QUADRATIC EQUATION DPP-1

Q.1 If α and β are roots of $x^2 + ax - b = 0$ and γ, δ the roots of $x^2 + ax + b = 0$, then $(\alpha - \gamma)(\beta - \delta)(\alpha - \delta)(\beta - \gamma) =$
(A) $2b$ (B) $2b^2$ (C) $4b^2$ (D) b

Q.2 If α, β are the roots of the equation $2x^2 - 3x - 5 = 0$, then the equation whose roots are $5/\alpha$, $5/\beta$ is -
(A) $x^2 - 3x - 10 = 0$ (B) $x^2 + 3x - 10 = 0$ (C) $x^2 + 3x + 10 = 0$ (D) $x^2 - 3x + 10 = 0$

Q.3 The roots of the equation $|x|^2 + |x| - 6 = 0$ are-
(A) only one real number
(B) real and sum = 1
(C) real and sum = 0
(D) real and product = 0

Q.4 The value of k for which the number 3 lies between the roots of the equation $x^2 + (1 - 2k)x + (k^2 - k - 2) = 0$ is given by-
(A) $2 < k < 5$ (B) $k < 2$ (C) $2 < k < 3$ (D) $k > 5$

Q.5 If the equations $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ have one root in common, then $k =$
(A) $-3, \frac{27}{4}$ (B) $3, \frac{-27}{4}$ (C) $-3, \frac{-27}{4}$ (D) $3, \frac{27}{4}$

Q.6 The roots of the equation $(b - c)x^2 + (c - a)x + (a - b) = 0$ are
(A) $\frac{c-a}{a-b}, 1$ (B) $\frac{b-c}{a-b}, 1$ (C) $\frac{a-b}{b-c}, 1$ (D) $\frac{c-a}{b-c}, 1$

Q.7 Let $p, q \in \{1, 2, 3, 4\}$. Then number of equation of the form $px^2 + qx + 1 = 0$ having imaginary roots.
(A) 15 (B) 9 (C) 7 (D) 8

Q.8 If one root of the equation $x^2 + px + 12 = 0$ is 4, while the equation $x^2 + px + q = 0$ has equal roots, then the value of q is -
(A) 49/4 (B) 4/49 (C) 4 (D) 1/4

Q.9 **Match the column :**
If α, β are the roots of the equation $x^2 - 4x + 1 = 0$, then

Column - I	**Column -II**
(A) $\alpha^2 + \beta^2$	(p) 52
(B) $\alpha^3 + \beta^3$	(q) 4
(C) $\lvert\alpha - \beta\rvert$	(r) 14
(D) $\frac{1}{\alpha} + \frac{1}{\beta}$	(s) $2\sqrt{3}$

Q.10 If α & β are the roots of the quadratic equation $ax^2 + bx + c = 0$, then the quadratic equation, $ax^2 - bx(x-1) + c(x-1)^2 = 0$ has roots :

(A) $\frac{\alpha}{1-\alpha}, \frac{\beta}{1-\beta}$ (B) $\alpha - 1, \beta - 1$ (C) $\frac{\alpha}{\alpha+1}, \frac{\beta+1}{\beta+1}$ (D) $\frac{1-\alpha}{\alpha}, \frac{1-\beta}{\beta}$

ANSWER KEY

1. (C)	**2.** (B)	**3.** (C)	**4.** (A)	**5.** (C)	**6.** (C)	**7.** (B)
8. (A)	**9.** (A) $\rightarrow$ (r), (B) $\rightarrow$ (p), (C) $\rightarrow$ (s), (D) $\rightarrow$ (q)			**10.** (C)		

QUADRATIC EQUATION DPP-2

Note : All star marked Questions are multiple correct with more than one Answer.

Q.1 Number of real solutions of the equation $x^2 + 4x + 7 = 2 \sin x$ are

(A) 1 (B) 2 (C) 3 (D) None of these

Q.2 Let $f(x) = x^4 + ax^3 + bx^2 + cx + d$, where a, b, c, d are constants. If $f(1) = 10, f(2) = 20, f(3) = 30$, then the value of $\frac{f(10)+f(-6)}{8}$ is

Q.3 If exactly one root of the equation $x^2 - 2kx + k^2 - 1 = 0$ satisfies the inequality $\log_{\sqrt{3}}(2-x) \le 0$ then find values of k.

