Quality Checkers Only way to fulfill your dreams	XI-SCI : Maths Complex Numbers,	**DATE:** **TIME: 1 Hours 30 Minutes** **MARKS: 25** SEAT NO:

Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1. Select and write the correct answer. **(4)**

1. If $i^2 = -1$, then the sum $i + i^2 + i^3 + ...$ upto 1000 terms is equal to

   A) 1 B) - 1

   C) i D) 0

2. If –1 + $\sqrt{3}$ i = re$^{i\theta}$ then θ =

   A) $-\frac{2\pi}{3}$ B) $\frac{\pi}{3}$

   C) $-\frac{\pi}{3}$ D) $\frac{2\pi}{3}$

Q.2. Answer the following. **(3)**

1. Simplify the following and express in the form a + ib
   (2 + 3i) (1 – 4i)
2. Find the value of w^{-105}
3. For z = 2 + 3i verify the following : $\overline{\overline{z}} = z$

Section B
Attempt any Four

Q.3 Find a and b if a + 2b + 2ai = 4 + 6i **(2)**

Q.4 Find the modulus and argument of each complex number and express it in the polar form. 6 – i **(2)**

Q.5 Simplify the following and express in the form a + ib **(2)**
(1 + 3i)^2 (3 + i)

Q.6 Find the modulus and argument of each complex number and express it in the polar form. 2i **(2)**

Q.7 If w is complex cube root of unity, show that (2 + w + w^2)^3 – (1 – 3w + w^2)^3 = 65 **(2)**

Q.8 Represent 1 + 2i, 2 – i, –3 –2i, –2 + 3i by points in Argand's diagram. **(2)**

Section C
Attempt any Two

Q.9 If w is complex cube root of unity, show that (a + b)^2 + (aw + bw^2)^2 + (aw^2 + bw)^2 = 6ab **(3)**

Q.10 Find the modulus and amplitude for each of the following : –4 – 4i **(3)**

Q.11 Prove that $(1 + i)^4 \times \left(1 + \frac{1}{i}\right) = 16$ **(3)**

Section D
Attempt any One

Q.12 Solve the following quadratic equations : $x^2 - (2 + i)x - (1 - 7i) = 0$ **(4)**

Q.13 Express the following in the form a + ib, a, b $\in$ R, using De Moviver's theorem. **(4)**

$(1 - i)^5$