CPP-03
FS JEE(M) &
ADVANCED

Mathematics

Chapterwise Practise Problems (CPP) for JEE (Main & Advanced)

Chapter - Quadratic Equation

Level-1

SECTION - A
Straight Objective Type

This section contains multiple choice questions. Each question has 4 choices (1), (2), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

1. Let α and β be roots of the equation $x^2 - px + r = 0$ and $\frac{\alpha}{2}$ and 2β be the roots of the equation $x^2 - qx + r = 0$, then the value of r

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

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

2. α , β are roots of $x^2 + (1 - 2^{2013})x + 2^{2012}(2^{2012} - 1) - 2 = 0$; then, $(\alpha - \beta)^{2014} =$

(A) $(2^{2012} - 1) . 17$ (B) 3^{4018}

(C) 3^{2014} (D) 2^{1007}

3. If α, β, γ are the roots of the equation $x^3 + 6x + 1 = 0$, then the value of $(\alpha+\beta)^{-1} + (\beta+\gamma)^{-1} + (\gamma + \alpha)^{-1}$ is

(A) 6 (B) –6

(C) 9 (D) – 9

4. If p, q are the roots of $ax^2 - bx + c = 0$ then the equation $(a + cy)^2 = b^2y$ in y has the roots

(A) $\frac{1}{p}, \frac{1}{q}$ (B) p^2, q^2

(C) $\frac{p}{q}, \frac{q}{p}$ (D) $\frac{1}{p^2}, \frac{1}{q^2}$

SECTION - B
Multiple Correct Answer Type

This section contains multiple choice questions. Each question has 4 choices (1), (2), (C) and (D) for its answer, out of which **ONE OR MORE** is/are correct.

5. The quadratic equation $x^2 - 2x - \lambda = 0$, $\lambda \neq 0$

(A) Cannot have a real root for $\lambda \in (-\infty, -1)$

(B) Can have a rational root if $\lambda = n^2$; $n \in N$

(C) Cannot have an integral root if $n^2 - 1 < \lambda < n^2 + 2n$; n = 0, 1, 2, 3, ...

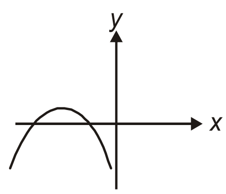
(D) Have equal roots for $\lambda = -1$.

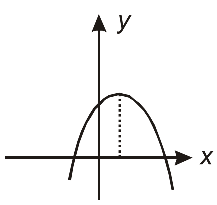
6. Both the roots of the equation $x^2 - 6kx + 2 - 2k + 9k^2 = 0$, are greater than 3; then k may be

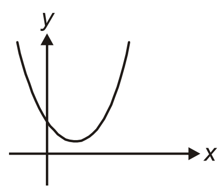
(A) $k > \frac{11}{9}$ (B) k = 2

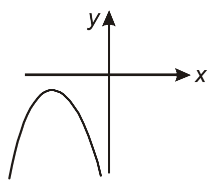
(C) $k = \frac{3}{2}$ (D) $k = \frac{5}{3}$

7. If $abc < 0$ and $y = ax^2 + bx + c$, then the graph of the quadratic curve is

(A) 

(B) 

(C) 

(D) 

8. Consider the equation $x^2 - 8ax + 16a^2 - 1 = 0$; which of the following(s) is/are true?

(A) If both roots of this equation are lying between -10 and 10 then $a \in \left(-\frac{11}{4}, \frac{11}{4}\right)$

(B) If both roots of this equation are lying between -10 and 10 then $a \in \left(-\frac{9}{4}, \frac{9}{4}\right)$

(C) The given equation has always real roots

(D) If both the roots of this equation are positive then $a \in \left(\frac{1}{4}, \infty\right)$

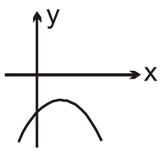
9. If each pair of the following equations $x^2 + px + qr = 0$, $x^2 + qx + pr = 0$ and $x^2 + rx + pq = 0$ has a common root, then product of the three common roots is