***Q.4** If α, β, γ are roots of the cubic equation $2011x^3 + 2x^2 + 1 = 0$, then which of the following relations is (are) correct ?

(A) $\alpha^{-1} + \beta^{-1} + \gamma^{-1} = -2011$.(B) $(\alpha\beta)^{-1} + (\beta\gamma)^{-1} + (\gamma\alpha)^{-1} = 2$

(C) $\alpha^2 + \beta^2 + \gamma^2 = \frac{4}{2011}$ (D) $\alpha^{-2} + \beta^{-2} + \gamma^{-2} = -4$

Q.5 If $x^2 - 4x + 5 - \sin y = 0, y \in [0, 2\pi]$, then -

(A) $x = 1, y = 0$ (B) $x = 1, y = \frac{\pi}{2}$ (C) $x = 2, y = 0$ (D) $x = 2, y = \frac{\pi}{2}$

Q.6 Number of real solutions of the equation $x^2 + 4x + 7 = 2 \sin x$ are

(A) 1 (B) 2 (C) 3 (D) None of these

Passage : (Q.7 to Q.9)

Consider the cubic equation

$x^3 - (1 + \cos\theta + \sin\theta)x^2 + (\cos\theta \sin\theta + \cos\theta + \sin\theta)x - \sin\theta . \cos\theta = 0$ whose roots are x_1, x_2 and x_3.

Q.7 The value of $x_1^2 + x_2^2 + x_3^2$ equals -

(A) 1 (B) 2 (C) 2 cos θ (D) sin θ (sin θ + cos θ)

Q.8 Number of values of θ in $[0, 2\pi]$ for which at least two roots are equal -

(A) 3 (B) 4 (C) 5 (D) 6

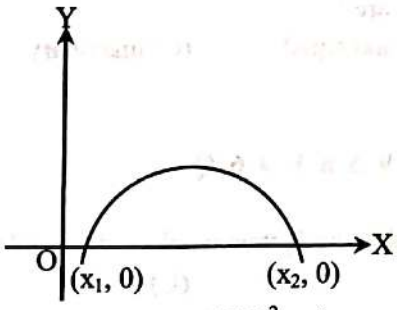
Q.9 Greatest possible difference between two of the roots, if $\theta \in [0, 2\pi]$ is

(A) 2 (B) 1 (C) $\sqrt{2}$ (D) $2\sqrt{2}$

Q.10 If the quadratic polynomial $P(x) = (p-3)x^2 - 2px + 3p - 6$ ranges from $[0, \infty)$ for every $x \in R$, then the value of p can be -

(A) 3/2 (B) 4 (C) 6 (D) 7

Q.11 The adjoining figure shows in the graph of $y = ax^2 + bx + c$. Then



(A) $a > 0$ (B) $b^2 < 4ac$

(C) $c > 0$ (D) a and b are of opposite sings

ANSWER KEY

1. (D)	**2.** 1013	**3.** $k \in [0, 1) \cup [2, 3)$	**4.** (B, D)	**6.** (D)	**7.** (B)	**8.** (B)
9. (A)	**10.** (C)	**11.** (D)				

QUADRATIC EQUATION DPP-3

Q.1 If the roots of the equation $x^2 + 2cx + ab = 0$ are real and unequal, then the roots of the equation $x^2 - 2(a + b)x + (a^2 + b^2 + 2c^2) = 0$ are :
(A) real and unequal (B) real and equal (C) imaginary (D) rational

Passage (Q.2 to 4)

Consider the number N = 7 7 4 9 5 8 P 9 6 Q

Q.2 If P = 2 and the number N is divisible by 3, then number of possible values of Q is/are
(A) 0 (B) 2 (C) 3 (D) 4

Q.3 If N is divisible by 4, then
(A) P can be any integer and Q = 0, 2, 4, 6, 8
(B) P can be any rational number and Q = 0, 4, 8
(C) P can be any single digit whole number and Q = 0, 4, 8
(D) P can be any real number and Q = 0, 4, 8

Q.4 If N is divisible by 8 and 9 both, then number of possible ordered pair (P, Q) is/are-
(A) 3 (B) 2 (C) 1 (D) 0

Q.5 If $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ is a polynomial such that when it is divided by $(x - 1)$ and $(x + 1)$ the remainders are 5 and 19 respectively. If f(x) is divided by $(x - 2)$, then remainder is-
(A) 0 (B) 5 (C) 10 (D) 2

Q.6 If $4x^4 - (a - 1)x^3 + ax^2 - 6x + 1$ is divisible by $(2x - 1)$, then 'a' is equal to-
(A) 13 (B) –13 (C) 11 (D) –11

Passage (Q.7 to 9)

Let $P_n = (\sin\theta)^n + (\cos\theta)^n$ where $n \in N$ and θ is a real number.

