

CHAPTER-5
COMPLEX NUMBERS
01 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	$(-i)(2i)(-\frac{1}{8}i)$ in the form of $(a + ib)$ is ----- a) $1/4i$ b) $-1/4i$ c) $16i$ d) $-16i$	1
2.	The modulus of $2 - 3i$ is ----- a) $\sqrt{13}$ b) $\sqrt{6}$ c) $-\sqrt{6}$ d) $-\sqrt{13}$	1
3.	Find the multiplicative inverse of $\frac{1}{i}$ a) i b) $-i$ c) $-\frac{1}{i}$ d) 1	1
4.	The value of $Z_1 - Z_2$ (where $Z_1 = 6 + 3i$ and $Z_2 = 2 - 3i$) is ---- a) $5-i$ b) $4+4i$ c) $5-2i$ d) $4+2i$	1
5.	The value of i^{-39} is ----- a) $-i$ b) $-\frac{1}{i}$ c) $3i$ d) i	1
6.	If $z_1 = 1-4i$ and $z_2 = 5+i$, then $\text{Re}(z_1 z_2)$ is ----- a) 9 b) 8 c) 4 d) 6	1
7.	If $4x + i(3x - y) = 3 + i(-6)$, where, x and y are real numbers, then the value of x and y are ----- and ----- a) $x = \frac{3}{4}, y = \frac{33}{4}$ b) $x = \frac{1}{2}, y = -\frac{1}{3}$ c) $x = \frac{5}{16}, y = \frac{7}{13}$ d) $x = \frac{7}{9}, y = \frac{14}{9}$	1
8.	The simplified value of $\frac{(1-i)^3}{1-i^3}$ is ----- a) $-i$ b) $-2i$	1

	c) -2 d) 1	
9.	The value of $\sqrt{-169}$ is ----- a) -13i b) $\pm 13i$ c) 13i d) none of these	1
10.	Find the value of $\sqrt{-16} + 2\sqrt{-4} + 3\sqrt{-9}$ a) 17i b) 15i b) -15i d) -17i	1
11.	Find the value of $\sqrt{-25} + 3\sqrt{-4} + 2\sqrt{-9}$ a) 17i b) 18i c) -17 d) -18	1
12.	Find the sum of : $-4 + 3i$ and $5i - 3$ a) $-8i + 7$ b) $7 + 8i$ c) $8i - 7$ d) $-7 - 8i$	1
13.	Evaluate i^{-999} a) i b) -i c) 2i d) -2i	1
14.	Find x and y if $(3y - 2) + i(7 - 2x) = 0$ a) $3/2, 7/2$ b) $-3/2, -7/2$ c) $7/2, 3/2$ d) $7/2, 2/3$	1
15.	Find the value of : $(6 + i) \times (3 - 2i)$	1

	a) $18 - 2i$ b) $18 - 12i$ c) $20 - 9i$ d) $9 - 20i$	
16.	Write the conjugate of $z = 2i - 7$ a) $2i + 7$ b) $7 - 2i$ c) $-7 - 2i$ d) $7i - 2$	1
17.	The value of θ for which $z = \cos \theta + i \sin \theta$ is purely imaginary is a) 0 b) $\pi/2$ c) π d) 2π	1
18.	The modulus of $5 + 4i$ is – a) $\pm \sqrt{41}$ b) 3 c) ± 3 d) $\sqrt{41}$	1
19.	For $z = 4 - 2i$, what is the value of $\text{Im} \left(\frac{1}{z\bar{z}} \right)$? a) $\frac{1}{20}$ b) $\frac{1}{2\sqrt{5}}$ c) 0 d) 1	1
20.	Assertion : Value of $\sqrt{-16} \times \sqrt{-25} = -20$ Reason : $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$ only if $a > 0, b > 0$ or $a > 0, b < 0$ or $a < 0, b > 0$ a) Both statements are correct and second statement is the correct explanation of first statement.	1

