Matrix theory

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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 $1 + \omega^7 = A + B\omega$ then A and B are respectively

(1995S)

(a) $0, 1$
(b) $2, 1$
(c) $1, 0$
(d) $-1, 1$

10) Let z and $\omega betwononzerocomplexnumberssuchthat$z=$\omega$ and $Argz + Arg\omega = \pi$, then z equals

(1995S)

(a) ω
(b) $-\omega$
(c) $\overline{\omega}$
(d) $-\overline{\omega}$

11) let z and$\omega betwocomplexnumberssuchthat$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) $ior-1$

1) 12.For positive numbers n_1, n_2 the value of the expression $1 + i_1^n + 1 + i^{3^n}_1 + 1 + i^{5^n}_2 + 1 + i^{7^n}_2$, 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) $n_1 > 0, n_2 > 0$

1) 13.If $i = \sqrt{-1}$ then $4 + 5\frac{-1}{2} + \frac{i\sqrt{3}}{2}^3 34 + 3\frac{-1}{2} +$ ^{3}65 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) $-i\sqrt{3}$

1) 14.If $argz < 0$,then $arg{-z} - argz =$

(2000S)

(a) $\pi - \pi$
(b) $\frac{-\pi}{2}$
(d) $\frac{\pi}{2}$

1) 15.If $z_1, z_2 and z_3$ are complex numbers such that $z_1 = z_2 = z_3 = \frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3} = 1$, 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

1) 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) $4k$

1) 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

1) 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

1) 19.If $z = 1$ and $\omega = \frac{z-1}{z+1}$ where z$\neq$ 1, $thenRe\omega is$

(2003S)

(a) 0
(b) $\frac{-1}{z+1^2}$
(c) $\frac{z}{z+1} \cdot \frac{1}{z+1^2}$
(d) $\frac{\sqrt{2}}{z+1^2}$

1) 20.If $\omega \neq 1$ be a cube root of unity and $1 + \omega^{2^n} = 1 + \omega^{4^n}$, then the least positive value of n is

(2004S)

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