

Assignment-1

Chapter-2

Complex Number

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SECTION-B JEE MAIN / AIEEE

a) 1 b) 2 c) ∞ d) 0

- 14) If $z^2 + z + 1 = 0$, where z is an imaginary number, then the value of

$$\left(z + \frac{1}{z}\right)^2 + \left(z^2 + \frac{1}{z^2}\right)^2 + \left(z^3 + \frac{1}{z^3}\right)^2 + \dots + \left(z^6 + \frac{1}{z^6}\right)^2$$

is

[2006]

a) 18 b) 54 c) 6 d) 12

- 15) If $|z+4| \leq 3$, then the maximum value of $|z+1|$ is

[2007]

a) 6 b) 0 c) 4 d) 10

- 16) The conjugate of a complex is $\frac{1}{i-1}$ then that complex number is

[2008]

a) $\frac{-1}{i-1}$ b) $\frac{1}{i+1}$ c) $\frac{-1}{i+1}$ d) $\frac{1}{i-1}$

- 17) Let R be the real line. Consider the following subsets of the real plane:

$$S = \{(x, y) : y = x + 1 \text{ and } 0 < x < 2\}$$

$$T = \{(x, y) : x - y \text{ is an integer}\},$$

Which one of the following is true ? [2008]

a) Neither S nor T is an R equivalence relation on

b) Both S and T are equivalence relation on R

c) S is an equivalence relation on R but T is not

d) T is an equivalence relation on R but S is not

- 18) The number of complex numbers z such that $|z-1| = |z+1| = |z-i|$ equals

[2010]

- 19) Let α, β be real and z be a complex number. If $z^2 + z\alpha + \beta = 0$ has two distinct roots on the line $Re z = 1$, then it is necessary that: [2011]

a) $\beta \in (-1, 0)$ b) $|\beta| = 1$
c) $\beta \in (1, \infty)$ d) $\beta \in (0, 1)$

- 20) If $\omega (\neq 1)$ is the cube root of unity, and $(1 + \omega)^7 = A + B\omega$. Then (A, B) equals : [2011]

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

- 21) If $z \neq 1$ and $\frac{z^2}{z-1}$ is real, then the point represented by the complex number z lies: [2012]

a) either on the real axis or on a circle not passing through the origin
b) on a circle with centre at the origin
c) either on the real axis or on a circle not passing through the origin
d) on imaginary axis

- 22) If z is a complex number of unit modulus and argument θ , then the $\arg\left(\frac{1+z}{1+\bar{z}}\right)$ equals: [JEE M 2013]

a) $-\theta$ b) $\frac{\pi}{2} - \theta$ c) θ d) $\pi - \theta$

- 23) If z is a complex number such that $|z| \geq 2$, then the minimum value of $|z + \frac{1}{z}|$: [JEE M 2014]

- a) is strictly greater than $\frac{5}{2}$
- b) is strictly greater than $\frac{3}{2}$ but less than $\frac{5}{2}$
- c) is equal to $\frac{5}{2}$
- d) lies in the interval $(1, 2)$
- 24) A complex number z is said to be unimodular if $|z| = 1$. Suppose z_1 and z_2 are complex numbers such that $\frac{z_1 - 2z_2}{2 - \overline{z_1} z_2}$ is unimodular and z_2 is not unimodular. Then the point z_1 lies on a:
[JEE M 2016]
- a) circle of radius 2
- b) circle of radius $\sqrt{2}$
- c) straight line parallel to x-axis
- d) straight line parallel to y-axis
- 25) A value of θ for which $\frac{2+3isin\theta}{1-2isin\theta}$ is purely imaginary is :
[JEE M2016]
- a) $\sin^{-1}\left(\frac{\sqrt{3}}{4}\right)$
- b) $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$
- c) $\frac{\pi}{3}$
- d) $\frac{\pi}{6}$
- 26) Let $A = \left\{ \theta \in \left(\frac{\pi}{2}, \pi \right) : \frac{3+2isin\theta}{1-2isin\theta} \text{ is purely imaginary} \right\}$. Then the sum of element in A is:
[JEE M 2019-9 Jan (M)]
- a) $\frac{5\pi}{6}$
- b) π
- c) $\frac{3\pi}{4}$
- d) $\frac{2\pi}{3}$
- 27) let α and β be two roots of the equation $x^2 + 2x + 2 = 0$, then $\alpha^{15} + \beta^{15}$ is equal to : [JEE M 2019-Jan (M)]
- a) -256
- b) 512
- c) -512
- d) 256
- 28) All the points in the set $S = \left\{ \frac{\alpha-i}{\alpha+i} : \alpha \in R \right\}$
[JEE M 2019-9 April (M)]
- a) straight line whose slope is 1
- b) circle whose radius is 1
- c) circle whose radius is $\sqrt{2}$