GUIDED REVISION

SECTION–I(i)

Straight Objective Type (3 Marks each, –1 for wrong answer)

1. The set of all real numbers x for which $x^2 - |x + 2| + x > 0$, is

(A) $(-\infty, -2) \cup (2, \infty)$ (B) $(-\infty, -\sqrt{2}) \cup (\sqrt{2}, \infty)$

(C) $(-\infty, -1) \cup (1, \infty)$ (D) $(\sqrt{2}, \infty)$

2. If one root of the equation $x^2 + px + q = 0$ is the square of the other, then

(A) $p^3 + q^2 - q(3p + 1) = 0$ (B) $p^3 + q^2 + q(1 + 3p) = 0$

(C) $p^3 + q^2 + q(3p - 1) = 0$ (D) $p^3 + q^2 + q(1 - 3p) = 0$

3. Let a, b, c be the sides of a triangle. No two of them are equal and $\lambda \in R$. If the roots of the equation $x^2 + 2(a + b + c)x + 3\lambda(ab + bc + ca) = 0$ are real, then

(A) $\lambda < \frac{4}{3}$ (B) $\lambda > \frac{5}{3}$ (C) $\lambda \in \left(\frac{1}{3}, \frac{5}{3}\right)$ (D) $\lambda \in \left(\frac{4}{3}, \frac{5}{3}\right)$

4. Let α, β be the roots of the equation $x^2 - px + r = 0$ and $\alpha/2$, 2β be the roots of the equation $x^2 - qx + r = 0$. Then the value of 'r' is

(A) $\frac{2}{9}(p-q)(2q-p)$ (B) $\frac{2}{9}(q-p)(2p-q)$

(C) $\frac{2}{9}(q-2p)(2q-p)$ (D) $\frac{2}{9}(2p-q)(2q-p)$

5. Let p and q be real numbers such that $p \neq 0$, $p^3 \neq q$ and $p^3 \neq -q$. If α and β are nonzero complex numbers satisfying $\alpha + \beta = -p$ and $\alpha^3 + \beta^3 = q$, then a quadratic equation having $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ as its roots is **[JEE 2010, 3]**

(A) $(p^3 + q)x^2 - (p^3 + 2q)x + (p^3 + q) = 0$ (B) $(p^3 + q)x^2 - (p^3 - 2q)x + (p^3 + q) = 0$

(C) $(p^3 - q)x^2 - (5p^3 - 2q)x + (p^3 - q) = 0$ (D) $(p^3 - q)x^2 - (5p^3 + 2q)x + (p^3 - q) = 0$

6. Let α and β be the roots of $x^2 - 6x - 2 = 0$, with $\alpha > \beta$. If $a_n = \alpha^n - \beta^n$ for $n \geq 1$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is **[JEE 2011]**

(A) 1 (B) 2 (C) 3 (D) 4

7. A value of b for which the equations $x^2 + bx - 1 = 0$, $x^2 + x + b = 0$, have one root in common is - **[JEE 2011]**

(A) $-\sqrt{2}$ (B) $-i\sqrt{3}$ (C) $i\sqrt{5}$ (D) $\sqrt{2}$

8. Let $-\frac{\pi}{6} < \theta < -\frac{\pi}{12}$. Suppose α_1 and β_1 are the roots of the equation $x^2 - 2x\sec\theta + 1 = 0$ and α_2 and β_2 are the roots of the equation $x^2 + 2x\tan\theta - 1 = 0$. If $\alpha_1 > \beta_1$ and $\alpha_2 > \beta_2$, then $\alpha_1 + \beta_2$ equals **[JEE(Advanced)-2016, 3(–1)]**

(A) $2(\sec\theta - \tan\theta)$ (B) $2\sec\theta$ (C) $-2\tan\theta$ (D) 0

SECTION–I(ii)

Multiple Correct Answer Type (4 Marks each, –1 for wrong answer)

9. Let S be the set of all non-zero numbers α such that the quadratic equation $\alpha x^2 - x + \alpha = 0$ has two distinct real roots x_1 and x_2 satisfying the inequality $|x_1 - x_2| < 1$. Which of the following intervals is(are) a subset(s) of S ? **[JEE 2015, 4M, –0M]**

