Sri Raghavendra Tuition Center

UNIT - 2 (2024 to 2025)

12th Standard

Date : 03-May-24

Reg.No. :

Maths

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Time : 00:45:00 Hrs

Total Marks : 83

I. ANSWER ALL QUESTION 83 x 1 = 83

1) $i^n+i^{n+1}+i^{n+2}+i^{n+3}$ is

(a) 0 (b) 1 (c) -1 (d) i

2) The value of $\sum_{n=1}^{13}\left(i^n+i^{n-1}\right)$ is

(a) 1+ i (b) i (c) 1 (d) 0

3) The area of the triangle formed by the complex numbers z, iz and z+iz in the Argand's diagram is

(a) $\frac{1}{2}|z|^2$ (b) $|z|^2$ (c) $\frac{3}{2}|z|^2$ (d) $2|z|^2$

4) The conjugate of a complex number is $\frac{1}{i-2}$. Then the complex number is

(a) $\frac{1}{i+2}$ **(b)** $\frac{-1}{i+2}$ (c) $\frac{-1}{i-2}$ (d) $\frac{1}{i-2}$

5) If $z=\frac{(\sqrt{3}+i)^3(3i+4)^2}{(8+6i)^2}$, then $|z|$ is equal to

(a) 0 (b) 1 **(c) 2** (d) 3

6) If z is a non zero complex number, such that $2iz^2=\bar{z}$ then $|z|$ is

(a) $\frac{1}{2}$ (b) 1 (c) 2 (d) 3

7) If $|z - 2 + i| \le 2$, then the greatest value of $|z|$ is

(a) $\sqrt{3}-2$ (b) $\sqrt{3}+2$ (c) $\sqrt{5}-2$ **(d)** $\sqrt{5}+2$

8) If $\left|z-\frac{3}{z}\right|=2$, then the least value $|z|$ is

(a) 1 (b) 2 (c) 3 (d) 5

9) If $|z| = 1$, then the value of $\frac{1+z}{1+\bar{z}}$ is

(a) z (b) $\bar{z}$ (c) $\frac{1}{z}$ (d) 1

10) The solution of the equation $|z| - z = 1 + 2i$ is

(a) $\frac{3}{2}-2i$ (b) $-\frac{3}{2}+2i$ (c) $2-\frac{3}{2}i$ (d) $2+\frac{3}{2}i$

11) If $|z_1| = 1$, $|z_2| = 2$, $|z_3| = 3$ and $|9z_1z_2 + 4z_1z_3 + z_2z_3| = 12$, then the value of $|z_1+z_2+z_3|$ is

(a) 1 **(b) 2** (c) 3 (d) 4

12) If z is a complex number such that $z \in \mathbb{C}\backslash\mathbb{R}$ and $z+\frac{1}{z}\epsilon R$, then |z| is

(a) 0 **(b) 1** (c) 2 (d) 3

13) z_1, z_2 and z_3 are complex number such that $z_1 + z_2 + z_3 = 0$ and $|z_1| = |z_2| = |z_3| = 1$ then $z_1^2 + z_2^2 + z_3^3$ is

(a) 3 (b) 2 (c) 1 **(d) 0**

14) If $\frac{z-1}{z+1}$ is purely imaginary, then |z| is

(a) $\frac{1}{2}$ **(b) 1** (c) 2 (d) 3

15) If z = x + iy is a complex number such that |z+2| = |z−2|, then the locus of z is

(a) real axis **(b) imaginary axis** (c) ellipse (d) circle

16) The principal argument of $\dfrac{3}{-1+i}$ is

(a) $\dfrac{-5\pi}{6}$ (b) $\dfrac{-2\pi}{3}$ **(c)** $\dfrac{-3\pi}{4}$ (d) $\dfrac{-\pi}{2}$

17) The principal argument of $(\sin 40°+i\cos 40°)^5$ is

(a) −110° (b) −70° (c) 70° (d) 110°

18) If (1+i)(1+2i)(1+3i)...(1+ni) = x + iy, then $2\cdot5\cdot10\ldots\left(1+n^2\right)$ is

(a) 1 (b) i **(c) x^2+y^2** (d) $1+n^2$

19) If $\omega\neq1$ is a cubic root of unity and $(1+\omega)^7=A+B\omega$, then (A, B) equals

(a) (1, 0) (b) (−1, 1) (c) (0, 1) **(d) (1, 1)**

20) The principal argument of the complex number $\frac{(1+i\sqrt{3})^2}{4i(1-i\sqrt{3})}$ is

(a) $\frac{2\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{5\pi}{6}$ **(d)** $\frac{\pi}{2}$

21) If α and β are the roots of $x^2+x+1 = 0$, then $\alpha^{2020}+\beta^{2020}$ is

