(39) The vector equation of a sphere whose centre is origin and radius 'a' is

(1) $r = \vec{a}$ (2) $\vec{r} - \vec{c} = \vec{a}$ (3) $|\vec{r}| = |\vec{a}|$ (4) $\vec{r} = a$

CHAPTER III

(1) The complex number form of $\sqrt{-35}$ is

(1) $i\sqrt{35}$ (2) $-i\sqrt{35}$ (3) $i\sqrt{-35}$ (4) $35i$

(2) The complex number form of $3 - \sqrt{-7}$ is

(1) $-3 + i\sqrt{7}$ (2) $3 - i\sqrt{7}$ (3) $3 - i7$ (4) $3 + i7$

(3) Real and imaginary parts of $4 - i\sqrt{3}$ are

(1) $4, \sqrt{3}$ (2) $4, -\sqrt{3}$ (3) $-\sqrt{3}, 4$ (4) $\sqrt{3}, 4$

(4) Real and imaginary parts of $\frac{3}{2}i$ are

(1) $0, \frac{3}{2}$ (2) $\frac{3}{2}, 0$ (3) 2, 3 (4) 3, 2

(5) The complex conjugate of $2 + i\sqrt{7}$ is

(1) $-2 + i\sqrt{7}$ (2) $-2 - i\sqrt{7}$ (3) $2 - i\sqrt{7}$ (4) $2 + i\sqrt{7}$

(6) The complex conjugate of $-4 - i9$ is

(1) $-4 + i9$ (2) $4 + i9$ (3) $4 - i9$ (4) $-4 - i9$

(7) The complex conjugate of $\sqrt{5}$ is

(1) $\sqrt{5}$ (2) $-\sqrt{5}$ (3) $i\sqrt{5}$ (4) $-i\sqrt{5}$

(8) The standard form $(a + ib)$ of $3 + 2i + (-7 - i)$ is

(1) $4 - i$ (2) $-4 + i$ (3) $4 + i$ (4) $4 + 4i$

(9) If $a + ib = (8 - 6i) - (2i - 7)$ then the values of a and b are

(1) 8, – 15 (2) 8, 15 (3) 15, 9 (4) 15, – 8

(10) If $p + iq = (2 - 3i)(4 + 2i)$ then q is

(1) 14 (2) – 14 (3) – 8 (4) 8

(11) The conjugate of $(2 + i)(3 - 2i)$ is

(1) $8 - i$ (2) $-8 - i$ (3) $-8 + i$ (4) $8 + i$

(12) The real and imaginary parts of $(2 + i)(3 - 2i)$ are

(1) – 1, 8 (2) – 8, 1 (3) 8, – 1 (4) – 8, – 1

(13) The modulus values of $-2 + 2i$ and $2 - 3i$ are

(1) $\sqrt{5}, 5$ (2) $2\sqrt{5}, \sqrt{13}$ (3) $2\sqrt{2}, \sqrt{13}$ (4) – 4, 1

(14) The modulus values of $-3-2i$ and $4+3i$ are

(1) 5, 5 (2) $\sqrt{5}$, 7 (3) $\sqrt{6}$, 1 (4) $\sqrt{13}$, 5

(15) The cube roots of unity are

(1) in G.P. with common ratio ω

(2) in G.P. with common difference ω^2

(3) in A.P. with common difference ω

(4) in AP with common difference with ω^2

(16) The arguments of nth roots of a complex number differ by

(1) $\frac{2\pi}{n}$ (2) $\frac{\pi}{n}$ (3) $\frac{3\pi}{n}$ (4) $\frac{4\pi}{n}$

(17) Which of the following statements is correct?

(1) negative complex numbers exist

(2) order relation does not exist in real numbers

(3) order relation exist in complex numbers

(4) $(1+i) > (3-2i)$ is meaningless

(18) Which of the following are correct?