(A) $\left(-\frac{1}{2}, -\frac{1}{\sqrt{5}}\right)$ (B) $\left(-\frac{1}{\sqrt{5}}, 0\right)$ (C) $\left(0, \frac{1}{\sqrt{5}}\right)$ (D) $\left(\frac{1}{\sqrt{5}}, \frac{1}{2}\right)$

10. If the expression $kx^2 + (2k-1)xy + y^2 + 2x - 2ky$ can be resolved as a product of two linear factors, then-

(A) there exists no real value of k

(B) at least one value of k is negative

(C) for at least one real value of k, $3k^3 + 1$ is negative

(D) there exist no real value of k for which $3k^3 + 1$ is negative

11. If $y = \log_{7-a}(2x^2 + 2x + a + 3)$ is defined $\forall\ x \in R$, then possible integral value(s) of a is/are

(A) – 3 (B) – 2 (C) 4 (D) 5

12. Possible set of values of the parameter 'a' for which the inequality $a.9^x + 4(a-1)3^x + a - 1 > 0$ is satisfied for all real values of x.

(A) [1,5] (B) $[3,\infty)$ (C) [–3,–1] (D) $(-\infty,0]$

13. Set of values of 't' for which $2\sin t = \frac{1-2x+5x^2}{3x^2-2x-1}$, $t \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$, can be

(A) $\left[-\frac{\pi}{2}, -\frac{\pi}{10}\right]$ (B) $\left[\frac{\pi}{10}, \frac{\pi}{2}\right]$ (C) $\left[-\frac{\pi}{2}, -\frac{3\pi}{10}\right]$ (D) $\left[\frac{3\pi}{10}, \frac{\pi}{2}\right]$

SECTION–II (i)

Numerical Grid Type (Single digit Ranging from 000 to 999) (4 Marks each, –1 for wrong answer)

1. Let x be a positive real. If the maximum possible value of the expression $y = \frac{x^2+2-\sqrt{x^4+4}}{x}$, is m then $(m+2)^2$, is

2. Two roots of a biquadratic $x^4 - 18x^3 + kx^2 + 200x - 1984 = 0$ have their product equal to (-32). Find the value of k.

3. If roots of the equation $x^2 - 10cx - 11d = 0$ are a, b and those of $x^2 - 10ax - 11b = 0$ are c, d, then find the value of $\frac{a+b+c+d}{10}$ (a, b, c and d are distinct numbers)

4. Let $P(x) = x^2 + bx + c$, where b and c are integer. If P(x) is a factor of both $x^4 + 6x^2 + 25$ and $3x^4 + 4x^2 + 28x + 5$, find the value of P(1).

SECTION–III(i)

Numerical Grid Type (Single digit Ranging from 0 to 9) (4 Marks each, –1 for wrong answer)

1. If $x^2 + (a-b)x + (1-a-b) = 0$ where $a, b \in R$ then least integral value of 'a' for which equation has unequal real roots for all values of 'b', is

2. The smallest value of k, for which both the roots of the equation, $x^2 - 8kx + 16(k^2 - k + 1) = 0$ are real, distinct and have values at least 4, is

3. Let $P(x) = 4x^2 + 6x + 4$ and $Q(y) = 4y^2 - 12y + 25$. If equation $P(x) \cdot Q(y) = 28$ is satisfied for $x = \alpha$ and $y = \beta$, then $4(\alpha + \beta)$ is

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(LOGARITHM + QUADRATIC EQUATION)-26 **ANSWER KEY** **MATHEMATICS**

SECTION-I	Q.	1	2	3	4	5	6	7	8	9	10
	A.	B	D	A	D	B	C	B	C	A,D	B,C
	Q.	11	12	13							
	A.	B,C,D	A,B	A,D							
SECTION-II	Q.	1	2	3	4						
	A.	008	086	121	004						
SECTION-III	Q.	1	2	3							
	A.	2	2	3							