(a) -2 **(b) -1** (c) 1 (d) 2

22) The product of all four values of $\left(cos\dfrac{\pi}{3}+isin\dfrac{\pi}{3}\right)^{\frac{3}{4}}$ is

(a) -2 (b) -1 **(c) 1** (d) 2

23) If $\omega\neq1$ is a cubic root of unity and $\begin{vmatrix}1&1&1\\1&-\omega^2-1&\omega^2\\1&\omega^2&\omega^7\end{vmatrix}$ = 3k, then k is equal to

(a) 1 (b) -1 (c) $\sqrt{3i}$ **(d)** $-\sqrt{3i}$

24) The value of $\left(\dfrac{1+\sqrt{3}i}{1-\sqrt{3}i}\right)^{10}$ is

(a) $cis\dfrac{2\pi}{3}$ (b) $cis\dfrac{4\pi}{3}$ (c) $-cis\dfrac{2\pi}{3}$ (d) $-cis\dfrac{4\pi}{3}$

25) If $\omega=cis\dfrac{2\pi}{3}$, then the number of distinct roots of $\begin{vmatrix}z+1&\omega&\omega^2\\\omega&z+\omega^2&1\\\omega^2&1&z+\omega\end{vmatrix}$=0

(a) 1 (b) 2 (c) 3 (d) 4

26) The value of $(1+i)\,(1+i^2)\,(1+i^3)\,(1+i^4)$ is ___________

(a) 2 **(b) 0** (c) 1 (d) i

27) If $\sqrt{a+ib}$ = x + iy, then possible value of $\sqrt{a-ib}$ is ___________

(a) x^2+y^2 (b) $\sqrt{x^2+y^2}$ (c) x+iy **(d) x-iy**

28) If, $i^2 = -1$, then $i^1 + i^2 + i^3 + ...+$ up to 1000 terms is equal to ________

(a) 1 (b) -1 (c) i **(d) 0**

29) If z = $\cos\frac{\pi}{4} + i\sin\frac{\pi}{6}$, then ______

(a) |z| = 1, arg(z) = $\frac{\pi}{4}$ (b) |z| = 1, arg(z) = $\frac{\pi}{6}$ (c) |z| = $\frac{\sqrt{3}}{2}$, arg(z) = $\frac{5\pi}{24}$ **(d) |z| = $\frac{\sqrt{3}}{2}$, arg (z) = $\tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$**

30) If a = cos θ + i sin θ, then $\frac{1+a}{1-a}$ = ___________

(a) cot $\frac{\theta}{2}$ (b) cot θ **(c) i cot $\frac{\theta}{2}$** (d) i tan$\frac{\theta}{2}$

31) .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 (d) Collinear

32) The least positive integer n such that $\left(\frac{2i}{1+i}\right)^n$ is a positive integer is ____________

(a) 16 **(b) 8** (c) 4 (d) 2

33) 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 **(d) Collinear**

34) If z = $\frac{1}{(2+3i)^2}$ then |z| = ____________

(a) $\frac{1}{13}$ (b) $\frac{1}{5}$ (c) $\frac{1}{12}$ (d) none of these

35) If z = 1-cos θ + i sin θ, then |z| = _____________

(a) 2 sin$\frac{1}{3}$ (b) 2 cos$\frac{\theta}{2}$ **(c) 2|sin$\frac{\theta}{2}$|** (d) 2|cos$\frac{\theta}{2}$|

36) If z = $\frac{1}{1-cos\theta-isin\theta}$, the Re(z) = ___________

(a) 0 **(b) $\frac{1}{2}$** (c) cot$\frac{\theta}{2}$ (d) $\frac{1}{2}$ cot$\frac{\theta}{2}$

37) If x + iy = $\frac{3+5i}{7-6i}$, they y = ___________

(a) $\frac{9}{85}$ (b) -$\frac{9}{85}$ **(c) $\frac{53}{85}$** (d) none of these

38) The amplitude of $\frac{1}{i}$ is equal to _______

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

39) The value of $(1+i)^4 + (1-i)^4$ is __________

(a) 8 (b) 4 **(c) -8** (d) -4

40) The complex number z which satisfies the condition $\left|\frac{1+z}{1-z}\right|$ = 1 lies on _________

(a) circle $x^2+ y^2 = 1$ **(b) x-axis** (c) y-axis (d) the lines x+y = 1

41) If z = a + ib lies in quadrant then $\frac{\bar{z}}{z}$ also lies in the III quadrant if _________

(a) a > b > 0 (b) a < b < 0 **(c) b < a < 0** (d) b > a > 0

42) $\frac{1+e^{-i\theta}}{1+e^{i\theta}}$ =__________

(a) cosθ + i sinθ **(b) cosθ - i sinθ** (c) sinθ - i cosθ (d) sinθ + icosθ

43) If $z^n = cos\frac{n\pi}{3} + isin\frac{n\pi}{3}$, then $z_1, z_2 ..... z_6$ is _________

(a) 1 **(b) -1** (c) i (d) -i

44) If x = cosθ + i sinθ, then the value of $x^n + \frac{1}{x^n}$ is __________

(a) 2 cosθ (b) 2i sin nθ (c) 2i sin nθ (d) 2i cos nθ

45) If ω is the cube root of unity, then the value of $(1-\omega)(1-\omega^2)(1-\omega^4)(1-\omega^8)$ is ________

(a) 9 (b) -9 (c) 16 (d) 32

46) The points represented by 3 - 3i, 4 - 2i, 3 - i and 2 - 2i form _____ in the argand plane.

