SET 2

1. Let z and w be two complex numbers such that $|z| = |w|$ and $\arg z + \arg w = \pi$, then z equals :
A. w B. -w C. $\overline{w}$ D. $-\overline{w}$

2. Let z and w be two complex numbers such that $|z| \leq 1, |w| \leq 1$ and $|z + iw| = |z - i\overline{w}| = 2$, then z equals :
A. 1 or i B. i or -i C. 1 or -1 D. i or -1

3. For positive integers n_1, n_2 the value of expression $(1+i)^{n_1} + (1+i^3)^{n_1} + (1+i^5)^{n_2} + (1+i^7)^{n_2}$, here $i = \sqrt{-1}$ is a real number, if and only if :
A. $n_1 = n_2 + 1$ B. $n_1 = n_2 - 1$ C. $n_1 = n_2$ D. $n_1 > 0, n_2 > 0$

4. If ω is an imaginary cube root of unity, then $(1 + \omega - \omega^2)^7$ is equal to :
A. 128ω B. -128ω C. $128\omega^2$ D. $-128\omega^2$

5. The value of sum $\sum_{n=1}^{13}(i^n + i^{n+1})$, where $i = \sqrt{-1}$ equals : A. i B. i-1 C. -i D. 0

6. If $\begin{vmatrix} 6i & -3i & 1 \\ 4 & 3i & -1 \\ 20 & 3 & i \end{vmatrix} = x + iy$, then : A. x=3,y=1 B. x=1,y=1 C. x=0,y=3 D. x=0,y=0

7. If i $=\sqrt{-1}$, then $4 + 5(-\frac{1}{2} + \frac{i\sqrt{3}}{2})^{334} + 3(-\frac{1}{2} + \frac{i\sqrt{3}}{2})^{365}$ is equal to : A. $1 - i\sqrt{3}$ B. $-1 + i\sqrt{3}$ C. $i\sqrt{3}$ D. $-i\sqrt{3}$

8. If $\arg(z) < 0$, then $\arg(-z) - \arg(z) =$ A. π B. $-\pi$ C. $-\frac{\pi}{2}$ D. $\frac{\pi}{2}$

9. If z_1, z_2 and z_3 are complex numbers such that $|z_1| = |z_2| = |z_3| = |\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3}| = 1$, then $|z_1 + z_2 + z_3|$ is : A. equal to 1 B. less than 1 C. greater than 3 D. equal to 3

10. Let z_1 and z_2 be the n^{th} roots of unity which subtend a right angle at the origin, then n must be of the form : A. 4k+1 B. 4k+2 C. 4k+3 D. 4k

11. The complex numbers z_1, z_2 and z_3 satisfying $\frac{z_1 - z_3}{z_2 - z_3} = \frac{1 - i\sqrt{3}}{2}$ are the vertices of a triangle which is :
A. of area zero B. right angled isosceles C. equilateral D. obtuse angled isosceles

12. Let $\omega = -\frac{1}{2} + i\frac{\sqrt{3}}{2}$, then value of the determinant $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -1-\omega^2 & \omega^2 \\ 1 & \omega^2 & \omega \end{vmatrix}$ is : A. 3ω B. $3\omega(\omega - 1)$
C. $3\omega^2$ D. $3\omega(1 - \omega)$

13. For all complex numbers z_1, z_2 satisfying $|z_1| = 12$ and $|z_2 - 3 - 4i| = 5$, the minimum value of $|z_1 - z_2|$ is : A. 0 B. 2 C. 7 D. 17

14. If $|z| = 1$ and w $=\frac{z-1}{z+1}$ (where $z \neq -1$), then Re(w) is : A. 0 B. $\frac{1}{|z+1|^2}$ C. $|\frac{1}{z+1}|.\frac{1}{|z+1|^2}$
D. $\frac{\sqrt{2}}{|z+1|^2}$

15. If $\omega(\neq 1)$ be a cube root of unity and $(1+\omega^2)^n = (1+\omega^4)^n$, then the least positive value of n is A. 2
B. 3 C. 5 D. 6

16. The minimum value of $|a + b\omega + c\omega^2|$, where a,b and c are all not equal integers and $\omega(\neq 1)$ is a cube root of unity, is : A. $\sqrt{3}$ B. $\frac{1}{2}$ C. 1 D. 0