	<p>b) Both statements are correct but second statement is not the correct explanation of first statement.</p> <p>c) First statement is correct but second statement is incorrect.</p> <p>d) First statement is incorrect but second statement is correct.</p>	
21.	<p>The real solutions of the equation $x^2 + 4 = 0$ are</p> <p>2 b) -2 c) ± 2 d) Does not Exist</p>	1
22.	<p>By the help of discriminant $D = \sqrt{b^2 - 4ac}$, we can find</p> <p>a) Real Solutions only b) Nature of roots c) Complex roots only d) None of them is correct.</p>	1
23.	<p>For the complex number $Z = -4 - 5i$, the Re Z and Im Z are respectively</p> <p>a) Re Z = -4, Im Z = -5 b) Re Z = -5, Im Z = -4</p> <p>c) Re Z = -4, Im Z = 5 d) Re Z = -5, Im Z = 4</p>	1
24.	<p>The value of i^{101} is</p> <p>1 b) -i c) i d) 0</p>	1
25.	<p>Which one is incorrect</p> <p>a) $\sqrt{ab} = \sqrt{a}\sqrt{b}$, $a < 0, b < 0$</p> <p>b) $\sqrt{ab} = \sqrt{a}\sqrt{b}$, $a > 0, b < 0$</p> <p>c) $\sqrt{ab} = \sqrt{a}\sqrt{b}$, $a < 0, b > 0$</p> <p>d) $\sqrt{ab} = \sqrt{a}\sqrt{b}$, $a > 0, b > 0$</p>	1
26.	<p>Geometrically $z = \sqrt{x^2 + y^2}$ represents</p> <p>a) Distance of the point (0,0) from (x,y)</p> <p>b) Distance of the point (0,0) from (-x,-y)</p> <p>c) Distance of the point (0,0) from (x,-y)</p> <p>d) All the above three.</p>	1
27.	<p>Which of the following relation is true, if $z = x + iy$?</p> <p>a) Conjugate of $z = \sqrt{x^2 + y^2}$</p> <p>b) $z\bar{z} = z$</p> <p>c) $z\bar{z} = z ^2$</p> <p>d) $z\bar{z} = z$</p>	1
28.	<p>If $\left[\frac{1+i}{1-i}\right]^x = 1$, then the least positive integral value of x is</p> <p>1 b) 2 c) 3 d) 4</p>	1
29.	<p>Assertion (A): If α and β are different complex numbers and $\beta = 1$, then</p> $\left \frac{\beta - \alpha}{1 - \bar{\alpha}\beta}\right = 1$ <p>Reason (R) : $z\bar{z} = z ^2$</p>	1

	<p>(a) Both A and R is true and R is the correct explanation of A</p> <p>(b) Both A and R is true and R is not the correct explanation of A</p> <p>(c) A is true but R is false</p> <p>(d) A is false but R is true</p>	
30.	<p>Assertion (A): If $z = x + iy$, then $z = \sqrt{x^2 + y^2}$</p> <p>Reason(R) : <i>Geometrically</i>, the point $(x,-y)$ is the mirror image of the point (x,y) on the real axis</p> <p>(a) Both A and R is true and R is the correct explanation of A</p> <p>(b) Both A and R is true and R is not the correct explanation of A</p> <p>(c) A is true but R is false</p> <p>(d) A is false but R is true</p>	1
31.	<p>If $Z = \left(\frac{1+i}{1-i}\right)$, then z^4 equals</p> <p>a) 1 b) -1 c) 0 d) none of these</p>	1
32.	<p>If $x+iy = (1+i)(1+2i)(1+3i)$, then x^2+y^2</p> <p>a) 0 b) 1 c) 100 d) none of these</p>	1
33.	<p>If $x+iy = \frac{3+5i}{7-6i}$, then $y =$</p> <p>a) $\frac{9}{85}$ b) $-\frac{9}{85}$ c) $\frac{53}{85}$ d) none of these</p>	1
34.	<p>If $\frac{1-ix}{1+ix} = a+ib$, then $a^2+b^2 =$</p> <p>a) 1 b) -1 c) 0 d) none of these</p>	1
35.	<p>$\frac{1+2i+3i^2}{1-2i+3i^2}$ equals</p> <p>a) i b) -1 c) -i d) 4</p>	1
36.	<p>The value of $(1+i)^4 + (1-i)^4$ is</p> <p>a) 8 b) 4 c) -8 d) -4</p>	1
37.	<p>If $\left(\frac{1+i}{1-i}\right)^n = 1$, then n is</p> <p>a) $2m+1$ b) $4m$ c) $2m$ d) $4m+1$ where $m \in N$</p>	1
38.	<p>The equation $z+1-i = z-1+i$ represents a</p> <p>a) Straight line b) circle c) parabola d) hyperbola</p>	1
39.	<p>If a, b are the roots of the equation $x^2+x+1=0$, then $a^2+b^2 =$</p> <p>a) 1 b) 2 c) -1 d) 3</p>	1
40.	<p>The number of solutions of $x^2 + x-1 = 1$ is</p> <p>a) 0 b) 1 c) 2 d) 3</p>	1
41.	<p>The value of $1 + i^2 + i^2 + i^2 + i^2 + i^2 + \dots + i^{2n}$ is</p> <p>a) Positive</p> <p>b) Negative</p> <p>c) 0</p> <p>d) Cannot be evaluated</p>	1
42.	<p>If $a + ib = c + id$, then</p>	1

