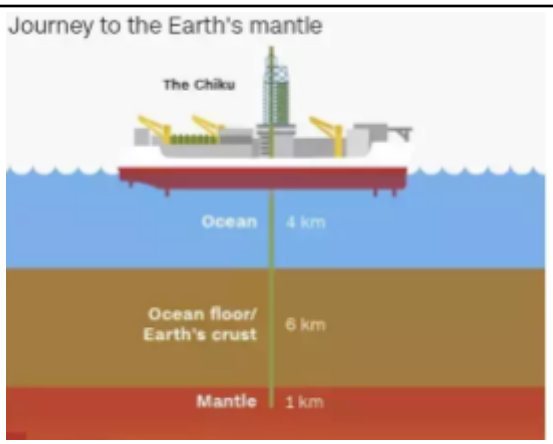
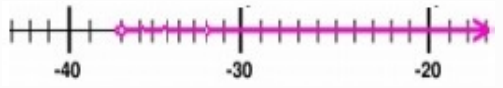
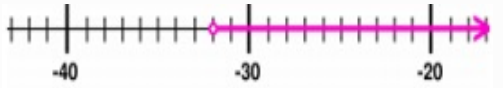
CBT CLASS XI MATHS SEPTEMBER 2024-25

GENERAL INSTRUCTION :

CHAPTER: COMPEX NUMBERS & LINEAR INEQUALITIES

Sr.No	Question	Marks
	Case Study 1 Rajat wants to find the modulus of z where z = $\frac{1}{(1+i)(2+3i)}$. While solving , he follows many steps. He frames some questions on each step. Read the questions and choose the correct options:	
1	What will be conjugate of $2 + 3i$? a) $-2 + 3i$ b) $-2 - 3i$ c) $2 + 3i$ d) $2 - 3i$	1
2	z can be written as a) $\frac{-1}{26} - \frac{3}{26}i$ b) $\frac{-1}{26} - \frac{5}{26}i$ c) $\frac{-1}{26} - \frac{9}{26}i$ d) $\frac{-1}{26} - \frac{1}{26}i$	1
3	What is the imaginary term of z ? a) -1/26 b) –(5/26)i c) –(1/26)i d) 5/26	1
4	Modulus of z will be a) $\frac{1}{\sqrt{26}}$ b) $\frac{3}{\sqrt{26}}$ c) $\frac{5}{\sqrt{26}}$ d) $\frac{7}{\sqrt{26}}$	1
	Case Study 2 In drilling world's deepest hole, the Kola Super deep Borehole, the deepest manmade hole on Earth and deepest artificial point on Earth, as a result of a scientific drilling project, it was found that the temperature T in degree Celsius, x km below the surface of Earth, was given by: T = 30 + 25 (x – 3), 3 < x < 15.	

		
5	If the required temperature lies between 200° C and 300° C, then the depth, x will lie between a) 9 km and 13 km b) 9.8 km and 13.8 km c) 9.5 km and 13.5 km d) 10 km and 14 km	1
6	Graph the inequality $x > -32$ on the number line: a)  b)  c)  d) 	1
7	**In above question $3 < x < 15$, for this T lies between** a) 0^0 C < T < 300^0 C b) 30^0 C < T < 300^0 C c) 30^0 C < T < 330^0 C d) 30^0 C < T < 310^0 C	1
8	If $\|x\| < 5$ then the value of x lies in the interval a) $(-\infty, -5)$ b) $(\infty, 5)$ c) $(-5, \infty)$ d) $(-5, 5)$	1
	Directions: (Q.9 – Q.10) Each of these questions contains two statements: Assertion (A) and Reason (R). Each of these questions also has four alternative choices, any one of which is the correct answer . You have to select one of the options (a) , (b) , (c) and (d) given below : **(a) A is true , R is true and R is a correct explanation for A** **(b) A is true , R is true and R is not a correct explanation for Assertion** **(c) A is true and R is false** **(d) A is false and R is true**	

9	Assertion: If $\|z_1 + z_2\|^2 = \|z_1\|^2 \|+ \|z_2\|^2$, then $\frac{z_1}{z_2}$ is purely imaginary. Reason: If z is purely imaginary, then $z + \bar{z} = 0$ **(a)** **(b)** **(c)** **(d**	1
10	**Assertion:** If a < b, c < 0, then $\frac{a}{c} < \frac{b}{c}$ **Reason:** If both sides are divided by the same negative quantity, then the inequality is reversed. **(a)** **(b)** **(c)** **(d**	1

Ans1	(d) $2 - 3i$
Feed back	Conjugate of a + bi = a- bi , conjugate of $2 + 3i$ $=2 - 3i$
Ans2	b) $\frac{-1}{26} - \frac{5}{26}i$
Feed back	$(1 + i)(2 + 3i) = 2 + 3i + 2i + 3i^2 = 2 + 5i - 3 = -1 + 5i$ Now , $1/(-1 + 5i) = \frac{1}{-1+5i} X \frac{(-1-5i)}{(-1-5i)} = \frac{-1-5i}{26}$
Ans3	b) –(5/26)i
Feed back	From the previous solution $z = \frac{-1}{26} - \frac{5}{26}i$ Real term= $\frac{-1}{26}$, Imaginary term =$-\frac{5}{26}i$
Ans4	a) $\frac{1}{\sqrt{26}}$
Feed back	$\|z\| = \sqrt{a^2 + b^2} = \sqrt{(-\frac{1}{26})^2 + (-\frac{5}{26})^2} = \sqrt{1/26}$
Ans5	(b) 9.8 km and 13.8 km
Feed back	200 < 30 + 25 (x – 3) < 300 i. e. 9.8<x<13.8
Ans6	(d) 
Feed back	x > –32 so x ∈ (-32, ∞)
Ans7	(c) *30° C < T < 330° C*
Feed back	*Option (c) is correct, Since solving T = 30 + 25(x-3) for x we get x = (T-30)/25 +3 and here 3 < x < 15 so 3< (T-30)/25 +3 <15, and by solving this we get 30° C < T < 330° C*
Ans8	(d) (-5, 5)
Feed back	$\|x\| = \{x, \ if\ x \geq 0 \ - \ x, \ if\ x < 0$
Ans9	**(b)**
Feed back	**A is true , R is true and R is not a correct explanation for Assertion**
Ans10	**(d)**
Feed back	**A is false and R is true**

Answer Key