(A) 2pqr (B) pqr

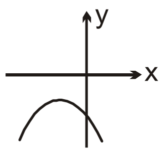
(C) – pqr (D) none of these

10. If a,b,c $\in$ R then for which of the following graphs of the quadratic polynomial $y = ax^2 - 2bx + c (a \neq 0)$; the product (abc) is negative

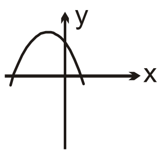
(A)



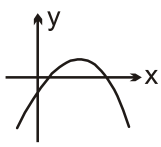
(B)



(C)



(D)



11. Which of the following are correct

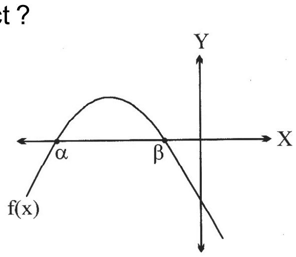
(A) $x^4+2x^2-6x+2=0$ has exactly two real solution

(B) $x^5+5x+1=0$ has exactly one real solutions

(C) $x^n+ax+b=0$ where n is an even natural number has atmost two real solution a, b, $\in$ R

(D) $x^3-3x+c=0$, c>0 does not have two real solution for c $\in$ (0, 1)

12. The following figure shows the graph of $f(x) = ax^2 + bx - c$. then which of the following alternative(s) is/are correct ?



(A) $\frac{b}{c} < 0$

(B) a and b are of same sign

(C) a and c are of opposite sign

(D) f (1) > 0

13. If f(x) and g(x) are two polynomials such that the polynomial $h(x) = xf(x^3) + x^2 g(x^6)$ is divisible by $x^2 + x + 1$, then which of the following options are correct

(A) f(1) = g(1) (B) f(1) = – g(1)

(C) f(1) = g(1) $\neq$ 0 (D) f(1) + g(1) $\neq$ 0

14. If a < 0, then the value of x satisfying $x^2 - 2a|x-a| - 3a^2 = 0$ is/are

(A) $a(1-\sqrt{2})$ (B) $a(1+\sqrt{2})$

(C) $a(-1-\sqrt{6})$ (D) $a(-1+\sqrt{6})$

SECTION-D

Single-Match Type

This section contains Single match questions. Each question contains statements given in two columns which have to be matched. The statements in **Column I** are labelled 1, 2, 3 and 4, while the statements in **Column II** are labelled p,q,r,s. Four options 1,2,3 and 4 are given below. Out of which, only one shows the right matching

15. Let α, β, γ be the roots of $x^3 + px + q = 0$, then value of

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

Codes

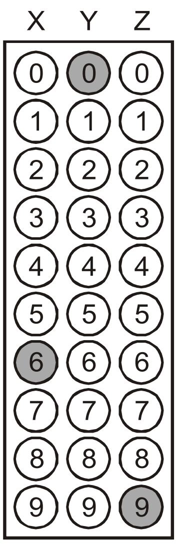
	A	B	C	D
(A)	s	q	r	p
(B)	s	r	q	p
(C)	p	q	r	s
(D)	p	r	q	s

16. Let $P(x) = 2x^2 - 12x + c \ \forall x \in R$ where c is a real constant, then

Column - I	**Column - II**
(A) If greatest value of p(x) for $x \in [1, 2]$ is 1, then c equals	(P) 8
(B) If smallest value of P(x) for $x \in [1, 5]$ is -1, then c equals	(Q) 11
(C) If the greatest value of P(x) for $x \in [1, 4]$ is 2, then c equals	(R) 12
	(S) 17

SECTION-E
Integer Answer Type

This section contains Integer type questions. The answer to each of the questions is a single digit integer, ranging from 0 to 9. The appropriate bubbles below the respective question numbers in the ORS have to be darkened. For example, if the correct answers to question numbers X, Y and Z(say) are 6, 0 and 9, respectively, then the correct darkening of bubbles will look like the following :



17. The number of quadratic equations $ax^2 + bx + c = 0$ having real roots and distinct coefficients $a, b, c \in \{2, 3, 6, 7\}$ is __________.

