Q1. 21 January Shift 1

If $x^2+x+1=0$, then the value of $\left(x+\frac{1}{x}\right)^4+\left(x^2+\frac{1}{x^2}\right)^4+\left(x^3+\frac{1}{x^3}\right)^4+\ldots+\left(x^{25}+\frac{1}{x^{25}}\right)^4$ is:

(1) 162 (2) 175 (3) 145 (4) 128

Q2. 21 January Shift 2

Let z be the complex number satisfying $|z-5| \leq 3$ and having maximum positive principal argument. Then $34\left|\frac{5z-12}{5iz+16}\right|^2$ is equal to :

(1) 26 (2) 12 (3) 20 (4) 16

Q3. 22 January Shift 1

Let $\alpha=\frac{-1+i\sqrt{3}}{2}$ and $\beta=\frac{-1-i\sqrt{3}}{2}, i=\sqrt{-1}$. If
$(7-7\alpha+9\beta)^{20}+(9+7\alpha-7\beta)^{20}+(-7+9\alpha+7\beta)^{20}+(14+7\alpha+7\beta)^{20}=m^{10}$, then m is _____

Q4. 22 January Shift 2

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

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

Q5. 23 January Shift 1

Let $S=\{z: 3 \leqslant |2z-3(1+i)| \leqslant 7\}$ be a set of complex numbers. Then $\min_{z \in S}\left|\left(z+\frac{1}{2}(5+3i)\right)\right|$ is equal to :

(1) 2 (2) $\frac{5}{2}$ (3) $\frac{3}{2}$ (4) $\frac{1}{2}$

Q6. 23 January Shift 2

If $z=\frac{\sqrt{3}}{2}+\frac{i}{2}, i=\sqrt{-1}$, then $\left(z^{201}-i\right)^8$ is equal to

(1) 1 (2) 256 (3) -1 (4) 0

Q7. 24 January Shift 2

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

Q8. 28 January Shift 1

Let z be a complex number such that $|z-6|=5$ and $|z+2-6i|=5$. Then the value of $z^3+3z^2-15z+141$ is equal to

(1) 50 (2) 61 (3) 37 (4) 42

Q9. 28 January Shift 2

Let $A = \{z \in \mathbb{C} : |z-2| \leqslant 4\}$ and $B = \{z \in \mathbb{C} : |z-2| + |z+2| = 5\}$. Then the max $\{|z_1 - z_2| : z_1 \in$ A and $z_2 \in$ B$\}$ is :

(1) $\frac{17}{2}$ (2) 8 (3) 9 (4) $\frac{15}{2}$

ANSWER KEYS

1. (3) **2.** (3) **3.** 49 **4.** (3) **5.** (1) **6.** (2) **7.** 5 **8.** (1)

9. (1)