COMPLEX NUMBER & QUADRATIC EQUATION

1. If $\left(\frac{1-i}{1+i}\right)^{100} = a+ib$, then

(a) $a=2, b=-1$ (b) $a=1, b=0$

(c) $a=0, b=1$ (d) $a=-1, b=2$

2. If $z=-\overline{z}$, then

(a) z is purely real

(b) z is purely imaginary

(c) Real part of z = Complex part of z

(d) z is any complex number.

3. $(1+i)^6+(1-i)^6 =$

(a) 0

(b) 2^7

(c) 2^6

(d) none of these

4. Multiplicative inverse of the non-zero complex number $x + iy$ $(x, y \in R)$ is

(a) $\frac{x}{x+y}-\frac{y}{x+y}i$

(b) $\frac{x}{x^2+y^2}-\frac{y}{x^2+y^2}i$

(c) $-\frac{x}{x^2+y^2}+\frac{y}{x^2+y^2}i$

(d) $\frac{x}{x+y}+\frac{y}{x+y}i$

5. If $(a+ib)^5=\alpha+i\beta$, then $(b+ia)^5$ is equal to

(a) $\beta+i\alpha$ (b) $\alpha-i\beta$

(c) $\beta-i\alpha$ (d) $-\alpha-i\beta$

6. If z is a complex number such that $|z+1|=z+2(1+i)$, then z is

(a) $\frac{1}{2}(1+4i)$ (b) $\frac{1}{2}(3+4i)$

(c) $\frac{1}{2}(1-4i)$ (d) $\frac{1}{2}(3-4i)$

7. If $\left(\frac{1+i}{1-i}\right)^3-\left(\frac{1-i}{1+i}\right)^3 = x+iy$, then (x, y) =

(a) (0, 2) (b) (-2, 0)

(c) (0, - 2) (d) none of these

8. Which of the following is not applicable for a complex number?

(a) Addition (b) Subtraction

(c) Division (d) Inequality.

