SUCCESS KEY TEST SERIES

Work Sheet

Std: 11th Science **Subject: Mathematics & Statistics** **Time: 1Hrs**

Date : **1. Complex Number** **Max Marks: 40**

Q.1 Select and write the most appropriate answers from given alternatives: **10**

1) What is imaginary part of $7+\sqrt{3}$?

(a) 7 (b) $\sqrt{3}$ (c) 1 (d) 0

2) $\left(\frac{\sqrt{3}}{2}+\frac{i}{2}\right)^5-\left(\frac{\sqrt{3}}{2}-\frac{i}{2}\right)^3$ is equal to

(a) i (b) i^2 (c) $-i$ (d) 1

3) $(\cos x+i\sin x)^4$ is equal to

(a) $(4\cos x+4i\sin x)$ (b) $4(\cos x+i\sin x)^3$

(c) $(\cos 4x-i\sin 4x)$ (d) $(\cos 4x+i\sin 4x)$

4) The value of $\sqrt{-25}$ is

(a) 4i (b) 5 (c) 5i (d) -5i

5) Find the values of a and b if $\frac{1}{a+ib}=4-3i$

(a) $a=\frac{48}{25}, b=\frac{9}{25}$ (b) $a=\frac{12}{25}, b=\frac{9}{25}$

(c) $a=\frac{9}{25}, b=\frac{12}{25}$ (d) $a=-\frac{48}{25}, b=\frac{25}{9}$

Q.2 Solve the following: **5**

1) Simplify the following and express in the form a + ib.
$(2 + 3i)(1-4i)$

2) Write the conjugates of the following complex number
$\cos\theta + i \sin\theta$

3) Express the following numbers in the form z + iy.
$\sqrt{3}(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6})$

4) Find the value of
w^{18}

5) Evaluate the following :
i^{403}

Q.3 Answer the following: **10**

1) Solve $x^2 + x + 1 = 0$.

2) If w is a complex cube root of unity, show that
$(a + b) + (aw + bw^2) + (aw^2 + bw) = 0$

3) For $z = 2 + 3i$ verify the following :

$z - \bar{z} = 6i$

4) If w is a complex cube root of unity, show that

$w^2 + w^3 + w^4$

5) Show that $(-1 + \sqrt{3}i)^3$ is a real number.

Q.4 Solve the following: **15**

1) Find the value of
$x^3 + 2x^2 - 3x + 21$, if $x = 1 + 2i$.

2) Find the value of x and y which satisfy the following equations$(x, y \in R)$
if $x(1 + 3i) + y(2 - i) - 5 + i^3 = 0$, find $x + y$

3) Find the modulus and argument of each complex number and express it in the polar form.

$$\frac{-1 - i}{\sqrt{2}}$$

4) If w is a complex cube root of unity, then show that
$(1 - w)(1 - w^2)(1 - w^4)(1 - w^5) = 9$

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

-------- All the Best --------