CLASS X – MATHEMATICS – CHAPTER 05

COMPLEX NUMBERS AND QUADRATIC EQUATIONS

Name: Date:

Q01. Evaluate i^{-39}

Q02. Solved the quadratic equation $x^2 + x + 1/\sqrt{2} = 0$

Q03. If $[(1 + i)/(1 – i)]^m = 1$, then find the least positive integral value of m.

Q04. Evaluate $(1+ i)^4$

Q05. Find the modulus of $[(1 + i)/(1 – i) – (1 – i)/1 + i)]$

Q06. If $x + iy = (a + ib))/(a – ib)$Prove that $x^2 + y^2 = 1$

Q07. Find real θ such that $(3 + 2iSin\phi)/ 1 – 2i Sin\phi$)is purely real.

Q08. Find the modulus of $(1 + i)(2 + i)/(3 + i)$.

Q09. If $|a+ ib| =1$,then Show that $[(1 + b + ai)/(1 + b – ai)] = b + ai$

Q10. If $z = x + iy$ and $w = (1 – i^2)/(z – i)$ Show that $|w| = 1 \Rightarrow z$ is purely real.

Q11. Express in the form of $(a + ib)\ (1+3i)^{-1}$

Q12. Explain the fallacy in $-1 = i.\ i. = \sqrt{-1}.\sqrt{-1} = \sqrt{(-1.-1)} = \sqrt{1} = 1$

Q13. Find the conjugate of $1/(2 − 3i)$.

Q14. Find the conjugate of $(–3i) – 5$.

Q15. Let $z_1 = 2 – i$, $z_2 = – 2 + i$ Find Re (z_1z_2/z_1)

Q16. If $x – iy = \sqrt{[(a− ib)/(c− id)]}$ Prove that $(x^2 + y^2)^2 = (a^2 + b^2)/(c^2 + d^2)$

Q17. If $a + ib = (c + i)/(c – i)$,where a, b, c are real prove that $a^2+b^2 = 1$ and $b/a = 2c/c^2 – 1$

Q18. If $z_1 = 2 – i$ and $Z_2 = 1 + i$ .Find $|(z_1 + z_2 +1)/ (z_1 – z_2 + i)|$

Q19. If $(p + iq)^2 = x + iy$ Prove that $(p^2 + q^2)^2 = x^2 + y^2$

Q20. Convert into polar form $–16/(1 + i\sqrt{3})$.

Q21. Express in the form of $(a + ib) = (3i – 7) + (7 – 4i) – (6 + 3i) + i^{23}$

Q22. Find the conjugate of $\sqrt{(–3 + 4i^2)}$

Q23. Solve for x and y $[3x + (2x – y)i = 6 – 3i]$

Q24. Find the value of $1 + i^2 + i^4 + i^6 + i^8 + \ldots\ldots\ldots\ldots + i^{20}$.

Q25. Multiply $3 – 2i$ by its conjugate.

Q26. If $a + ib = (x + i)^2/(2x^2 + 1)$ Prove that $a^2 + b^2 = (x^2 + 1)^2/(2x^2 + 1)^2$

Q27. If $(x + iy)^3 = u + iv$ then show that $(u/x) + (v/y) = 4(x^2 – y^2)$

Q28. Solve $[\sqrt{3}x^2 – \sqrt{2}x + 3\sqrt{3} = 0]$

Q29. Find the modulus $[i^{25} + (1 + 3i)^3]$

Q30. Find two numbers such that their sum is 6 and the product is 14.

Q31. Find the multiplicative inverse $4 – 3i$.

Q32. Express in term of $(a + ib) = \{[(3 i\sqrt{5})(3 –i\sqrt{5})]/[(\sqrt{3} + i\sqrt{2}) –(\sqrt{3} – i\sqrt{2})]\}$

Q33. Evaluate $[i^n + i^{n+1} + i^{n+2} + i^{n+3}]$

Q34. If 1, w, w^2 are three cube root of unity, show that $(1 – w + w^2)\ (1 + w – w^2) = 4$

Q35. Find that sum product of the complex number $-\sqrt{3} + \sqrt{-2}$ and $2\sqrt{3} – i$

Q36. If $a + ib = (x + i)^2/(2x – i)$ prove that $a^2 + b^2 = (x^2 + 1)^2/(4x^2 + 1)$

Q37. Evaluate $[i^{18} + (1/i)^{25}]^3$

Q38. Find that modulus and argument $(1 + i)/(1 − i)$.

Q39. For what real value of x and y are numbers equal $(1 + i) y^2 + (6 + i)$ and $(2 + i)x$

Q40. Convert into polar form $z = (i – 1)/(\cos\pi/3 + i\sin\pi/3)$

Q41. Write the real and imaginary part $1 – 2i^2$

Q42. If two complex number z_1, z_2 are such that $|z_1| = |z_2|$, is it then necessary that $z_1 = z_2$

Q43. Find the number of non zero integral solution of the equation $|1-i|^x = 2^x$

Q44. If $x + iy = \sqrt{[(1 + i)/(1 – i)]}$ prove that $x^2 + y^2 = 1$

Q45. Convert in the polar form $(1 + 7i)/(2 – i)^2$

Q46. Find the real values of x and y if $(x –iy) (3 + 5i)$ is the conjugate of $(–6) – 24i$.

Q47. If α and β are different complex number with $|\beta| = 1$, then find $|(\beta – \alpha)/(1– \alpha\beta)|$.