COMPLEX NUMBER

1. If z_1 and z_2 are two complex numbers satisfying the equation $\left|\frac{z_1+z_2}{z_1-z_2}\right|=1$, then $\frac{z_1}{z_2}$ is a number which is

(a) Positive real (b) Negative real (c) Zero or purely imaginary (d) None of these

2. If $z(1+a)=b+ic$ and $a^2+b^2+c^2=1$, then $\frac{1+iz}{1-iz}=$

(a) $\frac{a+ib}{1+c}$ (b) $\frac{b-ic}{1+a}$ (c) $\frac{a+ic}{1+b}$ (d) None of these

3. Given that the equation $z^2+(p+iq)z+r+is=0$, where, *p, q, r, s* are real and non-zero has a real root, then

(a) $pqr=r^2+p^2s$ (b) $prs=q^2+r^2p$ (c) $qrs=p^2+s^2q$ (d) $pqs=s^2+q^2r$

4. If $\sum_{k=0}^{100} i^k = x+iy$, then the value of *x* and *y* are

(a) $x=-1,\ y=0$ (b) $x=1,\ y=1$ (c) $x=1,\ y=0$ (d) $x=0,\ y=1$

5. The equation $z^2=\bar{z}$ has

(a) No solution (b) Two solutions (c) Four solutions (d) An infinite number of solutions

6. If $z_1=9y^2-4-10ix, z_2=8y^2-20i$, where $z_1=\bar{z}_2$, then $z=x+iy$ is equal to

(a) $-2+2i$ (b) $-2\pm 2i$ (c) $-2\pm i$ (d) None of these

7. If α is a complex constant such that $\alpha z^2+z+\bar{\alpha}=0$ has a real root then

(a) $\alpha+\bar{\alpha}=1$ (b) $\alpha+\bar{\alpha}=0$

(c) $\alpha+\bar{\alpha}=-1$ (d) The absolute value of the real root is 1

8. If *amp* $\frac{z-2}{2z+3i}=0$ and $z_0=3+4i$ then

(a) $z_0\bar{z}+\bar{z}_0z=12$ (b) $z_0z+\bar{z}_0\bar{z}=12$ (c) $z_0\bar{z}+\bar{z}_0z=0$ (d) None of these

9. The principal value of the *arg* (*z*) and | *z* | of the complex number $z=1+\cos\left(\frac{11\pi}{9}\right)+i\sin\frac{11\pi}{9}$ are respectively

(a) $\frac{11\pi}{8}, 2\cos\left(\frac{\pi}{18}\right)$ (b) $-\frac{7\pi}{18}, -2\cos\left(\frac{11\pi}{18}\right)$ (c) $\frac{2\pi}{9}, 2\cos\left(\frac{7\pi}{18}\right)$ (d) $-\frac{\pi}{9}, -2\cos\left(\frac{\pi}{18}\right)$

10. If *amp* $(z_1 z_2)=0$ and $|z_1|=|z_2|=1$ then

(a) $z_1+z_2=0$ (b) $z_1 z_2=1$ (c) $z_1=\bar{z}_2$ (d) None of these

11. Let *z* be a complex number satisfying $|z-5i|\le 1$ such that *amp z* is minimum. Then *z* is equal to

(a) $\frac{2\sqrt{6}}{5}+\frac{24i}{5}$ (b) $\frac{24}{5}+\frac{2\sqrt{6}i}{5}$ (c) $\frac{2\sqrt{6}}{5}-\frac{24i}{5}$ (d) None of these

12. If ω is a complex number satisfying $\left|\omega+\frac{1}{\omega}\right|=2$, then maximum distance of ω from origin is

(a) $2+\sqrt{3}$ (b) $1+\sqrt{2}$ (c) $1+\sqrt{3}$ (d) None of these

13. If $|z-25i|\le 15$, then | max. *amp* (*z*) – min. *amp* (*z*) | =

(a) $\cos^{-1}\left(\frac{3}{5}\right)$ (b) $\pi-2\cos^{-1}\left(\frac{3}{5}\right)$ (c) $\frac{\pi}{2}+\cos^{-1}\left(\frac{3}{5}\right)$ (d) $\sin^{-1}\left(\frac{3}{5}\right)-\cos^{-1}\left(\frac{3}{5}\right)$

14. f $(\cos\theta+i\sin\theta)(\cos 2\theta+i\sin 2\theta)........(\cos n\theta+i\sin n\theta)=1$, then the value of θ is

(a) $4m\pi$ (b) $\frac{2m\pi}{n(n+1)}$ (c) $\frac{4m\pi}{n(n+1)}$ (d) $\frac{m\pi}{n(n+1)}$

15. $\frac{(-1+i\sqrt{3})^{15}}{(1-i)^{20}}+\frac{(-1-i\sqrt{3})^{15}}{(1+i)^{20}}$ is equal to

(a) – 64 (b) – 32 (c) – 16 (d) $\frac{1}{16}$