18. If α, β, γ are the roots of equation $x^3 + px^2 + qx - r = 0$, then the value of $\left(\frac{1}{\alpha^2}+\frac{1}{\beta^2}+\frac{1}{\gamma^2}\right)$ is $\frac{q^2+kpr}{r^2}$, then k =

19. If a,b,c, are distinct real numbers & consider the expression $f(x) = a^2\frac{(x-b)(x-c)}{(a-b)(a-c)} + b^2\frac{(x-c)(x-a)}{(b-c)(b-a)} + c^2\frac{(x-a)(x-b)}{(c-a)(c-b)}$, then $\lim_{x\to a}\frac{f(x)}{x^2} = ?$

20. Let P (x) be polynomial of degree 4 with leading co-efficient 1. Give that P (1) = 1, P(2) = 3, P(3) = 5 and P(4) = 7. The value of P (5) will be k, then $\frac{k}{11} =$

21. Let $P(x) = x^6 + ax^5 + bx^4 + cx^3 + dx^2 + ex + f$ be a polynomial such that P (1) = 1 ; P (2) = 2 ; P(3) = 3; P (4) = 4 ; P (5) = 5 and P (6) = 6 then find the value of P (7).

❑ ❑ ❑

SECTION - A

Straight Objective Type

This section contains multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

1. If $x^2 + (a-b)x + 1 - a - b = 0$, where a and b are real numbers, has distinct real roots for all values of b, then

   (A) $a > 1$ (B) $a < 1$

   (C) $a < 0$ (D) $0 < a < 1$

2. If α and β are the roots of the equation $x^2 - 6x + 7 = 0$ and $a_n = \alpha^n + \beta^n$, $n \geq 1$ then the value of $\frac{a_{12} + 7a_{10}}{6a_{11}}$ is

   (A) 1 (B) 2

   (C) 3 (D) 4

3. The equation

   $$\sqrt{x+3-4\sqrt{x-1}} + \sqrt{x+8-6\sqrt{x-1}} = 1, \text{ has}$$

   (A) No solution (B) One solution

   (C) Two solutions (D) Infinite solutions

4. If $|x^2 - 5x + 6| = \lambda(x - 7)$ has 3 solutions, then λ is equal to

   (A) $\sqrt{23} - 7$ (B) $4\sqrt{5} - 9$

   (C) $-7 - \sqrt{23}$ (D) 0

5. If the roots of the equation $x^4 + x^2 + 5x + 100 = 0$ are α, β, γ, δ, then the biquadratic equation, whose roots are $\alpha+\beta+\gamma$, $\alpha+\beta+\delta$, $\beta+\gamma+\delta$, $\alpha+\gamma+\delta$ is

   (A) $2x^4 + 3x^2 + 6x + 100 = 0$

   (B) $x^4 + x^2 + 5x - 100 = 0$

   (C) $x^4 + x^2 + 5x + 100 = 0$

   (D) $x^4 + x^2 - 5x + 100 = 0$

6. The set of real values of a for which the equation $\frac{2a^2 + x^2}{a^3 - x^3} - \frac{2x}{ax + a^2 + x^2} + \frac{1}{x - a} = 0$ has a unique solution is

   (A) $(-\infty, 1)$ (B) $(-1, \infty)$

   (C) $(-1, 1)$ (D) $R - \{0\}$

7. Find the values of 'a' for which the equation

   $(x^2 + x + 2)^2 - (a - 3)(x^2 + x + 2)$

   $(x^2 + x + 1) + (a - 4)(x^2 + x + 1)^2 = 0$ has at least one real root.

   (A) $(0, 5)$ (B) $(5, \frac{19}{3}]$

   (C) $(\frac{19}{3}, 7)$ (D) $(0, 4)$

8. If the roots of $2x^3 - 3x^2 - 12x + 12 = 0$

   are α, β, γ, then $[\alpha] + [\beta] + [\gamma]$ (where [.] denote greatest integer function) equals to

   (A) 0

   (B) 1

   (C) –1

   (D) 2

9. Consider the equation

   $x^3 - nx + 1 = 0, \quad n \in N, \quad n \geq 3$. Then

   (A) Equation has atleast one rational root.