(a) collinear points (b) Vertices of a parallelogram (c) Vertices of a rectangle **(d) Vertices of a square**

47) $(1+i)^3$ = ______

(a) 3 + 3i (b) 1 + 3i (c) 3 - 3i **(d) 2i - 2**

48) $\frac{(cos\theta+isin\theta)^6}{(cos\theta-isin\theta)^5}$ = ________

(a) cos 11θ - isin 11θ **(b) cos 11θ + isin 11θ** (c) cosθ + i sinθ (d) $cos\frac{6\theta}{5} + isin\frac{6\theta}{5}$

49) If a = cos α + i sin α, b = -cos β + i sin β then $\left(ab - \frac{1}{ab}\right)$ is ________

(a) -2i sin(α - β) (b) 2i sin(α - β) (c) 2 cos(α - β) (d) -2 cos(α - β)

50) The conjugate of $\frac{1+2i}{1-(1-i)^2}$ is _______

(a) $\frac{1+2i}{1-(1-i)^2}$ **(b)** $\frac{5}{1-(1-i)^2}$ (c) $\frac{1-2i}{1+(1+i)^2}$ (d) $\frac{1+2i}{1+(1-i)^2}$

51) The modular of $\frac{(-1+i)(1-i)}{1+i\sqrt{3}}$ is ______

(a) $\sqrt{2}$ (b) 2 **(c) 1** (d) $\frac{1}{2}$

52) The value of $\frac{(cos45^0+isin45^0)^2(cos30^0-isin30^0)}{cos30^0+isin30^0}$ is __________

(a) $\frac{1}{2}+i\frac{\sqrt{3}}{2}$ (b) $\frac{1}{2}-i\frac{\sqrt{3}}{2}$ (c) $-\frac{\sqrt{3}}{2}+\frac{1}{2}$ **(d)** $\frac{\sqrt{3}}{2}+\frac{1}{2}$

53) If x = cos θ + i sin θ, then $x^n + \frac{1}{x^n}$ is ______

(a) 2 cos nθ (b) 2 i sin nθ (c) 2^n cosθ (d) 2^n i sinθ

54) If z_1, z_2, z_3 are the vertices of a parallelogram, then the fourth vertex z_4 opposite to z_2 is _____

(a) $z_1 + z_2 - z_2$ (b) $z_1 + z_2 - z_3$ (c) $z_1 + z_2 - z_3$ (d) $z_1 - z_2 - z_3$

55) If $x_r = cos\left(\frac{\pi}{2^r}\right) + isin\left(\frac{\pi}{2^r}\right)$ then $x_1, x_2, x_3 \ldots x_\infty$ is ________

(a) -∞ (b) -2 **(c) -1** (d) 0

56) If $z = x+iy, x, y \in R$ and $3x+(3x-y)i = 4-6i$ then z = __________

(a) $\frac{4}{3}+i10$ (b) $\frac{4}{3}-i10$ (c) $-\frac{4}{3}+i10$ (d) $-\frac{4}{3}-i10$

57) The value of $\left[i^{19}+\left(\frac{1}{i}\right)^{25}\right]^2$ is ___________

(a) 4 **(b) -4** (c) 5 (d) -5

58) If $z = \frac{4+3i}{5-3i}$ then z^{-1} = __________

(a) $\frac{11}{25}-\frac{27}{25}i$ (b) $\frac{-11}{25}-\frac{27}{25}i$ (c) $\frac{-11}{25}+\frac{27}{25}i$ (d) $\frac{11}{25}+\frac{27}{25}i$

59) If the cube roots of unity are 1, ω, ω^2 then $1+\omega+\omega^2 =$ ____________

(a) 1 **(b) 0** (c) -1 (d) ω

60) The complex numbers sin x + i cos 2x and cos x - i sin 2x are conjugates of each other for ___________

(a) $x = k\pi, k \in Z$ (b) x = 0 (c) $x = \left(k + \frac{1}{2}\right)\pi, k \in Z$ **(d) no value of x**

