Multiple Choice Questions

➾ Tip :– This topic has been included in the CET syllabus for the first time for CET – 2021.

[MHT-CET 2021]
(online shift)
(Memory based questions)

1. If α, β, γ and a, b, c are complex numbers such that $\frac{\alpha}{a}+\frac{\beta}{b}+\frac{\gamma}{c}=1+i$ and $\frac{a}{\alpha}+\frac{b}{\beta}+\frac{c}{\gamma}=0$, then the value of $\frac{\alpha^2}{a^2}+\frac{\beta^2}{b^2}+\frac{\gamma^2}{c^2}$ is equal to

a) 0 b) -1 c) $2i$ d) $-2i$

2. If $z=\frac{\pi}{4}(1+i)^4\left(\frac{1-\sqrt{\pi}i}{\sqrt{\pi}+i}+\frac{\sqrt{\pi}-i}{1+\sqrt{\pi}i}\right)$, then $\left(\frac{|z|}{amp(z)}\right)$ equals.

a) 1 b) π c) 3π d) 4

3. If $z=\frac{(\sqrt{3}+i)^3\,(3i+4)^2}{(8+6i)^2}$, then $|z|$ is equal to

a) 8 b) 2 c) 5 d) 4

4. If $\frac{3}{2+\cos\theta+i\sin\theta}=a+ib$, then $[(a-2)^2+b^2]$ is equal to

a) 0 b) 1 c) -1 d) 2

5. The value of $(1+i)^5-(1-i)^7$ is

a) -64 b) $-64i$ c) $64i$ d) 64

6. If ω is complex cube root of unity and $(1+\omega)^7=A+B\omega$, then values of A and B are respectively.

a) 0, 1 b) 1, 1 c) 1, 0 d) -1, 1

7. The complex number with argument $\frac{5\pi^c}{6}$ at a distance of 2 units from the origin is

a) $\sqrt{3}-i$ b) $\sqrt{3}+i$ c) $-\sqrt{3}-i$ d) $-\sqrt{3}+i$

8. If $z(2-i)=(3+i)$, then $z^{38}=$? (where $z=x+iy$)

a) $-(2^{19})i$ b) $2^{19}i$ c) $-(2^{19})$ d) 2^{19}

9. If $x=1+2i$, then the value of x^3+7x^2-x+16 is

a) $-17-24i$ b) $-17+24i$ c) $17-24i$ d) $17+24i$

10. If ω is the complex cube root of unity then $(3 + 5\omega + 3\omega^2)^2 + (3 + 3\omega + 5\omega^2)^2 =$

a) -1 b) 0 c) 4 d) -4

11. If $z = x + iy$ satisfies the condition $|z + 1| = 1$ then z lies on the

a) Parabola with vertex (0, 0)
b) circle with centre (−1, 0) and radius 1
c) circle with centre (1, 0) and radius 1
d) Y − axis

12. If amplitude of $(z - 2 - 3i)$ is $\frac{3\pi}{4}$, then locus of z is (where $z = x + iy$)

a) $x + y = 1$ b) $x + y = 5$ c) $x - y = -5$ d) $x - y = 1$

13. The square roots of the complex number $(-5 - 12i)$ are

a) $\pm(2 - 3i)$ b) $\pm(3 + 2i)$ c) $\pm(2 + 3i)$ d) $\pm(3 - 2i)$

14. $\frac{3+2i}{1+i} = \frac{1}{2}.(x + iy)$, then $x - y =$

a) 4 b) 3 c) 6 d) 5

15. The complex number with argument $\frac{5\pi}{6}^c$ at a distance of 2 units from the origin is

a) $\sqrt{3} - i$ b) $\sqrt{3} + i$ c) $-\sqrt{3} - i$ d) $-\sqrt{3} + i$

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16. Let z be a complex number such that $|z| + z = 3 + i$, $i = \sqrt{-1}$, then $|z|$ is equal to

a) $\frac{\sqrt{41}}{4}$ b) $\frac{5}{3}$ c) $\frac{\sqrt{34}}{3}$ d) $\frac{5}{4}$

17. If $x = -2 - \sqrt{3}\, i$, where $i = \sqrt{-1}$, then the value of $2x^4 + 5x^3 + 7x^2 - x + 41$ is

a) 6 b) 76 c) -76 d) -6

18. If $(x + iy)^{\frac{1}{3}} = a + ib$, where $x, y, a, b \in R$ and $i = \sqrt{-1}$ then $\frac{x}{a} - \frac{y}{b} =$

a) $a^2 + b^2$ b) $2(a^2 - b^2)$ c) $-2(a^2 + b^2)$ d) $a^2 - b^2$

19. If α and β are the complex cube roots of unity, then $\alpha^3 + \beta^3 + \alpha^{-2}.\beta^{-2}$ is equal to

a) 0 b) 3 c) -3 d) 1

20. If $\left(\frac{1-i}{1+i}\right)^{100} = a + ib$, where $a, b \in R$ and $i = \sqrt{-1}$, then (a, b) is equal to

a) (0, 1) b) (1, 0) c) (2, −1) d) (−1, 2)

30. If $(3x+2)-(5y-3)\,i$ and $(6x+3)+(2y-4)\,i$ are conjugates of each other, then $\frac{x-y}{x+y}$ equals

a) -1 b) 1 c) 2 d) 0

31. If $a>0$ and $z=\frac{(1+i)^2}{a+i}$, $i=\sqrt{-1}$ has magnitude $\frac{2}{\sqrt{5}}$, then $z=$

a) $\frac{2+4i}{5}$ b) $\frac{2-4i}{5}$ c) $\frac{-2+4i}{5}$ d) $\frac{-2-4i}{5}$