   (B) Equation has exactly one rational root.

   (C) Equation has all real roots belonging to (0, 1).

   (D) Equation has no rational root.

10. If $a_1, a_2, a_3 (a_1 > 0)$ are in G.P. with common ratio r, then the value of r, for which the inequality $9a_1 + 5a_3 > 14a_2$ holds, can not lie in the interval

    (A) $[1, \infty)$ (B) $[1, 9/5]$

    (C) $[4/5, 1]$ (D) $[5/9, 1]$

11. Let p (x) = 0 be a polynomial equation of least possible degree, with rational coefficients, having $\sqrt[3]{7}+\sqrt[3]{49}$ as one of its roots. Then the product of all the roots of p (x) = 0 is

(A) 7 (B) 49

(C) 56 (D) 63

12. If α, β, γ are the roots of the cubic equation

$x^3 - 2x + 3 = 0$ then the value of

$\frac{1}{\alpha^3+\beta^3+6}+\frac{1}{\beta^3+\gamma^3+6}+\frac{1}{\gamma^3+\alpha^3+6}$ equals

(A) $\frac{1}{3}$ (B) $\frac{-1}{3}$

(C) $\frac{1}{2}$ (D) $\frac{-1}{2}$

13. A quadratic binomial P(x) is such that P (x) = 0 and P (P(P(x))) = 0 have a common root, then

(A) $P(0)\cdot P(1) > 0$

(B) $P(0)\cdot P(1) < 0$

(C) $P(0)\cdot P(1) = 0$

(D) Nothing can be said in general

14. If $x_1, x_2, x_3, \ldots\ldots, x_{n-1}\, x_n$ be 'n' zeroes of the polynomial $P(x)= x^n + \alpha x + \beta$ where, $x_i \neq x_j$, i and j = 1,2, 3,......,(n). Then the value of $Q = (x_1 - x_2)(x_1 - x_3)(x_1 - x_4)\ldots\ldots(x_1 - x_{n-1})(x_1 - x_n)$

(A) $n(n-1)x_1^{n-2}$

(B) ${}^nc_2.x_1^{n-2}$

(C) $nx_1^{n-1}+\alpha$

(D) Zero

15. P(x) is a polynomial such that

$P(x) + P(2x) = 5x^2 - 18$, then $\lim_{x\to 3}\frac{P(x)}{x-3}$ is

(A) 6 (B) 9

(C) 18 (D) Zero

16. Let $y = f(x) = x^3 + x^2 + 100x + 7 \sin x$.

Then the equation $\frac{1}{y-f(1)}+\frac{2}{y-f(2)}+\frac{3}{y-f(3)}=0$ has

(A) exactly one root lying in (f(1), f(2))

(B) both roots lying in (f(1), f(2))

(C) exactly one root lying in $(-\infty, f(1))$

(C) exactly one root lying in $(f(2), \infty)$

SECTION - B

Multiple Correct Answer Type

This section contains multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE** is/are correct.

17. If α is a real root of the equation $ax^2 + bx + c = 0$ and β is a real root of equation $-ax^2 + bx + c = 0$, then the equation $\frac{a}{2}x^2+bx+c=0$ has

(A) Real roots

(B) Non-real roots

(C) Has a root lying between α and β

(D) No root between α and β

18. Consider the equation $x^4-3x^3-2x^2-3x+1=0$; which of the following(s) is/are true?

(A) The given equation has four real roots

(B) The given equation has two imaginary roots

(C) The given equation has two rational roots

(D) The given equation has two irrational roots

19. Consider the equation $x^3-12x=K$, then which of the following(s) is/are true?

(A) If $K\in(-16, 16)$, then the given equation has three distinct real roots

(B) If $K\in(16, \infty)$, then the given equation has exactly one real root which is positive

(C) If $K\in(-\infty, -16)$, then the given equation has exactly one negative real root

(D) There are exactly two values of K for which the given equation has exactly two repeated roots.