9. The number $\frac{(1-i)^3}{1-i^3}$ is equal to

(a) i (b) - 1

(c) 1 (d) - 2

10. For a positive integer n, the expression $(1-i)^n\left(1-\frac{1}{i}\right)^n$ equals

(a) 0 (b) $2i^n$

(c) 2^n (d) 4^n

11. If a complex number lies in the IIIrd quadrant then its conjugate lies in quadrant number

(a) I (b) II

(c) III (d) IV

12. Let $z=\frac{11-3i}{1+i}$. If α is a real number such that $z-i\alpha$ is real, then the value of α is

(a) 4 (b) -4

(c) -7 (d) 7

13. The square roots of $3 - 4i$ are

(a) $\pm(2-i)$ (b) $\pm(2+i)$

(c) $\pm(\sqrt{3}-2i)$ (d) $\pm(\sqrt{3}+2i)$

14. If $(1+i)(1+2i)(1+3i)....(1+ni) = a+ib$, then $2.5.10.... (1 + n^2)$ is

(a) a^2+b^2 (b) $\sqrt{a^2+b^2}$

(c) $\sqrt{a^2-b^2}$ (d) a^2-b^2

15. The value of the sum $=\sum_{n=1}^{13}(i^n + i^{n+1})$, when $i=\sqrt{-1}$ equals

(a) i (b) $i-1$

(c) $-i$ (d) 0

16. The complex number $i+\sqrt{3}$ in polar form can be written as

(a) $\frac{1}{\sqrt{2}}\left(\sin\frac{\pi}{6}+i\cos\frac{\pi}{6}\right)$

(b) $2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$

(c) $\frac{1}{2}\left(\sin\frac{\pi}{6}+i\cos\frac{\pi}{6}\right)$

(d) $4\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$

17. If $\frac{(a+ib)^2}{a-ib}-\frac{(a-ib)^2}{a+ib}=x+iy,$ then x =

(a) 0 (b) $\frac{6a^2b}{(a^2+b^2)^2}$

(c) $\frac{-2b^3}{(a^2+b^2)^2}$ (d) none of these

18. If $z=x+iy,\ z^{\frac{1}{3}}=a-ib$ and $\frac{x}{a}-\frac{x}{b}=K(a^2-b^2),$ then K =

(a) 3 (b) 4

(c) 2 (d) none of these

19. If $\frac{(a^2+1)^2}{2a-i}=x+iy,$ then x^2+y^2 is equal to

(a) $\frac{(a+i)^2}{4a^2+1}$

(b) $\frac{(a^2-1)^2}{(4a^2-1)^2}$

(c) $\frac{(a^2+1)^4}{4a^2+1}$

(d) none of these

20. The magnitude and amplitude of $\frac{(1+i\sqrt{3})(2+2i)}{\sqrt{3}-i}$ are respectively

(a) $2,\frac{3\pi}{4}$ (b) $2\sqrt{2},\frac{3\pi}{4}$

(c) $2\sqrt{2},\frac{\pi}{4}$ (d) $2\sqrt{2},\frac{\pi}{2}$

21. Find the values of m for which the equation $(3m + 1)x^2 + 2(m + 1)x + m = 0$ has equal roots.

(a) m = 1 or 2 (b) m = $-\frac{1}{2}$ or 2

(c) m = 1 or $-\frac{1}{2}$ (d) none of these

22. If α, β are the roots of $ax^2+bx+c=0$, then $-\frac{1}{\alpha},-\frac{1}{\beta}$ are the roots of

(a) $ax^2-bx+c=0$

(b) $cx^2-bx+a=0$

(c) $cx^2+bx+a=0$

(d) $ax^2-bx-c=0$

23. If α, β are the roots of the equation $x^2+x\sqrt{\alpha}+\beta=0,$ then the value of α, β are

(a) α = - 2, β = 1 (b) α = 2, β = - 1

(c) α = 1, β = - 2 (d) α = 4, β = - 2

24. Determine the values of m for which the equation $x^2+mx+1=0$ and $x^2-3x+2=0$ may have a common root.

(a) - 2 (b) 5/2

(c) - 2 or 5/2 (d) - 2 or – 5/2

25. Solution of $6 + x - x^2 > 0$ is

(a) $-1 < x < 2$ (b) $-2 < x < 3$

(c) $-2 < x < -1$ (d) none of these

26. If α, β are the roots of the equation $ax^2+bx+c=0$, then the value of $(a\alpha+b)^{-2}+(a\beta+b)^{-2}$ is

(a) $\frac{c^2-a^2}{b^2-2ac}$ (b) $\frac{b^2-2ac}{c^2-2ab}$

(c) $\frac{b^2-2ac}{c^2a^2}$ (d) $\frac{b^2-4ac}{a^2c^2}$

27. If $x \in R$, the maximum and minimum values of $\frac{x^2-3x+4}{x^2+3x+4}$ are

(a) 3 and $\frac{1}{3}$ (b) 7 and – 7

(c) 7 and $\frac{1}{7}$ (d) 3 and – 3

28. If both the roots of the quadratic equation $x^2-2kx+k^2+k-5=0$ are less than 5, then k lies in the interval

(a) (- ∞, 4) (b) [4, 5]

(c) (5, 6] (d) (6, ∞)

29. If $2+i\sqrt{3}$ is a root of the equation $x^2+px+q=0$, where *p, q* real, then (*p, q*).

(a) (4, -7) (b) (4, 7)

(c) (-4, 7) (d) (-4, -7)

30. If one root of $ax^2+bx+c=0$ is equal to n^{th} power of the other, then b =

(a) $\left(ac^n\right)^{\frac{1}{n}}+\left(a^nc\right)^{\frac{1}{n}}$ (b) $-\left(ac^n\right)^{1/n}-\left(a^nc\right)^{1/n}$

(c) $\left(ac^n\right)^{1/(n+1)}+\left(a^nc\right)^{1/(n+1)}$

(d) $-\left(ac^n\right)^{1/(n+1)}-\left(a^nc\right)^{1/(n+1)}$

31. The equation $x-\frac{2}{x-1}=1-\frac{2}{x-1}$ has

(a) no root

(b) one root

(c) two equal roots

(d) infinitely many root

32. The number of solutions of the equation $|x|^2-3|x|+2=0$ is

(a) 1 (b) 2

(c) 3 (d) 4

33. The set of values of m for which both roots of the equation $x^2-(m+1)x+m+4=0$ are real and negative, is

(a) $-3 \geq m$ or $m \geq 5$

(b) $-3 \leq m \leq 5$

(c) $-4 < m < -3$

(d) $-3 < m \leq -1$

34. If the quadratic equations $x^2+ax+b=0$ *and* $x^2+bx+a=0$ $(a \neq b)$ have a common root, then *a*+*b*=

(a) 0 (b) 1

(c) 2 (d) -1

35. The product of all the value of *x* satisfying the equation $\left(5+2\sqrt{6}\right)^{x^2-3}+\left(5-2\sqrt{6}\right)^{x^2-3}=10$ is