Q.7 If $P_{n-2} - P_n = (\sin^2\theta . \cos^2\theta)P_\lambda$, then the value of λ is
(A) n – 1 (B) n – 2 (C) n – 3 (D) n – 4

Q.8 The value of $\frac{P_7 - P_5}{P_5 - P_3}$ is equal to

(A) $\frac{P_3}{P_1}$ (B) $\frac{P_7}{P_5}$ (C) $\frac{P_5}{P_3}$ (D) $\frac{P_3}{P_5}$

Q.9 $2P_6 - 3P_4 + 10$ has the value equal to

(A) 0 (B) 6 (C) 9 (D) 15

Q.10 If α, β, γ are the roots of the equation $x^3 - px^2 + qx - r = 0$, then the value of $\sum \frac{\alpha\beta}{\gamma}$ is equal to

(A) $pq + 3r$ (B) $pq + r$ (C) $pq - 3r$ (D) $\frac{q^2 - 2pr}{r}$

ANSWER KEY

1. (C)	**2.** (D)	**3.** (C)	**4.** (A)	**5.** (C)	**6.** (A)	**7.** (D)
8. (A)	**9.** (C)	**10.** (D)				

QUADRATIC EQUATION DPP-4

Q.1 If $f(x) = x^2 + 2bx + 2c^2$ and $g(x) = -x^2 - 2cx + b^2$ are such that min $f(x) >$ max $g(x)$, then the relation between b and c is

(A) no relation (B) $0 < c < b/2$ (C) $|c| < |b|\sqrt{2}$ (D) $|c| > |b|\sqrt{2}$

Q.2 If α, β be the roots of $ax^2 + bx + c = 0$, $(a \neq 0)$ and $\alpha + \lambda, \beta + \lambda$ are those of $Ax^2 + Bx + C = 0$ $(A \neq 0)$, then $(b^2 - 4ac)/(B^2 - 4AC) =$

(A) a/A (B) A/a (C) A^2/a^2 (D) a^2/A^2

Q.3 If the equation $ax^2 + 2bx + 3c = 0$ and $3x^2 + 8x + 15 = 0$ have a common root, where a, b, c are the lengths of the sides of a ΔABC, then $\sin^2 A + \sin^2 B + \sin^2 C$ is equal to

(A) 1 (B) $\frac{3}{2}$ (C) $\sqrt{2}$ (D) 2

Q.4 All the values of m for which both the roots of the equation $x^2 - 2mx + m^2 - 1 = 0$ are greater than -2 but less than 4, lie in the interval -

(A) $-2 < m < 0$ (B) $m > 3$

(C) $-1 < m < 3$ (D) $1 < m < 4$

Q.5 If α, β, γ are the roots of the equation $2x^3 - 3x^2 + 6x + 1 = 0$, then $\alpha^2 + \beta^2 + \gamma^2$ is equal to -

(A) 15/4 (B) –15/4 (C) 9/4 (D) 4

Q.6 The quadratic equation $x^2 - 9x + 3 = 0$ has roots α and β. If $x^2 - bx - c = 0$ has roots α^2 and β^2, then (b, c) is

(A) (75, – 9) (B) (– 75, 9) (C) (–87, 4) (D) (–87, 9)

Q.7 If the difference of the roots of the equation, $x^2 + px + q = 0$ be unity, then $(p^2 + 4q^2)$ equals to :

(A) $(1 + 2q)^2$ (B) $(1 - 2q)^2$ (C) $4(p - q)^2$ (D) $2(p - q)^2$

Q.8 For all real values of x, the maximum value of the expression $\frac{x}{x^2 - 5x + 9}$ is-

(A) 1 (B) 45 (C) 90 (D) 50

ANSWER KEY

1. (D) **2.** (D) **3.** (D) **4.** (C) **5.** (B) **6.**(A) **7.**(A)

8. (A)