61) If z = x + iy and |3z| = |z - 4| then $x^2 + y^2 + x$ = _________

(a) 1 (b) -1 **(c) 2** (d) -2

62) 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-angle isosceles

63) Let z, w be complex numbers such that $\bar{z} + i\bar{w} = 0$ and arg $(\mathbf{zw}) = \pi$ then arg z = ___________

(a) $\frac{3\pi}{4}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) $\frac{5\pi}{4}$

64) If $\frac{(1+i)x - 2i}{3+i} + \frac{(2-3i)\cdot y + i}{3-i} =$ i then $(x, y) =$ ___________

(a) (3, 1) **(b) (3, -1)** (c) (-3, 1) (d) (- 3, - 1)

65) Let z be complex number with modulus 2 and argument $\frac{-2\pi}{3}$ then $z =$ _________

(a) $-1 + i\sqrt{3}$ (b) $\frac{-1 + i\sqrt{3}}{2}$ **(c)** $-1 - i\sqrt{3}$ (d) $\frac{-1 - i\sqrt{3}}{2}$

66) The small positive integer 'n' for which $(1 + i)^{2n} = (1 - i)^{2n}$ is ______

(a) 4 (b) 8 **(c) 2** (d) 12

67) If z_1, z_2 are complex numbers and $|z_1 + z_2| = |z_1| + |z_2|$ then ________

(a) $\arg(z_1) + \arg(z_2) = 0$ (b) $\arg(z_1 z_2) = 0$ **(c)** $\arg(z_1) = \arg(z_2)$ (d) None of these

68) If a, b, c are integers, not all equal and ω is a cube root of unity $(\omega \neq 1)$ then the minimum value of $|a + b\omega + c\omega^2|$ is ________

(a) 0 **(b) 1** (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{2}$

69) If $x = a + b, y = a\alpha + b\beta$ and $z = a\beta + b\alpha$, where $\alpha, \beta \neq 1$ are cube roots of unity, then x, y, z =___________

(a) $2(a^3 + b^3)$ (b) $2(a^3 - b^3)$ **(c)** $\mathbf{(a^3 + b^3)}$ (d) $(a^3 - b^3)$

70) The equation | z - i | + | z + i | = k represents an ellipse if k = ___________

(a) 1 (b) 2 **(c) 4** (d) -1

71) If z is a complex number satisfying |z - i Re (z)| = | z -Im(z) | then z lies on ___________

(a) y = x (b) y = -x **(c)** $x = \pm y$ (d) y = -x + 1

72) If ω is one of the cube root of unity other than 1, then $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -1-\omega^2 & \omega^2 \\ 1 & \omega^2 & \omega^4 \end{vmatrix} =$ __________

(a) 3ω **(b)** $3\omega(\omega - 1)$ (c) $3\omega^2$ (d) $3\omega(1 - \omega)$

73) If $\begin{vmatrix} 6i & -3i & 1 \\ 4 & 3i & -1 \\ 20 & 3 & i \end{vmatrix} = x +$ iy then __________

(a) x = 3, y = 1 (b) x = 1, y = 3 (c) x = 0, y = 3 **(d) x = 0, y = 0**

74) If $= \cos\frac{\pi}{3} - i\sin\frac{\pi}{3}$ then $z^2 - z + 1 =$ _________

(a) - 2i (b) 2 **(c) 0** (d) -2

75) If z_1, z_2 and z_3, are complex numbers such that $|z_1| = |z_2| = |z_3| = \left|\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3}\right| = 1$ then $|z_1 + z_2 + z_3|$ is _______

(a) = 1 (b) < 1 (c) > 1 (d) 3

76) arg(0) is _______

(a) ∞ (b) 0 (c) π **(d) undefined**

77) All complex numbers z which satisfy the equation $\left|\frac{z-6i}{z+6i}\right| = 1$ lie on the ________

(a) real axis (b) imaginary axis (c) circle (d) ellipse

78) If $x = \frac{-1+i\sqrt{3}}{2}$ then the value of $x^2 + x + 1$ ________

(a) 2 (b) 1/2 **(c) 0** (d) 1

79) The value of $\mathbf{i}^{201} + \mathbf{i}^{202} + \mathbf{i}^{203}$ is ________

(a) 1 (b) i (c) -i **(d) -1**

80) 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 **(d) Collinear**

81) The value of $\sum_{n=1}^{12} i^n$

(a) 0 (b) 1 (c) -1 (d) -2

82) The value of $\left(\frac{1+i}{\sqrt{2}}\right)^8 + \left(\frac{1-i}{\sqrt{2}}\right)^8$ is

(a) 8 (b) 4 **(c) 2** (d) 6

83) arg $\left(\frac{3}{-1-i}\right)$=

(a) $\frac{-5\pi}{6}$ (b) $\frac{-2\pi}{3}$ (c) $\frac{3\pi}{4}$ (d) $\frac{-\pi}{2}$