(a) $Re(z) \leq |z|$ (b) $Im(z) \geq |z|$ (c) $|\overline{z}| = |z|$ (d) $(\overline{z^n}) = (\overline{z})^n$

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

(19) The values of $\overline{\overline{z}} + \overline{z}$ is

(1) 2 $Re(z)$ (2) $Re(z)$ (3) $Im(z)$ (4) 2 $Im(z)$

(20) The value of $z - \overline{z}$ is

(1) 2 $Im(z)$ (2) $2i\ Im(z)$ (3) $Im(z)$ (4) $i\ Im(z)$

(21) The value of $z\overline{z}$ is

(1) $|z|$ (2) $|z|^2$ (3) $2|z|$ (4) $2|z|^2$

(22) If $|z - z_1| = |z - z_2|$ then the locus of z is

(1) a circle with centre at the origin

(2) a circle with centre at z_1

(3) a straight line passing through the origin

(4) is a perpendicular bisector of the line joining z_1 and z_2

(23) If ω is a cube roots of unity then

(1) $\omega^2 = 1$ (2) $1 + \omega = 0$ (3) $1 + \omega + \omega^2 = 0$ (4) $1 - \omega + \omega^2 = 0$

(24) The principal value of arg z lies in the interval

(1) $\left[0, \frac{\pi}{2}\right]$ (2) $(-\pi, \pi]$ (3) $[0, \pi]$ (4) $(-\pi, 0]$

(25) If z_1 and z_2 are any two complex numbers then which one of the following is false?

(1) $Re\,(z_1 + z_2) = Re\,(z_1) + Re(z_2)$ (2) $Im\,(z_1 + z_2) = I_m\,(z_1) + I_m\,(z_2)$

(3) $\arg\,(z_1 + z_2) = \arg z_1 + \arg z_2$ (4) $|z_1 z_2| = |z_1|\ |z_2|$

(26) The fourth roots of unity are

(1) $1 \pm i, -1 \pm i$ (2) $\pm i, 1 \pm i$ (3) $\pm 1, \pm i$ (4) $1, -1$

(27) The fourth roots of unity form the vertices of

(1) an equilateral triangle (2) a square

(3) a hexagon (4) a rectangle

(28) Cube roots of unity are

(1) $1, \frac{-1 \pm i\sqrt{3}}{2}$ (2) $i, -1 \pm \frac{i\sqrt{3}}{2}$ (3) $1, \frac{1 \pm i\sqrt{3}}{2}$ (4) $i, \frac{1 \pm i\sqrt{3}}{2}$

(29) The number of values of $(\cos\theta + i \sin\theta)^{\frac{p}{q}}$ where p and q are non-zero integers prime to each other, is

(1) p (2) q (3) $p + q$ (4) $(p - q)$

(30) The value of $e^{i\theta} + e^{-i\theta}$ is

(1) $2\cos\theta$ (2) $\cos\theta$ (3) $2\sin\theta$ (4) $\sin\theta$

(31) The value of $e^{i\theta} - e^{-i\theta}$ is

(1) $\sin\theta$ (2) $2\sin\theta$ (3) $i\sin\theta$ (4) $2i\sin\theta$

(32) Geometrical interpretation of $\overline{z}$ is

(1) reflection of z on real axis

(2) reflection of z on imaginary axis

(3) rotation of z about origin

(4) rotation of z about origin through $\pi/2$ in clockwise direction

(33) If $z_1 = a + ib$, $z_2 = -a + ib$ then $z_1 - z_2$ lies on

(1) real axis (2) imaginary axis

(3) the line $y = x$ (4) the line $y = -x$

(34) Which one of the following is incorrect?

(1) $(\cos\theta + i\sin\theta)^n = \cos n\theta + i\sin n\theta$

(2) $(\cos\theta - i\sin\theta)^n = \cos n\theta - i\sin n\theta$

(3) $(\sin\theta + i\cos\theta)^n = \sin n\theta + i\cos n\theta$

(4) $\frac{1}{\cos\theta + i\sin\theta} = \cos\theta - i\sin\theta$

(35) Polynomial equation $P(x) = 0$ admits conjugate pairs of imaginary roots only if the coefficients are

(1) imaginary (2) complex (3) real (4) either real or complex

(36) Identify the correct statement

(1) Sum of the moduli of two complex numbers is equal to their modulus of the sum

(2) Modulus of the product of the complex numbers is equal to sum of their moduli

(3) Arguments of the product of two complex numbers is the product of their arguments.

(4) Argument of the product of two complex numbers is equal to sum of their arguments.

(37) Which of the following is not true?

