DPP 3 (COMPLEX NUMBERS)

1. z_1, z_2, z_3 are the affixes of the vertices of a triangle having its circumcentre at the origin. If z is the affix of its orthocenter, then -

(a) $z_1 + z_2 + z_3 - z = 0$ (b) $z_1 + z_2 - z_3 + z = 0$

(c) $z_1 - z_2 + z_3 + z = 0$ (d) $- z_1 + z_2 + z_3 + z = 0$ ans a

2. The curve represented by Re (z^2) = 4 is

(a) A parabola (b) An ellipse

(c) A circle (d) A rectangular hyperbola ans d

3. The centre of circle z = $\frac{3i - t}{2 + it}$ $(t \in R)$ must be -

(a) $\left(0, \frac{3}{4}\right)$ (b) (0, 0) (c) $\left(0, \frac{5}{4}\right)$ (d) None ans c

4. If | z - i | + | z + i | = 4 then the locus of point z is -

(a) Circle (b) Straight line (c) ellipse (d) hyperbola ans c

5. If $z_1 = 8 + 4i$, $z_2 = 6 + 4i$, and arg $\left(\frac{z - z_1}{z - z_2}\right) = \frac{\pi}{4}$, then z satisfies -

(a) | z - 7 - 4i | = 1 (b) | z - 7 - 5i | = $\sqrt{2}$

(c) | z - 4i | = 8 (d) | z - 7i| = $\sqrt{18}$ ans b

6. If p represents z = x + iy in the argand plane $|z - 1|^2 + |z + 1|^2 = 4$ then locus of P is -

(a) $x^2 + y^2 = 2$ (b) $x^2 + y^2 = 1$

(c) $x^2 + y^2 = 4$ (d) $x + y = 2$ ans b

7. The common roots of the equation

$z^3 + 2z^2 + 2z + 1 = 0$ and $z^{1985} + z^{100} + 1 = 0$ are -

(a) - 1 ,ω (b) - 1 , ω^2 (c) ω, ω^2 (d) ω, - ω^2 ANS C

8. If the area of the triangle on the complex plane formed by the points z, z + iz and iz is 50, then |z| is -

(a) 1 (b) 5 (c) 10 (d) 100 ANS C

9. The equation $z^2 = \overline{z}$ has -

(a) No solution (b) 2 solutions

(c) Four solutions (d) An infinite number of solutions ans c

10. The radius of the circle $\left|\frac{z-i}{z+i}\right|$ = 5 is given by -

(a) $\frac{13}{12}$ (b) $\frac{5}{12}$ (c) 5 (d) 625 ANS B

11. If z is a complex number, then | 3z - 1| = 3 | z - 2 | represents

(a) y-axis (b) A circle

(c) x-axis (d) A line parallel to y-axis ans d

12. 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

(a) Of area zero (b) Right-angled isosceles

(c) Equilateral (d) Obtuse-angled isosceles ans c

13. The inequality $|z - 4| < |z - 2|$ represents the region given by

(a) Re (z) > 0 (b) Re (z) < 0

(c) Re (z) > 2 (d) None of these ans d

14. If the equation $|z - z_1|^2 + |z - z_2|^2 = k$ represents the equation of a circle, where $z_1 = 2 + 3i$, $z_2 = 4 + 3i$ are the extremities of a diameter, then the value of k is

(a) 1/ 4 (b) 4 (c) 2 (d) None of these ans c

15. If $\left|\frac{z_1 z - z_2}{z_1 z + z_2}\right|$ = k, ($z_1, z_2 \neq 0$) then

(a) For k = 0 , locus of z is a straight line

(b) For k $\notin$ {1, 0}, z lies on a circle

(c) For k = 1, z represents a point ans b

(d) For k = 0, z lies on the perpendicular bisector of the line segment joining $\frac{z_2}{z_1}$ and - $\frac{z_2}{z_1}$

16. The equation $z\bar{z}$ + (4 - 3i) z + (4 + 3i) $\bar{z}$ + 5 = 0 represents a circle, whose radius is -

(a) 2 (b) $\frac{5}{2}$ (c) $2\sqrt{5}$ (d) 5 ans c

17. If Re $\left(\frac{z-8i}{z+6}\right)$ = 0, then z lies on the curve -

(a) 4x - 3y + 24 = 0 (b) $x^2 + y^2 - 8 = 0$

(c) $x^2 + y^2 + 6x - 8y = 0$ (d) None of these ans c

18. Let $z = 1 - t + i\sqrt{t^2 + t + 2}$, where t is a real parameter. The

locus of z in the Argand plane is -

(a) A straight line (b) A hyperbola

(c) An ellipse (d) None of these ans b

19. Number of complex numbers z satisfying $|z - 3 - i| = |z - 9 - i|$ and $|z - 3 + 3i| = 3$ are

(a) One (b) Two (c) Three (d) Four ans a

20. A and B represent the complex numbers $1 + ai$ and $3 + bi$ and ΔOAB is an isosceles triangle right- angled at A. Then the values of a and b can be-

(a) a = 2, b = -1 (b) a = 1, b = -2

(c) a = 2, b = 1 (d) a = 2, b = -2 ans c