

25. What is the conjugate of $\frac{2-i}{(1-2i)^2}$?
26. If $|z_1| = |z_2|$, is it necessary that $z_1 = z_2$?
27. If $\frac{(a^2+1)^2}{2a-i} = x + iy$, what is the value of $x^2 + y^2$?
28. Find z if $|z| = 4$ and $\arg(z) = \frac{5\pi}{6}$.
29. Find $\left| (1+i) \frac{(2+i)}{(3+i)} \right|$
30. Find principal argument of $(1 + i\sqrt{3})^2$.
31. Where does z lie, if $\left| \frac{z-5i}{z+5i} \right| = 1$.

32. $\sin x + i \cos 2x$ and $\cos x - i \sin 2x$ are conjugate to each other for:
- (A) $x = n\pi$ (B) $x = \left(n + \frac{1}{2}\right)\frac{\pi}{2}$
 (C) $x = 0$ (D) No value of x
33. The real value of α for which the expression $\frac{1 - i \sin \alpha}{1 + 2i \sin \alpha}$ is purely real is :
- (A) $(n+1)\frac{\pi}{2}$ (B) $(2n+1)\frac{\pi}{2}$
 (C) $n\pi$ (D) None of these, where $n \in \mathbb{N}$
34. If $z = x + iy$ lies in the third quadrant, then $\frac{\bar{z}}{z}$ also lies in the third quadrant if
- (A) $x > y > 0$ (B) $x < y < 0$
 (C) $y < x < 0$ (D) $y > x > 0$
35. The value of $(z+3)(\bar{z}+3)$ is equivalent to
- (A) $|z+3|^2$ (B) $|z-3|$
 (C) z^2+3 (D) None of these
36. If $\left(\frac{1+i}{1-i}\right)^x = 1$, then
- (A) $x = 2n+1$ (B) $x = 4n$
 (C) $x = 2n$ (D) $x = 4n+1$, where $n \in \mathbb{N}$
37. A real value of x satisfies the equation $\left(\frac{3-4ix}{3+4ix}\right) = \alpha - i\beta$ ($\alpha, \beta \in \mathbb{R}$) if $\alpha^2 + \beta^2 =$
- (A) 1 (B) -1 (C) 2 (D) -2
38. Which of the following is correct for any two complex numbers z_1 and z_2 ?
- (A) $|z_1 z_2| = |z_1| |z_2|$ (B) $\arg(z_1 z_2) = \arg(z_1) + \arg(z_2)$
 (C) $|z_1 + z_2| = |z_1| + |z_2|$ (D) $|z_1 + z_2| \geq |z_1| - |z_2|$
39. The point represented by the complex number $2 - i$ is rotated about origin through

an angle $\frac{\pi}{2}$ in the clockwise direction, the new position of point is:

- (A) $1 + 2i$ (B) $-1 - 2i$ (C) $2 + i$ (D) $-1 + 2i$
40. Let $x, y \in \mathbf{R}$, then $x + iy$ is a non real complex number if:
(A) $x = 0$ (B) $y = 0$ (C) $x \neq 0$ (D) $y \neq 0$
41. If $a + ib = c + id$, then
(A) $a^2 + c^2 = 0$ (B) $b^2 + c^2 = 0$
(C) $b^2 + d^2 = 0$ (D) $a^2 + b^2 = c^2 + d^2$
42. The complex number z which satisfies the condition $\left| \frac{i+z}{i-z} \right| = 1$ lies on
(A) circle $x^2 + y^2 = 1$ (B) the x -axis
(C) the y -axis (D) the line $x + y = 1$.
43. If z is a complex number, then
(A) $|z^2| > |z|^2$ (B) $|z^2| = |z|^2$
(C) $|z^2| < |z|^2$ (D) $|z^2| \geq |z|^2$
44. $|z_1 + z_2| = |z_1| + |z_2|$ is possible if
(A) $z_2 = \bar{z}_1$ (B) $z_2 = \frac{1}{z_1}$
(C) $\arg(z_1) = \arg(z_2)$ (D) $|z_1| = |z_2|$
45. The real value of θ for which the expression $\frac{1 + i \cos \theta}{1 - 2i \cos \theta}$ is a real number is:
(A) $n\pi + \frac{\pi}{4}$ (B) $n\pi + (-1)^n \frac{\pi}{4}$
(C) $2n\pi \pm \frac{\pi}{2}$ (D) none of these.
46. The value of $\arg(x)$ when $x < 0$ is:
(A) 0 (B) $\frac{\pi}{2}$