the letters of the word "INDEPENDENCE". In how many these arrangement-

(i) do the words start with P.

(ii) do the all vowel always occur together.

(iii) do the words begin with 'I' and end in 'P'.

rectum for the ellipse $\frac{x^2}{36}+\frac{y^2}{16}=1$

(g) Find the area of parallelogram whose adjacent sides are given by vectors $\vec{a}=3\hat{i}+\hat{j}+4\hat{k}$ *and* $\vec{b}=\hat{i}-2\hat{j}+\hat{k}$.

Section-C

Attempt any two question. (15×2=30))

Q3. If p and p be the perpendiculars from origin upon the straight lines $x\sec\theta + y\operatorname{cosec}\theta = a$ and $x\cos\theta - y\sin\theta = a\cos 2\theta$ respectively. Prove that $4p^2 + p^2 = a^2$

Q4. Find angle between the line vectors

$\vec{r}_1=3\hat{i}-2\hat{j}+\hat{k}$ *and* $\vec{r}_2=4\hat{i}+5\hat{j}+7\hat{k}$

Q5. Find shortest distance between two lines whose vector equations are

$$\vec{r} = \left(\hat{i} + 2\hat{j} + \hat{k}\right) + \lambda\left(\hat{i} - \hat{j} + \hat{k}\right)$$
$$\vec{r} = \left(2\hat{i} - \hat{j} - \hat{k}\right) + \mu\left(2\hat{i} + \hat{j} + 2\hat{k}\right)$$