Model Question Paper

Complex Numbers - Part III

12th Standard

Maths

Reg.No. :

I.Answer all the Questions.

II.Use blue pen only.

Time : 01:30:00 Hrs

Total Marks : 100

Section-A

5 x 1 = 5

1) If z represents a complex number then $arg(z) + arg(\bar{z})$ is

   (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$ (c) 0 (d) $-\frac{\pi}{4}$

2) If the amplitude of a complex number is $\frac{\pi}{2}$ then the number is

   (a) purely imaginary (b) purely real (c) 0 (d) neither real nor imaginary

3) If the point represented by the complex number iz is rotated about the origin through the angle $\frac{\pi}{2}$ in the counter clockwise direction then the complex number representing the new position is

   (a) iz (b) $-iz$ (c) $-z$ (d) z

4) The polar form of the complex number $\left(i^{25}\right)^3$ is

   (a) $cos\frac{\pi}{2} + isin\frac{\pi}{2}$ (b) $cos\pi + isin\pi$ (c) $cos\pi - isin\pi$ (d) $cos\frac{\pi}{2} - isin\frac{\pi}{2}$

5) If P represents the variable complex number Z and if $|2z-1| = 2\ |z|$ then the locus of P is

   (a) the straight line $x = \frac{1}{4}$ (b) the straight line $y = \frac{1}{4}$ (c) the straight line $z = \frac{1}{2}$ (d) the circle $x^2 + y^2 - 4x - 1 = 0$

Section-B

5 x 3 = 15

6) Express the following complex numbers in polar form $-1 + i\sqrt{3}$

7) Express the following complex numbers in polar form $-1 - i$

8) Express the following complex numbers in polar form $1 - i$

9) Find all the values of the following: $(i)^{\frac{1}{3}}$

10) Find the real and imaginary parts of the following complex numbers: $\frac{2+5i}{4-3i}$

Section-C

5 x 6 = 30

11) Solve : $6x^4 - 25x^3 + 32x^2 + 3x - 10 = 0$ given that one of the root is $2 - i$

12) Find all the value of the following: $(8i)^{1/3}$

13) If $x = a + b, y = a\omega + b\omega^2, z = a\omega^2 + b\omega$show that$xyz = a^3 + b^3$where $\omega$is the complex cube root of unity.

14) Prove that if $\omega^3 = 1$, then $(a + b + c)\quad (a + b\omega + c\omega^2)\quad (a + b\omega^2 + c\omega) = a^3 + b^3 + c^3 - 3abc$

15) Solve:$x^4 + 4 = 0$

Section-D

5 x 10 = 50

16) If P represents the variable complex number z. Find the locus of P, if Re $\left(\frac{z-1}{z+i}\right) = 1$

17) If P represents the variable complex number z. Find the locus of P, if arg $\left(\frac{z-1}{z+3}\right) = \frac{\pi}{2}$

18) If P represents the variable complex number z, find the locus of P if arg $\left(\frac{z-1}{z+1}\right) = \frac{\pi}{3}$

19) P presents the variable complex number z, find the locus of P if $Re\left(\frac{z+1}{z+i}\right) = 1$

20) a) Find the modulus and argument of the following complex numbers: $-\sqrt{2} + i\sqrt{2}$

    b) Prove that the complex numbers $3 + 3i, -3 - 3i, -3\sqrt{3} + 3\sqrt{3}i$ are the vertices of an equilateral triangle in the complex plane.

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