Matrix theory

1

(1983 - 1 Mark)

(1985 - 2 Marks)

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6) If z = x + iy and $\omega = \frac{1 - iz}{z - i}$, then $|\omega| = 1$ implies that, in the complex plane (1983 - 1)

7) The points z_1, z_2, z_3, z_4 in the complex plane are the vertices of a parallelogram taken

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

9) If $\omega \neq 1$ is a cube root of unity and $(1 + \omega)^7 = A + B\omega$ then A and B are respectively

c) $z_1 + z_2 = z_3 + z_4$

d) None of these

c) are congruent

d) none of these

Mark)

a) z lies on the imaginary axisb) z lies on the real axisc) z lies on unit circled) None of these

in order if and only if

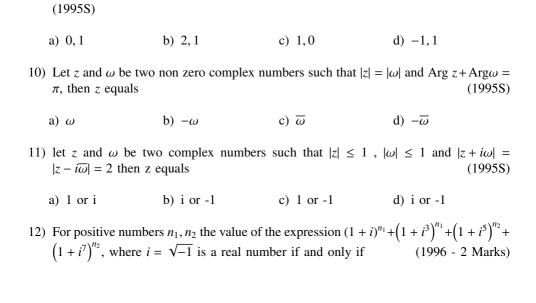
a) $z_1 + z_4 = z_2 + z_3$

b) $z_1 + z_3 = z_2 + z_4$

the two triangles

b) are similar

a) have the same area



(2000S)

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 1b) 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 z₁, z₂ and z₃ satisfying z_{1-z₃} = 1-i√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 $Re(\omega)$ is (2003S)			
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 $(1 + \omega^2)^n = (1 + \omega^4)^n$, then the least positive value of n is (2004S)			

c) $n_1 = n_2$

13) If $i = \sqrt{-1}$ then $4 + 5\left(\frac{-1}{2} + \frac{i\sqrt{3}}{2}\right)^{334} + 3\left(\frac{-1}{2} + \frac{i\sqrt{3}}{2}\right)^{365}$ is a real number if and only if (1999 - 2 Marks)

c) $\frac{-\pi}{2}$

a) $1 - i\sqrt{3}$ b) $-1 + i\sqrt{3}$ c) $i\sqrt{3}$

b) $-\pi$

14) If arg (z) < 0, then arg (-z) - arg(z) =

d) $n_1 > 0, n_2 > 0$

d) $-i\sqrt{3}$

d) $\frac{\pi}{2}$

a) $n_1 = n_2 + 1$ b) $n_1 = n_2 - 1$

a) π

d) 6