Matrix theory

ai24btech11035 - V.Preethika

6) If z = x + iy and $\omega = (1 - iz)/(z - i)$, then $|\omega| = 1$ implies that, in the complex plane

(1983 - 1 Mark)

- (a) z lies on the imaginary axis
- (b) z lies on the real axis
- (c) z lies on unit circle
- (d) None of these
- 7) The points z_1, z_2, z_3, z_4 in the complex plane are the vertices of a parallelogram taken in order if and only if

(1983 - 1 Mark)

- (a) $z_1 + z_4 = z_2 + z_3$
- (b) $z_1 + z_3 = z_2 + z_4$
- (c) $z_1 + z_2 = z_3 + z_4$
- (d) None of these
- 8) If a,b,c and u,v,w are complex numbers representing the vertices of two triangles such that c = (1 - r)a + rb and w = (1 - r)u + rv, where r is a complex number, then the two triangles

(1985 - 2 Marks)

- (a) have the same area
- (b) are similar
- (c) are congruent
- (d) none of these
- 9) If $\omega \neq 1$ is a cube root of unity and $(1 + \omega)' =$ $A + B\omega$ then A and B are respectively

(1995S)

- (a) 0, 1
- (b) 2, 1
- (c) 1,0
- (d) -1, 1
- 10) Let $zand\omega$ be two non zero complex numbers such that $|z| = |\omega|$ and $Argz + Arg\omega = \pi$, then z equals

(1995S)

- (a) ω
- (b) $-\omega$
- (c) $\overline{\omega}$
- (d) $-\overline{\omega}$
- 11) let $zand\omega$ be two complex numbers such that $|z| \le 1$, $|\omega| \le 1$ and $|z + i\omega| = |z - i\overline{\omega}| = 2$ then

z equals

(1995S)

- (a) 1*ori*
- (b) ior 1
- (c) 1or 1
- (d) ior 1
- 12) For positive numbers n_1, n_2 the value of the expression $(1+i)^{n_1} + (1+i^3)^{n_1} + (1+i^5)^{n_2} +$ $(1+i^7)^{n_2}$, where $i=\sqrt{-1}$ is a real number if and only if

(1996 - 2 Marks)

- (a) $n_1 = n_2 + 1$
- (b) $n_1 = n_2 1$
- (c) $n_1 = n_2$
- (d) $n_1 > 0, n_2 > 0$
- 13) If $i = \sqrt{-1}$ then $4 + 5\left(\frac{-1}{2} + \frac{i\sqrt{3}}{2}\right)^3 34 + \frac{i\sqrt{3}}{2}$ $3\left(\frac{-1}{2} + \frac{i\sqrt{3}}{2}\right)^{365}$ is a real number if and only if
 - (a) $1 i\sqrt{3}$
 - (b) $-1 + i\sqrt{3}$
 - (c) $i\sqrt{3}$
 - (d) $-i\sqrt{3}$
- 14) If arg(z) < 0, then arg(-z) arg(z) =(2000S)
 - (a) π
 - (b) $-\pi$
 - (c) $\frac{-\pi}{2}$ (d) $\frac{\pi}{2}$
- 15) If z_1, z_2 and z_3 are complex numbers such that $|z_1| = |z_2| = |z_3| = \left|\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3}\right| = 1$, then $|z_1 + z_2 + z_3|$ is

(2000S)

- (a) equal to 1
- (b) less than 1
- (c) greater than 3
- (d) equal to 3
- 16) Let $z_1 and z_2$ be n^{th} roots of unity which substend a right angle at the origin. Then n must be of the form

(2001S)

- (a) 4k + 1
- (b) 4k + 2
- (c) 4k + 3
- (d) 4k
- 17) The complex numbers $z_1, z_2 and z_3$ satisfying $\frac{z_1-z_3}{z_2-z_3} = \frac{1-i\sqrt{3}}{2}$ are the vertices of a triangle which is

(2001S)

- (a) of area zero
- (b) right angled triangle
- (c) equilateral
- (d) obtuse-angled triangle
- 18) For all complex numbers z_1, z_2 satisfying $|z_1| =$ 12 and $|z_2 - 3 - i| = 5$, the minimum value of $|z_1 - z_2|$

(2002S)

- (a) 0
- (b) 2
- (c) 7
- (d) 17
- 19) If |z| = 1 and $\omega = \frac{z-1}{z+1}$ (where $z \neq 1$), then $\text{Re}(\omega)$

(2003S)

- (a) 0

- (a) 0 (b) $\frac{-1}{|z+1|^2}$ (c) $\left|\frac{z}{|z+1|}\right| \cdot \frac{1}{|z+1|^2}$ (d) $\frac{\sqrt{2}}{|z+1|^2}$ 20) If $\omega \neq 1$ be a cube root of unity and $\left(1+\omega^2\right)^n = \left(1+\omega^4\right)^n$, then the least positive value of n is

(2004S)

- (a) 2
- (b) 3
- (c) 5
- (d) 6