

JEE MAIN COMPLEX NUMBERS AND QUADRATIC EQUATIONS — MODULUS AND CONJUGATE OF A COMPLEX NUMBER — PYQS

Max. Marks: 48

Questions: 12

Section A (MCQ) — 10 questions

- Q.1** Let the set of all values of $k \in \mathbb{R}$ such that the equation $z(\bar{z} + 2 + i) + k(2 + 3i) = 0$, $z \in \mathbb{C}$, has at least one solution, be the interval $[\alpha, \beta]$. Then $9(\alpha + \beta)$ is equal to :

[JEE Main 2026 (Online) 6th April Morning Shift]

- (1) -10 (2) -8
(3) $10\sqrt{13}$ (4) $8\sqrt{13}$

Scan or tap for the
full solution

- Q.2** Let $S = \{z \in \mathbb{C} : 4z^2 + \bar{z} = 0\}$. Then $\sum_{z \in S} |z|^2$ is equal

to: [JEE Main 2026 (Online) 22nd January Evening Shift]

- (1) $\frac{5}{64}$ (2) $\frac{1}{16}$ (3) $\frac{7}{64}$ (4) $\frac{3}{16}$

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full solution

- Q.3** Let z be a complex number such that $|z| = 1$. If $\frac{2+k^2z}{k+\bar{z}} = kz$, $k \in \mathbb{R}$, then the maximum distance of $k + ik^2$ from the circle $|z - (1 + 2i)| = 1$ is :

[JEE Main 2025 (Online) 2nd April Morning Shift]

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

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full solution

- Q.4** The number of complex numbers z , satisfying $|z| = 1$ and $\left| \frac{z}{\bar{z}} + \frac{\bar{z}}{z} \right| = 1$, is :

[JEE Main 2025 (Online) 23rd January Evening Shift]

- (1) 8 (2) 10 (3) 4 (4) 6

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full solution

- Q.5** Let z be a complex number such that $|z + 2| = 1$ and $\text{Im}\left(\frac{z+1}{z+2}\right) = \frac{1}{5}$. Then the value of $|\text{Re}(\bar{z} + 2)|$ is

[JEE Main 2024 (Online) 8th April Morning Shift]

- (1) $\frac{2\sqrt{6}}{5}$ (2) $\frac{24}{5}$ (3) $\frac{\sqrt{6}}{5}$ (4) $\frac{1+\sqrt{6}}{5}$

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full solution

- Q.6** If z_1, z_2 are two distinct complex numbers such that $\left| \frac{z_1 - 2z_2}{\frac{1}{2} - z_1\bar{z}_2} \right| = 2$, then

[JEE Main 2024 (Online) 6th April Evening Shift]

- (1) either z_1 lies on a circle of radius $\frac{1}{2}$ or z_2 lies on a circle of radius 1.
(2) z_1 lies on a circle of radius $\frac{1}{2}$ and z_2 lies on a circle of radius 1.
(3) either z_1 lies on a circle of radius 1 or z_2 lies on a circle of radius $\frac{1}{2}$.
(4) both z_1 and z_2 lie on the same circle.

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full solution

- Q.7** Consider the following two statements :
Between the above two statements,

Statement-I: For any two non-zero complex numbers z_1, z_2 , $(|z_1| + |z_2|) \left| \frac{z_1}{|z_1|} + \frac{z_2}{|z_2|} \right| \leq 2(|z_1| + |z_2|)$

Statement-II: If x, y, z are three distinct complex numbers and a, b, c are three positive real numbers such that $\frac{a}{|y-z|} = \frac{b}{|z-x|} = \frac{c}{|x-y|}$, then

$$\frac{a^2}{y-z} + \frac{b^2}{z-x} + \frac{c^2}{x-y} = 1.$$

[JEE Main 2024 (Online) 5th April Morning Shift]

- (1) both Statement-I and Statement-II are incorrect.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Statement-I is incorrect but Statement-II is correct.
(4) both Statement-I and Statement-II are correct.

Scan or tap for the
full solution

- Q.8** Let α and β be the sum and the product of all the non-zero solutions of the equation $(\bar{z})^2 + |z| = 0, z \in \mathbb{C}$. Then $4(\alpha^2 + \beta^2)$ is equal to :

[JEE Main 2024 (Online) 4th April Morning Shift]

- (1) 4 (2) 2 (3) 6 (4) 8

Scan or tap for the full solution



- Q.9** If $z = x + iy$, $xy \neq 0$, satisfies the equation $z^2 + i\bar{z} = 0$, then $|z^2|$ is equal to :

[JEE Main 2024 (Online) 30th January Morning Shift]

- (1) 9 (2) $\frac{1}{4}$ (3) 4 (4) 1

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- Q.10** If $z = \frac{1}{2} - 2i$ is such that $|z + 1| = \alpha z + \beta(1 + i)$, $i = \sqrt{-1}$ and $\alpha, \beta \in \mathbb{R}$, then $\alpha + \beta$ is equal to

[JEE Main 2024 (Online) 29th January Morning Shift]

- (1) 2 (2) -4 (3) 3 (4) -1

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Section B (Numerical) — 2 questions

- Q.11** Let $z = (1 + i)(1 + 2i)(1 + 3i) \dots (1 + ni)$, where $i = \sqrt{-1}$. If $|z|^2 = 44200$, then n is equal to _____.

[JEE Main 2026 (Online) 24th January Evening Shift]

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- Q.12** Let the complex numbers α and $\frac{1}{\alpha}$ lie on the circles $|z - z_0|^2 = 4$ and $|z - z_0|^2 = 16$ respectively, where $z_0 = 1 + i$. Then, the value of $100|\alpha|^2$ is _____.

[JEE Main 2024 (Online) 27th January Evening Shift]

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ANSWER KEY

Section A (MCQ) — 10 questions

Ques.	1	2	3	4	5	6	7	8	9	10	
Ans.	1	4	1	1	1	3	2	1	4	3	

Section B (Numerical) — 2 questions

Ques.	11	12									
Ans.	5	20									