20. $x^8 - x^5 - \frac{1}{x} + \frac{1}{x^4} > 0$ is satisfied for

(A) positive value of x

(B) negative value of x

(C) all real numbers except zero

(D) only for x > 1

21. Equation $\frac{\pi^e}{x-e} + \frac{e^\pi}{x-\pi} + \frac{e^\pi}{x-\pi} + \frac{\pi^\pi + e^e}{x-\pi-e} = 0$ has

(A) one real root in (e, π) and other in $(\pi - e, e)$

(B) one real root in (e, π) and other in $(\pi, \pi + e)$

(C) two real roots $(\pi - e, \pi + e)$

(D) no real root

22. The interval for which $x^{12} - x^9 + x^4 - x + 1 > 0$ is:

(A) $-4 < x < 0$ (B) $0 < x < 1$

(C) $-100 < x < 100$ (D) $-\infty < x < \infty$

23. If sin x + cos x + tan x + cot x + sec x + cosecx =7 and $\sin 2x = a - b\sqrt{7}$,

(A) a = 22 (B) a = 8

(C) b = 8 (D) b = 4

SECTION - C

Linked Comprehension Type

This section contains paragraph. Based upon this paragraph, some multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE OR MORE** is/are correct.

Paragraph for Question Nos. 24 to 25

Let $f(x) = ax^2 + bx + c$. If $x_i \in R$, $i = 1, 2, 3$ and are distinct values such that $f(x_i) = 0$, then $f(x) \equiv 0$ *i.e.* $f(x) = 0 \ \forall\ x \in R$.

24. If *f* and x_i, $i = 1, 2, 3$ are same as given in above paragraph, then

(A) $a \neq 0$, $b \neq 0$, $c = 0$ (B) $a = b \neq 0$, $c = 0$

(C) a = 0, and b=c=0 (D) $a \neq 0$, $b = c = 0$

25. Let $g(x) = \frac{(x-x_2)(x-x_3)}{(x_1-x_2)(x_1-x_3)} + \frac{(x-x_3)(x-x_1)}{(x_2-x_3)(x_2-x_1)} + \frac{(x-x_1)(x-x_2)}{(x_3-x_1)(x_3-x_2)}$, then g(x) is identically equal to

(A) 0

(B) 1

(C) $(x - x_1)(x - x_2)(x - x_3)$

(D) $(x_1 - x_2)(x_2 - x_3)(x_3 - x_1)$

Paragraph for Question Nos. 26 to 27

Let $a_0, a_1, a_2, \ldots\ldots\ldots\ldots a_n$ be real numbers, then $f(x) = a_0 + a_1x + a_2x^2 + \ldots + a_nx^n$ is called polynomial in variable *x*. If all *n* roots of any polynomial equation of *n* degree satisfy an other polynomial of *n* degree then both equations are called identical.

26. Equations $a_1x^2 + b_1x + c_1 = 0$ and $a_2x^2 + b_2x + c_2 = 0$, where $(a_1, a_2, b_1, b_2, c_1, c_2) \in R$ are identical equations if and only if

(A) $\left(\frac{a_1}{a_2}\right)^{2n} = \left(\frac{b_1}{b_2}\right)^{2n} = \left(\frac{c_1}{c_2}\right)^{2n}$, where $n \in I$

(B) $a_1 = ka_2$; $b_1 = kb_2$, $c_1 = kc_2$ for any $k \in R - \{0\}$

(C) $a_1 = ka_2$; $b_1 = kb_2$, $c_1 = kc_2$ for any $k \in C$

(D) $\left(\frac{a_1}{a_2}\right)^{2n+1} = \left(\frac{b_1}{b_2}\right)^{2n+2} = \left(\frac{c_1}{c_2}\right)^{2n+3}$

27. If *a*, *b*, *c* are the sides of a triangle, then what is the value of $(c^2 + a^2 - b^2)$ if following two equations are identical?

