Q1. Consider the equation $x^2-2x-n=0$, where $n\in N$ and $n\in[5,100]$. The total number of different values of n so that the given equation has integral roots is

Q2. If $\pi<0<\pi$, the equation $(\cos 3\theta+1)x^2+(2\cos 2\theta-1)x+(1-2\cos\theta)=0$ has more than 2 roots for

(a) No value of θ

(b) One value of θ

(c) Two values of θ

(d) Infinite values of θ

Q3. If α,β are the roots of the equation $2x^2+4x-5=0$, the equation whose roots are $\dfrac{1}{2\alpha-3}$ and $\dfrac{1}{2\beta-3}$ is

(a) $x^2+10x-11=0$

(b) $11x^2+10x+1=0$

(c) $x^2+10x+11=0$

(d) $11x^2-10x+1=0$

Q4. The number of natural number n for which the equation $(x-8)x=x(n-10)$ has no real solution is equal to

(a) 2

(b) 3

(c) 4

(d) 5

Q5. The value of a for which the sum of cubes of the roots of equation $x^2-ax+(2a-3)=0\,\forall a\in\left[\dfrac{1}{2},4\right]$ attains its minimum value

(a) greater than 4

(b) less than 2

(c) Greater than $\frac{3}{2}$

(d) less than $\frac{1}{2}$

Q6. If $\frac{\alpha+5i}{2}$ is a root of the equation $2x^2-6x+k=0$ then the value of $\frac{k}{10}$ is $(\alpha, k \in R)$

Q7. If α and β are the roots of the quadratic equation, $x^2+x\sin\theta-2\sin\theta=0, \theta\in\left(0,\frac{\pi}{2}\right)$,

then $\frac{\alpha^{12}+\beta^{12}}{\left(\alpha^{-12}+\beta^{-12}\right)(\alpha-\beta)^{24}}$ is equal to:

(a) $\frac{2^{12}}{(\sin\theta-8)^6}$

(b) $\frac{2^6}{(\sin\theta+8)^{12}}$

(c) $\frac{2^{12}}{(\sin\theta+8)^{12}}$

(d) $\frac{2^{12}}{(\sin\theta-4)^{12}}$

Q8. If for a positive integer n, the quadratic equation
$x(x+1)+(x+1)(x+2)+\cdots+(x+\overline{(n-1)})(x+n)=10n$ has 2 consecutive integral solutions then n is equal to

(a) 12

(b) 9

(c) 10

(d) 11

Q9. If α and β are roots of the equation, $x^2-4\sqrt{2}kx+2e^{4\ln k}-1=0$ for some k, and $\alpha^2+\beta^2=66$, then $\alpha^3+\beta^3$ is equal to

(a) $248\sqrt{2}$

(b) $280\sqrt{2}$

(c) $-32\sqrt{2}$

(d) $-280\sqrt{2}$