EXERCISE – II   MULTIPLE CORRECT (OBJECTIVE QUESTIONS)

1. If $|z_1 + z_2|^2 = |z_1|^2 + |z_2|^2$ then

(A) $\frac{z_1}{z_2}$ is purely real (B) $\frac{z_1}{z_2}$ is purely imaginary

(C) $z_1\bar{z}_2 + z_2\bar{z}_1 = 0$ (D) amp $\frac{z_1}{z_2}$ may be equal to $\frac{\pi}{2}$

2. The equation $|z - i| + |z + i| = k$, $k > 0$, can represent

(A) an ellipse if $k > 2$ (B) line segment if $k = 2$

(C) an ellipse if $k = 5$ (D) line segment if $k = 1$

3. The equation $||z + i| - |z - i|| = k$ represents

(A) a hyperbola if $0 < k < 2$ (B) a pair of ray if $k > 2$

(C) a straight line if $k = 0$ (D) a pair of ray if $k = 2$

4. POQ is a straight line through the origin O, P and Q represent the complex number $a + i\,b$ and $c + i\,d$ respectively and OP = OQ. Then

(A) $|a + i\,b| = |c + i\,d|$ (B) $a + c = b + d$

(C) $\arg(a + i\,b) = \arg(c + i\,d)$ (D) None of these

5. If z satisfies the inequality $|z - 1 - 2i| \le 1$, then

(A) $\min(\arg(z)) = \tan^{-1}\left(\frac{3}{4}\right)$ (B) $\max(\arg(z)) = \frac{\pi}{2}$

(C) $\min(|z|) = \sqrt{5} - 1$ (D) $\max(|z|) = \sqrt{5} + 1$

6. If z is a complex number then the equation $z^2 + z|z| + |z^2| = 0$ is satisfied by

(ω and ω^2 are imaginary cube roots of unity)

(A) $z = k\omega$ where $k \in R$

(B) $z = k\omega^2$ where k is non negative real

(C) $z = k\omega$ where k is positive real

(D) $z = k\omega^2$ where $k \in R$

7. If $2\cos\theta = x + \frac{1}{x}$ and $2\cos\varphi = y + \frac{1}{y}$, then

(A) $x^n + \frac{1}{x^n} = 2\cos(n\theta)$ (B) $\frac{x}{y} + \frac{y}{x} = 2\cos(\theta - \varphi)$

(C) $xy + \frac{1}{xy} = 2\cos(\theta + \varphi)$ (D) None of these

8. The value of $i^n + i^{-n}$, for $i = \sqrt{-1}$ and $n \in I$ is

(A) $\frac{2^n}{(1-i)^{2n}} + \frac{(1+i)^{2n}}{2^n}$ (B) $\frac{(1+i)^{2n}}{2^n} + \frac{(1-i)^{2n}}{2^n}$

(C) $\frac{(1+i)^{2n}}{2^n} + \frac{2^n}{(1-i)^{2n}}$ (D) $\frac{2^n}{(1+i)^{2n}} + \frac{2^n}{(1-i)^{2n}}$

9. ABCD is a square, vertices being taken in the anticlockwise sense. If A represents the complex number z and the intersection of the diagonals is the origin then

(A) B represents the complex number iz

(B) D represents the complex number $i\bar{z}$

(C) B represents the complex number $i\bar{z}$

(D) D represents the complex number $-iz$

10. If g(x) and h(x) are two real polynomials such that the polynomial $g(x^3) + xh(x^3)$ is divisible by $x^2 + x + 1$, then

(A) $g(1) = h(1) = 0$ (B) $g(1) = h(1) \ne 0$

(C) $g(1) = -h(1)$ (D) $g(1) + h(1) = 0$