	<p>a) $a^2 + c^2 = 0$ b) $b^2 + c^2 = 0$ c) $b^2 + d^2 = 0$ d) $a^2 + b^2 = c^2 + d^2$</p>	
43.	<p>The simplified value of $(1-i)^3/(1-i^3)$ is</p> <p>a) 1 b) -2 c) -i d) 2i</p>	1
44.	<p>$\sin x + \cos 2x$ and $\cos x - i \sin 2x$ are conjugate to each other for:</p> <p>a) $X = n$ b) $X = [n + (1/2)](\pi/2)$ c) 0 d) No value of x</p>	1
45.	<p>The value of $\sqrt{-25} + 3\sqrt{-4} + 2\sqrt{-9}$ is</p> <p>a) 13i b) -13i c) 17i d) -17i</p>	1
46.	<p>The least value of n for which $\{(1+i)/(1-i)\}^n$ is real, is</p> <p>a) 1 b) 2 c) 3 d) 4</p>	1
47.	<p>The value of i^{-999} is</p> <p>a) 1 b) -1 c) i d) -i</p>	1
48.	<p>The value of x and y if $(3y-2) + i(7-2x) = 0$,</p> <p>a) $X=7/2, y=2/3$ b) $X=2/7, y=2/3$ c) $X=7/2, y=3/2$ d) $X=2/7, y=3/2$</p>	1
49.	<p>If $x + 1/x = 1$ find the value of $x^{2000} + \frac{1}{x}$ is</p> <p>a) 0 b) 1 c) -1 d) None of them</p>	1
50.	<p>The complex numbers $\sin x + i \cos 2x$ are conjugate to each other for</p> <p>a) $X = n\pi$ b) $X = [n + (1/2)]\pi$</p>	1

	c) 0 d) No value of x	
--	--------------------------	--

ANSWERS:

Q. NO	ANSWER	MARKS
1.	$(i)(2i)(-\frac{1}{8}i) = (-2i^2)(-\frac{1}{8}i) = 2(-\frac{1}{8}i) = -\frac{1}{4}i$	1
2.	2-3i Here a=2,b=-3 Modulus= $\sqrt{a^2 + b^2}$ $=\sqrt{2^2 + (-3)^2}$ $=\sqrt{4 + 9} = \sqrt{13}$	1
3.	$\frac{1}{i} = \frac{i}{i.i} = \frac{i}{i^2} = \frac{i}{-1} = -i$ ($i^2 = -1$)	1
4.	$z_1 = 6+3i$ $z_2 = 2-i$ $z_1 - z_2 = 6+3i - (2-i)$ $= 6+3i - 2 + i$ $= 4+4i$	1
5.	i^{-39} $= i^{-4 \times 9 - 3}$ $= i^{-4 \times 9} i^{-3}$ $= (i^4)^{-9} i^{-3}$ $= (1)^{-9} i^{-3}$ $= \frac{-1}{i^3}$ $= \frac{-1}{i}$	1
6.	$z_1 = 1-4i$ $z_2 = 5+i$ $z_1 \cdot z_2 = (1-4i)(5+i)$ $= 5+i - 20i - 4i^2$ $= 5-19i+4$ ($i^2 = -1$) $= 9-19i$ $\text{Re}(z_1 z_2) = 9$	1
7.	$4x+i(3x-y) = 3+i(-6)$ $4x+i3x-iy = 3-i6$ $4x+i(3x-y) = 3-i6$ Comparing real part and imaginary part $4x=3, 3x-y=-6$	1

	$x = \frac{3}{4}, 3(\frac{3}{4}) - y = -6$ $\frac{9}{4} - y = -6$ $y = \frac{9}{4} + 6$ $y = \frac{33}{4}$	
8.	$\frac{(1-i)^3}{1-i^3} = \frac{(1-i)(1+i^2+i)}{(1-i)} = (1 + i^2 + i) = (1-1+i) = i$	1
9.	$\sqrt{-169} = 13i$	1
10.	$\sqrt{-16} + 2\sqrt{-4} + 3\sqrt{-9}$ $= 4i + 2(2i) + 3(3i)$ $= 4i + 4i + 9i$ $= 17i$	1
11.	a)	1
12.	c)	1
13.	a)	1
14.	d)	1
15.	c)	1
16.	c)	1
17.	b)	1
18.	d)	1
19.	c)	1
20.	b)	1
21.	d)	1
22.	b)	1
23.	a)	1
24.	c)	1
25.	a)	1
26.	d)	1
27.	c)	1
28.	d)	1
29.	a)	1
30.	b)	1
31.	a	1
32.	c	1
33.	c	1
34.	a	1
35.	c	1
36.	c	1
37.	b	1
38.	a	1
39.	c	1
40.	a	1

41.	d)	1
42.	d)	1
43.	b)	1
44.	d)	1
45.	c)	1
46.	b)	1
47.	c)	1
48.	a)	1
49.	c)	1
50.	d)	1

DRAFT