(1) $\overline{z_1 + z_2} = \overline{z_1} + \overline{z_2}$ (2) $\overline{z_1 z_2} = \overline{z_1}\ \overline{z_2}$

(3) $Re(z) = \frac{\overline{z} + z}{2}$ (4) $Im(z) = \frac{\overline{z} - z}{2i}$

(38) If z_1 and z_2 are complex numbers then which of the following is meaningful?

(1) $z_1 < z_2$ (2) $z_1 > z_2$ (3) $z_1 \geq z_2$ (4) $z_1 \neq z_2$

(39) Which of the following is incorrect?

(1) $Re(z) \leq |z|$ (2) $Im(z) \leq |z|$ (3) $z\,\overline{z} = |z|^2$ (4) $Re(z) \geq |z|$

(40) Which of the following is incorrect?

(1) $|z_1 + z_2| \leq |z_1| + |z_2|$ (2) $|z_1 - z_2| \leq |z_1| + |z_2|$

(3) $|z_1 - z_2| \geq |z_1| - |z_2|$ (4) $|z_1 + z_2| \geq |z_1| + |z_2|$

(41) Which of the following is incorrect?

(1) $\overline{z}$ is the mirror image of z on the real axis

(2) The polar form of $\overline{z}$ is $(r, -\theta)$

(3) $-z$ is the point symmetrical to z about the origin

(4) The polar form of $-z$ is $(-r, -\theta)$

(42) Which of the following is incorrect?

(1) Multiplying a complex number by i is equivalent to rotating the number counter clockwise about the origin through an angle 90°

(2) Multiplying a complex number by $-i$ is equivalent to rotating the number clockwise about the origin through an angle 90°

(3) Dividing a complex number by i is equivalent to rotating the number counter clockwise about the origin through an angle 90°

(4) Dividing a complex number by i is equivalent to rotating the number clockwise about the origin through an angle 90°

(43) Which of the following is incorrect regarding nth roots of unity?

(1) the number of distinct roots is n

(2) the roots are in G.P. with common ratio cis $\frac{2\pi}{n}$

(3) the arguments are in A.P. with common difference $\frac{2\pi}{n}$

(4) product of the roots is 0 and the sum of the roots is ± 1

(44) Which of the following are true?

(i) If n is a positive integer then $(\cos\theta + i\sin\theta)^n = \cos n\theta + i\sin n\theta$

(ii) If n is a negative integer then $(\cos\theta + i\sin\theta)^n = \cos n\theta - i\sin n\theta$

(iii) If n is a fraction then $\cos n\theta + i\sin n\theta$ is one of the values of $(\cos\theta + i\sin\theta)^n$

(iv) If n is a negative integer then $(\cos\theta + i\sin\theta)^n = \cos n\theta + i\sin n\theta$

(1) (i), (ii), (iii), (iv) (2) (i), (iii), (iv) (3) (i), (iv) (4) (i) only

(45) If $O(0, 0)$, $A(z_1)$, $B(z_2)$, $B'(-z_2)$ are the complex numbers in a argand plane then which of the following are correct?

(i) In the parallelogram $OACB$, C represents $z_1 + z_2$

(ii) In the argand plane E represents z_1z_2 where $OE = OA.OB$ and OE makes an angle $arg(z_1) + arg(z_2)$ with positive real axis.

(iii) In the argand parallelogram $OB'DA$, D represents $z_1 - z_2$

(iv) In the argand plane F represents $\frac{z_1}{z_2}$ where $OF = \frac{OA}{OB}$ and OF makes an angle $arg(z_1) - arg(z_2)$ with positive real axis

(1) (i), (ii), (iii), (iv) (2) (i), (iii), (iv) (3) (i), (iv) (4) (i) only

(46) If $Z = 0$ then the $arg(Z)$ is

(1) 0 (2) π (3) $\frac{\pi}{2}$ (4) indeterminate

CHAPTER IV

(1) The axis of the parabola $y^2 = 4x$ is

(1) $x = 0$ (2) $y = 0$ (3) $x = 1$ (4) $y = 1$

(2) The vertex of the parabola $y^2 = 4x$ is

(1) (1, 0) (2) (0, 1) (3) (0, 0) (4) (0, – 1)

(3) The focus of the parabola $y^2 = 4x$ is

(1) (0, 1) (2) (1, 1) (3) (0, 0) (4) (1, 0)