Assignment-1
Chapter-2
Complex Number

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Section-B JEE MAIN / AIEEE

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

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

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=$\{(x,y) : y = x + 1 and 0<x<2\}$
T=$\{(x,y) : x - y is an integer\}$,
Which one of the following is true ? [2008]
a) Neither S nor T is an equivalence relation on R
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]

a) 1 b) 2 c) ∞ d) 0

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,thenthe 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 arguement 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 $|z+\frac{1}{2}|$: [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 $\frac{z_1-2z_2}{2-z_1\bar{z_2}}$ 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 = $\theta \in \left(\frac{\pi}{2}, \pi\right)$: $\frac{3+2isin\theta}{1-2isin\theta}$ is purely imaginary. 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 $\sqrt{2}$
d) straight line whose slope is -1