Std:XI VOC – CT   Mid Term Exam August, 2024   Duraton: 1 hr.

Date: 07/08/24   Subject : Mathematics (voc)   Marks:20

Instructions : 1) All questions are compulsory.

              2) Write the number of questions clearly.

Question numbers from 1 to 3 carry 1 mark each.

1. Find the product of the following complex number.

$$(1+2i)(2-3i)$$

2. Find the roots of the following quadratic equation

$$2x^2 - x - 1 = 0$$

3. If one root of $kx^2 + 2x + 6 = 0$ is -1 , find the value of k

Question numbers from 4 to 7 carry 2 marks each.

4. Express the following in a+bi where a,b ∈R and i= $\sqrt{-1}$

$$\frac{2+5i}{2+3i}$$

5. Prove that $\left(\frac{-1+\sqrt{3}i}{2}\right)^2 = \frac{-1-\sqrt{3}i}{2}$

6. If α and β are the roots of the equation $5x^2 + 10x + 1 = 0$, find the equation whose roots are α + 1 and β+1.

7. Find the value of k in $x^2 - 6x + k = 0$, if one root is double the other.

Question numbers from 8 to10 carry 3 marks each.

8. Represent the following complex number in polar form.

     4 - 4i

9. Find the square root of the following complex number

     7 - 24i

10. If α and β are the roots of equation $x^2 - 5x + 8 = 0$, find the value of

     i) $\alpha^2 + \beta^2$ ii) $\frac{1}{\alpha} + \frac{1}{\beta}$

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