$(b - c)x^2 - (c - a)x + (a - b) = 0$

$ax^2 + (a + b + c)x + (b + c) = 0$

(A) 2*ca* (B) 2*ab*

(C) 2*bc* (D) a*b*

Paragraph for question nos. 28 and 29

Consider a quadratic expression

$f(x) = tx^2 - (2t-1)x + (5t-1)$

28. If f(x) can take both positive and negative values then t must lie in the interval

(A) $\left(\frac{-1}{4}, \frac{1}{4}\right)$ (B) $\left(-\infty, \frac{-1}{4}\right) \cup \left(\frac{1}{4}, \infty\right)$

(C) $\left(\frac{-1}{4}, \frac{1}{4}\right) - \{0\}$ (D) $(-4, 4)$

29. If f(x) is non-negative $\forall x \geq 0$ then t lies in the interval

(A) $\left[\frac{1}{5}, \frac{1}{4}\right]$ (B) $\left[\frac{1}{4}, \infty\right]$

(C) $\left[\frac{-1}{4}, \frac{1}{4}\right]$ (D) $\left[\frac{1}{5}, \infty\right]$

Paragraph for question nos. 30 to 31

For a, b $\in$ R - {0}, let $f(x) = ax^2 + bx + a$ satisfies

$f\left(x + \frac{7}{4}\right) = f\left(\frac{7}{4} - x\right) \forall x \in R$

Also the equation $f(x) = 7x + a$ has only one real and distinct solution.

30. The value of (a + b) is equal to

(A) 4 (B) 5

(C) 6 (D) 7

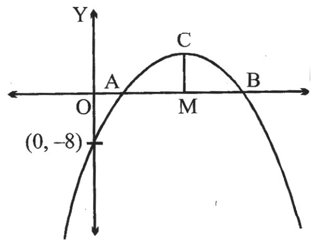
31. The minimum value of f (x) in $\left[0, \frac{3}{2}\right]$ is equal to

(A) $\frac{-33}{8}$ (B) 0

(C) 4 (D) – 2

Paragraph for question no. 32 and 33

The graph of $y = px^2 + qx + r$, $x \in R$ is plotted in adjacent diagram. Given AM = 2 and CM = 1.



32. Which of the following statements (s) is (are) correct?

(A) The value of (4p – r) is equal to 7.

(B) The value of (4p – r) is equal to 5.

(C) The sum of roots of equation $px^2 + qx + r = 0$ is equal to 10.

(D) The sum of roots of equation $px^2 + qx + r = 0$ is equal to 12.

33. Which of the following statement (s) is (are) incorrect?

(A) The value of $\lim_{x \to 8} (px^2 + qx + r)$ is not equal to zero.

(B) The inequality $px^2 + qx + r < 0$ is true for all $x \in (6, \infty)$

(C) Harmonic mean of roots of the equation

$px^2 + qx + r = 0$ is $\frac{32}{3}$.

(D) The value of q is equal to 3.

SECTION-D

Single-Match Type

This section contains Single match questions. Each question contains statements given in two columns which have to be matched. The statements in **Column I** are labelled 1, 2, 3 and 4, while the statements in **Column II** are labelled p, q, r, s and t. Four options 1,2,3 and 4 are given below. Out of which, only one shows the right matching

34. If $x^4 - 6x^3 + 8x^2 + 4ax - 4a^2 = 0$, $a \in R$, then match the following :

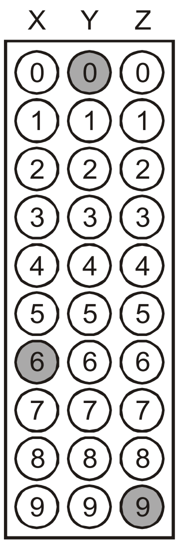
	Column I		**Column II**
(A)	Equation will have 4 real and distinct roots for a belongs to	(P)	(0, 1)
(B)	Equation will have 2 distinct real roots for a belongs to	(Q)	(3, 4)
(C)	Equation will have at least one negative root for a belongs to	(R)	(–2, –1)
(D)	Equation will have 2 equal and 2 distinct real roots for a belongs to	(S)	{2}