32. $\frac{i^{248}+i^{246}+i^{244}+i^{242}+i^{240}}{i^{249}+i^{247}+i^{245}+i^{243}+i^{241}}=$

a) $-i$ b) i c) -1 d) 1

33. $\left(\frac{1}{\sqrt{2}}+\frac{i}{\sqrt{2}}\right)^{10}+\left(\frac{1}{\sqrt{2}}-\frac{i}{\sqrt{2}}\right)^{10}=$]

a) 64 b) 32 c) 0 d) 2

34. Let $z\in C$ with Im $(z)=10$ and it satisfies $\frac{2z-n}{2z+n}=2i-1$, $i=\sqrt{-1}$ for some natural number n, then

a) $n=20$ and Re $(z)=10$ b) $n=20$ and Re $(z)=-10$ c) $n=40$ and Re $(z)=10$ d) $n=40$ and Re $(z)=-10$

35. If $z=x+iy$ and $z^{\frac{1}{3}}=a+ib$, where $x, y, a, b\in$ R and $i=\sqrt{-1}$, then $\frac{x}{a}+\frac{y}{b}=$

a) $4(a^2-b^2)$ b) $4(a^2+b^2)$ c) $-2(a^2-b^2)$ d) $-2(a^2+b^2)$

36. If $x=\frac{5}{1-2i}$, then $x^3+x^2-x+22=$

a) 39 b) 17 c) 9 d) 7

37. If $|z-2+i|\le 2$, then the difference between the greatest and the least value of $|z|$ is

a) 4 b) 2 c) $2\sqrt{5}$ d) $4+2\sqrt{5}$

38. Let $z_1=4i^{40}-5i^{35}+6i^{17}+2$, $z_2=-1+i$, then $|z_1+z_2|=$

a) 5 b) 12 c) 13 d) 15

39. Argument of $\frac{1+i\sqrt{3}}{\sqrt{3}+i}$ is

a) 30° b) 45° c) 60° d) 90°

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

a) a line b) a circle c) a parabola d) an ellipse

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

a) a line b) a circle c) a parabola d) an ellipse

51. The polar form of the complex number $z = \frac{1}{2} + \frac{\sqrt{3}}{2} i$ is

a) $1\left(\cos\left(\frac{\pi}{6}\right) + i\sin\left(\frac{\pi}{6}\right)\right)$
b) $1\left(\cos\left(\frac{\pi}{6}\right) - i\sin\left(\frac{\pi}{6}\right)\right)$
c) $1\left(\cos\left(\frac{\pi}{3}\right) + i\sin\left(\frac{\pi}{3}\right)\right)$
d) $1\left(\cos\left(\frac{\pi}{3}\right) - i\sin\left(\frac{\pi}{3}\right)\right)$

52. If $z = r(\cos\theta + i\sin\theta)$, then $\frac{z}{\bar{z}} + \frac{\bar{z}}{z} =$

a) $\cos 2\theta$ b) $2\cos 2\theta$ c) $2\cos\theta$ d) $2\sin\theta$

53. If z is a complex number such that $|z| \geq 2$, then the minimum value of $z + \frac{1}{2}$

a) is strictly greater than $\frac{3}{2}$ but less than $\frac{5}{2}$
b) is equal to $\frac{5}{2}$
c) lies in the interval $(1, 2)$
d) is strictly greater than $\frac{5}{2}$

54. If P (x, y) denotes $z = x + iy$, $x, y \in \mathbb{R}$ and $i = \sqrt{-1}$ in Argand's plane and $\frac{z-1}{z+2i} = 1$, then the locus of P is

a) a straight line b) a circle c) a parabola d) a hyperbola

55. If $z = x + iy$ satisfies the condition $|z + 1| = 1$, then z lies on the

a) y-axis
b) parabola with vertex $(0, 0)$
c) circle with centre $(-1, 0)$ and radius 1
d) circle with centre $(1, 0)$ and radius 1

56. If $\left|\frac{z}{1+i}\right| = 2$, where $z = x + iy$ represents a circle, then centre C and radius r of circle are

a) $C \equiv (0, 0), r = 2\sqrt{2}$ b) $C \equiv (0, 3), r = 8$ c) $C \equiv (3, 0), r = 4$ d) $C \equiv (6, 0), r = 2$

57. If $|z| = 1$ and $w = \frac{z-1}{z+1}$, $z \neq -1$, then Re (w) is

a) 0 b) $-\frac{1}{|z+1|^2}$ c) $\frac{\sqrt{2}}{|z+1|^2}$ d) $\left|\frac{z}{z+1}\right| \cdot \frac{1}{|z+1|^2}$

58. If $z = x + iy$, then the area of the rectangle whose vertices are the roots of the equation $z\bar{z}^3 + \bar{z}z^3 - 350 = 0$ is]

a) 80 sq units b) 48 sq units c) 40 sq units d) 32 sq units

59. If $z^2 + z + 1 = 0$, where $z = \omega$ = complex cube root of unity, then $\left(z^3 + \frac{1}{z^3}\right)^2 + \left(z^4 + \frac{1}{z^4}\right)^2 =$

a) 1 b) 2 c) 4 d) 5