Model Question Paper

Complex Numbers - Part II

12th Standard

Maths

Reg.No. : | | | | | | |

I.Answer all the Questions.

II.Use blue pen only.

Time : 01:00:00 Hrs

Total Marks : 80

Section-A

4 x 1 = 4

1) If $A+iB=(a_1+ib_1)(a_2+ib_2)(a_3+ib_3)$ then $A^2 + B^2$ is

(a) $a_1^2+b_1^2+a_2^2+b_2^2+a_3^2+b_3^2$ (b) $(a_1+a_2+a_3)^2+(b_1+b_2+b_3)^2$ (c) $(a_1^2+b_1^2)(a_2^2+b_2^2)(a_3^2+b_3^2)$ (d) $(a_1^2+a_2^2+a_3^2)(b_1^2+b_2^2+b_3^2)$

2) If $a=3+i$ and $z=2-3i$ then the points on the Argand diagram representing az, $3az$ and $-az$ are

(a) vertices of a right angled triangle (b) vertices of an equilateral triangle (c) vertices of an isosceles triangle (d) collinear

3) The points z_1, z_2, z_3 in the complex plane are the vertices of a parallelogram taken in order if and only if

(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) $z_1-z_2=z_3-z_4$

4) 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

Section-B

4 x 3 = 12

5) If $z^2=(0,1)$ find Z.

6) Express the following complex numbers in polar form $2+2\sqrt{3}i$

7) Find the real and imaginary parts of the complex number $z=\frac{3i^{20}-i^{19}}{2i-1}$

8) If $z_1=2+i, \quad z_2=3-2i \quad and \quad z_3=\frac{-1}{2}+\frac{\sqrt{3}}{2}i$ Find the conjugate of z_1z_2

Section-C

4 x 6 = 24

9) Prove that the points representing the complex numbers $(7+5i), (5+2i), (4+7i)$ and $(2+4i)$ form a parallelogram (Plot the points and use midpoint formula)

10) If $arg(z-1)=\frac{\pi}{6}$ and $arg(z+1)=\frac{2\pi}{3}$ then prove that $|z|=1$

11) Solve the equation $x^4-8x^3+24x^2-32x+20 = 0$ if $3+i$ is a root.

12) Solve the equation $x^4-4x^3+11x^2-14x+10 = 0$ if one root is $1+2i$.

Section-D

4 x 10 = 40

13) Solve the equation $x^9+x^5-x^4-1=0$

14) Solve the equation $x^7+x^4+x^3+1=0$

15) Find all the values of $\left(\sqrt{3}+i\right)^{2/3}$

16) a) Find the modulus or the absolute value of $\frac{(1+3i)(1-2i)}{(3+4i)}$

b) Graphically prove that $|z_1+z_2+z_3| \leq |z_1|+|z_2|+|z_3|$

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