ASSIGNMENT – 1(BASIC) ON COMPLEX NUMBER

SECTION – A (Onemark Questions)

1. Multiply $\sqrt{\mathbf{2}} + \boldsymbol{i}$ in to its conjugate.
2. Find real x and y , if (x – iy) (3 + 5i) is the conjugate of – 6 – 24i
3. Find the multiplication inverse of $\sqrt{\mathbf{3}}$ - i
4. **The standard form of $(\mathbf{1} - \boldsymbol{i})^{\mathbf{3}}$ is ……**
5. **$\mathbf{1} + \boldsymbol{i}^{\mathbf{5}} + \boldsymbol{i}^{\mathbf{10}} - \boldsymbol{i}^{\mathbf{15}}$ is ------**

6.The modulus of $(\mathbf{1} - \mathbf{2}\boldsymbol{i})^{-\mathbf{3}}$ is …

7.The the principal argument of the complex number -*i* is ……

8. Square root of ‘i’ is (a) $\frac{1}{\sqrt{2}}$ (b) $-\frac{1}{\sqrt{2}}$ (c) $\frac{1+i}{\sqrt{2}}$ (d) $\pm\frac{1+i}{\sqrt{2}}$

SECTION – B (Two marks Questions)

9.Prove that $\left(\frac{2+3i}{3+4i}\right)\left(\frac{2-3i}{3-4i}\right)$ is purely real

10.If a + ib $=\frac{c+i}{c-i}$ **,** prove that $a^2 + b^2 = 1$

11.What is the value of $\frac{i^{4n+1} - i^{4n-1}}{2}$

12.Express $\left(\frac{1}{1-4i} - \frac{2}{1+i}\right)\left(\frac{3-4i}{5+i}\right)$ in to a+$\boldsymbol{i}$b form

SECTION – C (Four marks Questions)

13.Find the modulus and argument of the $\frac{\mathbf{1}+\mathbf{2}\boldsymbol{i}}{\mathbf{1}-\mathbf{3}\boldsymbol{i}}$ complex numbers and convert them in to polar form .

14. Write the real value for which $\frac{1 - i\sin\alpha}{1 + 2i\sin\alpha}$ is purely real

15. If a+ ib = $\frac{c+i}{c-i}$ where a, b, c are real , prove that $a^2 + b^2 = 1$ and $\frac{\boldsymbol{b}}{\boldsymbol{a}} = \frac{\mathbf{2}\boldsymbol{c}}{\boldsymbol{c}^{\mathbf{2}} - \mathbf{1}}$

16. Find the values of x and y if $\frac{(1+i)x - 2i}{3+i} + \frac{(2-3i)\,y + i}{3-i} = i$

ASSIGNMENT – 2(STANDARD) ON COMPLEX NUMBER

SECTION – A (Onemark Questions)

1. Find the modulus of $\left(\frac{1-i}{1+i}\right)^{100}$
2. Find z if $|z| = 4$ and arg (z) = $5\pi/6$
3. Write the amplitude of sin $\frac{\pi}{5} + i\left(1 - \cos\frac{\pi}{5}\right)$
4. Write the polar form of $\left(i^{25}\right)^3$
5. The value of $i^{348} + i^{349} + i^{350} + i^{351} + i^{352}$ is ....
6. The polar form of $(i^3)^{25}$.
   (a) $\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}$ (b) $\cos\frac{\pi}{2} - i\sin\frac{\pi}{2}$
   (c)$\cos\pi + i\sin\pi$ (d) $\cos\pi - i\sin\pi$

SECTION – B (Two marks Questions)

7. If , $\frac{\left(a^2+1\right)^2}{2a-i}$ = x + iy Evaluate $x^2 + y^2$
8. If $\left(\frac{1-i}{1+i}\right)^{100} = a + ib$, then find ab .
9. Find least positive value of n if $\left(\frac{1+i}{1-i}\right)^n = 1$
10. If $1 + i$ is a root of the equation $x^2 + ax + b = 0$ $where\ a, b \in R$, then find the value of $a + b$.

SECTION – C (Four marks Questions)

11. **If $(x + iy)^{\frac{1}{3}} = a + ib$, x , y a , b ϵR , show that $\frac{x}{a} + \frac{y}{b} = 4(a^2 + b^2)$**
12. Find the square root of -7 – 24i
13. Write the complex number $z = \frac{1-i}{\cos\frac{\pi}{3} + i\sin\pi/3}$ in polar form
14. If α and β are different complex numbers with $|\beta| = 1$, find $\left|\frac{\beta-\alpha}{1-\bar{\alpha}\beta}\right|$
15. Find the real values of θ , for which the complex number $\frac{1+icos\theta}{1-2i\ cos\theta}$ is purely real

ASSIGNMENT – 3(HOTS) ON COMPLEX NUMBER

SECTION – A (Onemark Questions)

1. Find non-zero integral solutions of $|\mathbf{1-i}|^{x} = \mathbf{2}^{x}$

2.If 2 - 3i is a root of $x^2 + px + q = 0$, then pq is -----

3.If a+ ib= $(1+i)(2-i)(1+2i)(\sqrt{3}+i)$, then $a^2 + b^2$ is ----

4.If $= \frac{1+2i}{1-(1-i)^2}$, then $\arg z$ equals

(a) 0 (b) $\frac{\pi}{2}$ (c) π (d)none of these

5.If θ is amplitude of $\frac{x+iy}{x-iy}$, then $\tan\theta$ is

(a) $\frac{2xy}{x^2+y^2}$ (b) $\frac{2xy}{x^2-y^2}$ (c) $\frac{x^2-y^2}{x^2+y^2}$ (d)None of these

SECTION – B (Two marks Questions)

6.Express $\frac{1}{1-\cos\theta+2i\sin\theta}$ in to a+$\boldsymbol{i}$ b form

7.What is the smallest positive integer n, for which $\left(\frac{1+i}{1-i}\right)^{2n} = 1$

8.Express in to polar form $\frac{1+i}{1-i}$

9.Evaluate $(1+i)^{100} + (1-i)^{100}$

10. Find x, if sinx + i cos2x and cosx – i sin2x are conjugate to each other

SECTION – C (Four marks Questions)

11. If $|z_1| = |z_2| = |z_3| = -------- = |z_n| = 1$ show that

$$\left|\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3} + ------ \frac{1}{z_n}\right| = |z_1 + z_2 + z_3 + ----- + z_n|$$

12.Find the relation between x and y if z = x + iy satisfying $\left|\frac{z-3}{z+3}\right| = 2$

13.If z_1 & z_2 are two complex numbers , prove that $|z_1 + z_2| \le |z_1| + |z_2|$

14. Solve for x , $x^2 - (2+i)x = 1 - 7i$.

15. Show that the complex number z , satisfying $\arg\left(\frac{z-1}{z+1}\right) = \frac{\pi}{4}$ lies on a circle.