(a) 4 (b) 6

(c) 8 (d) 19

36. The number of solution of the equation $\sqrt{x+1}-\sqrt{x-1}=\sqrt{4x-1}$ is

(a) 0 (b) 1

(c) 2 (d) > 2

37. If the roots of $x^2+px+q=0$ are $\tan 30^0$ and $\tan 15^0$, then *2*+*q*-*p* =

(a) 0

(b) 1

(c) 2

(d) 3

38. If α, β are the roots of $ax^2 + bx + c = 0$ then the equation whose roots are $\frac{1}{a\alpha + \beta}, \frac{1}{a\beta + b}$ is

(a) $cxa^2 - bx + 1 = 0$ (b) $cax^2 + bx + 1 = 0$

(c) $cax^2 + bx - 1 = 0$ (d) $cax^2 - bx - 1 = 0$

39. If $\omega \neq 1$ is a cube root of unity, then $\left(1 + w - w^2\right)^7 =$

(a) 128 w (b) - 128 w

(c) $128w^2$ (d) $-128w^2$

40. If $|z+4| \leq 3$, then the maximum value of $|z+1|$ is

(a) 10 (b) 6

(c) 0 (d) 4

41. The argument of $\frac{z_1}{z_2}$ if $z_1 = \frac{\sqrt{3}}{2} + \frac{1}{2}i$ and $z_2 = -i$ is

(a) $-\frac{2\pi}{3}$ (b) $\frac{2\pi}{3}$

(c) $\frac{\pi}{3}$ (d) $-\frac{\pi}{3}$

42. The product of the cube roots of – 1 is equal to

(a) 0 (b) 1

(c) -1 (d) none of these

43. If $\left(-\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)^{1000} = a + ib$, then (a, b) =

(a) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ (b) $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

(c) $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ (d) $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

44. What is the value of i^i ?

(a) ∞ (b) i

(c) $e^{-\frac{\pi}{2}}$ (d) Not defined

45. The value of $\sum_{k=1}^{6}\left[\sin\frac{2k\pi}{7} - i\cos\frac{2k\pi}{7}\right]$ is

(a) 0 (b) 1

(c) i (d) - i

46. The locus of z if $|z - 4| + |z + 2| = 4$ is

(a) an ellipse

(b) a parabola

(c) a circle

(d) There is no z that satisfies the condition

47. If z_1, z_2 and z_3 are the complex numbers such that $|z_1| = |z_2| = |z_3| = |z_1 + z_2 + z_3| = 1$, then $\left|\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3}\right|$ is

(a) equal to 3

(b) greater than 3

(c) equal to 1

(d) none of these

48. If the cube roots of unity are 1, ω, ω², then the roots of the equation $(x-1)^3 + 8 = 0$, are:

(a) $-1, 1-2\omega, 1-2\omega^2$

(b) $-1, 1+2\omega, 1+2\omega^2$

(c) $-1, -1+2\omega, -1-2\omega^2$

(d) $-1, -1, -1$

49. If $w = \frac{z}{z - \frac{1}{3}i}$ and $|w| = 1$, then z lies on:

(a) a straight line (b) a parabola

(c) an ellipse (d) a circle

50. If $z^2 + z + 1 = 0$, where z is a complex number, then the value of $\left(z + \frac{1}{z}\right)^2 + \left(z^2 + \frac{1}{z^2}\right)^2 + \left(z^3 + \frac{1}{z^3}\right)^2 + ... + \left(z^6 + \frac{1}{z^6}\right)^2$ is

(a) 12 (b) 18

(c) 54 (d) 6

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ANSWERS

1. (b)	**2.** (b)	**3.** (a)	**4.** (b)	**5.** (a)	**6.** (c)	**7.** (c)	**8.** (d)	**9.** (d)	**10.** (c)
11. (b)	**12.** (c)	**13.** (a)	**14.** (a)	**15.** (b)	**16.** (b)	**17.** (a)	**18.** (b)	**19.** (c)	**20.** (b)
21. (c)	**22.** (b)	**23.** (c)	**24.** (d)	**25.** (b)	**26.** (c)	**27.** (c)	**28.** (a)	**29.** (c)	**30.** (d)
31. (a)	**32.** (d)	**33.** (c)	**34.** (d)	**35.** (c)	**36.** (a)	**37.** (d)	**38.** (a)	**39.** (d)	**40.** (b)
41. (b)	**42.** (c)	**43.** (b)	**44.** (c)	**45.** (c)	**46.** (d)	**47.** (c)	**48.** (a)	**49.** (a)	**50.** (a)