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) $z_1 + z_4 = z_2 + z_3$ (c) $z_1 + z_2 = z_3 + z_4$
   (b) $z_1 + z_3 = z_2 + z_4$ (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 (c) are congruent
   (b) are similar (d) none of these
9) If $\omega (\neq 1)$ is a cube root of unity and $(1 + \omega)^7 = A + B\omega$ 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 $|z| \leq 1$, $|\omega| \leq 1$ and $|z + i\omega| = |z - i\overline{\omega}| = 2$ then z equals
(1995S)
   (a) $1ori$ (b) $ior - 1$ (c) $1or - 1$ (d) $ior - 1$
12) For positive numbers n_1, n_2 the value of the expression $(1 + i)^{n_1} + \left(1 + i^3\right)^{n_1} + \left(1 + i^5\right)^{n_2} + \left(1 + i^7\right)^{n_2}$, where $i = \sqrt{-1}$ is a real number if and only if
(1996 - 2 Marks)
   (a) $n_1 = n_2 + 1$ (c) $n_1 = n_2$
   (b) $n_1 = n_2 - 1$ (d) $n_1 > 0, n_2 > 0$
13) If $i = \sqrt{-1}$ then $4 + 5\left(\frac{-1}{2} + \frac{i\sqrt{3}}{2}\right)^3 34 + 3\left(\frac{-1}{2} + \frac{i\sqrt{3}}{2}\right)^{365}$ is a real number if and only if
(1999 - 2 Marks)
   (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 (c) greater than 3
   (b) less than 1 (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 $\text{Re}(\omega)$ is

(2003S)

(a) 0
(b) $\frac{-1}{|z+1|^2}$
(c) $\left|\frac{z}{z+1}\right| . \frac{1}{|z+1|^2}$
(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