35. Match the following **Column - I** with **Column - II** :

	Column I		**Column II**
(A)	If $x^4 - ax^3 - ax^2 + ax + 1 = 0$ has two distinct positive real roots then exhaustive set of values of a is	(P)	$\left(\frac{2\sqrt{2}-1}{1+2\sqrt{2}}, \frac{1+2\sqrt{2}}{2\sqrt{2}-1}\right)$
(B)	If $x^4 - ax^3 - ax^2 + ax + 1 = 0$ has two distinct positive real roots and two distinct negative real roots then exhaustive set of values of a is	(Q)	$\left(-\infty, \frac{3}{2}\right)$
(C)	If $x^4 + ax^3 + x^2 + ax + 1 = 0$ has atleast two distinct negative real roots then exhaustive values of a is	(R)	$(3, \infty)$
(D)	If $(x^2 + x + 2)^2 - a(x^4 + 3x^2 + 4) = 0$ has two distinct real roots then exhaustive set of a is	(S)	$\left(-\infty, \frac{3}{2}\right) \cup (3, \infty)$
		(T)	$(-\infty, -2-2\sqrt{3}) \cup (-2+2\sqrt{3}, \infty)$

SECTION-E
Integer Answer Type

This section contains Integer type questions. The answer to each of the questions is a single digit integer, ranging from 0 to 9. The appropriate bubbles below the respective question numbers in the ORS have to be darkened. For example, if the correct answers to question numbers X, Y and Z(say) are 6, 0 and 9, respectively, then the correct darkening of bubbles will look like the following :



36. The number of real roots of $x^{100} - 2x^{99} + 3x^{98} -.....- 100x + 101 = 0$ is ____.

37. If $x > 0$, then minimum value of

$$\frac{\left(x+\frac{1}{x}\right)^6 - \left(x^6+\frac{1}{x^6}\right) - 2}{\left(x+\frac{1}{x}\right)^3 + \left(x^3+\frac{1}{x^3}\right)}$$ is ______.

38. If $\frac{k+1}{k}$ and $\frac{k+2}{k+1}$ are the roots of $ax^2+bx+c = 0$ and the discriminant is 11, then the value of $(a+b+c)^2-11$ is _____

39. If α is a common root of the equations $x^3 + 2x^2 - 5x + 2 = 0$ and $x^3+x^2 - 8x + 4 = 0$, then $\left|\frac{2\alpha}{\sqrt{17}-3}\right|$ is equal to

40. Let f(x) be a polynomial of degree 8 such that $F(r) = \frac{1}{r}$, r=1,2,3,.........,8, 9 then $\frac{1}{F(10)}$ is

41. The number of real root(s) of the equation $ae^x = 1 + x + \frac{x^2}{2}$; where a is positive constant less than unity.

42. Let $f(x) = x^2+\lambda x + \mu \cos x$, λ being an integer and μ is a real number. The number of ordered pairs (λ, μ) for which the equation f(x) = 0 and f(f(x)) = 0 have the same (non empty)set of real roots is

43. If the biquadratic $x^4 + ax^3 + bx^2 + cx + d = 0$ (a, b, c, $d \in R$) has 4 non real roots, two with sum 3 + 4i and the other two with product 13 + i. Then the value of 'b' is

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ANSWERS

LEVEL-1

1. (D)	2. (C)	3. (A)	4. (D)	5. (A,C,D)	6. (A,B,C,D)
7. (A,B,C,D)	8. (B,C,D)	9. (B,C)	10. (A,C,D)	11. (A,B,C)	12. (A,B,C)
13. (B)	14. (A,D)	15. (B)	16. (A-Q B-S,C-R)	17. (6)	18. (2)
19. (1)	20. (3)	21. (727)			

LEVEL-2

1. (A)	2. (A)	3. (D)	4. (B)	5. (D)	6. (D)
7. (B)	8. (C)	9. (A)	10. (B)	11. (C)	12. (B)
13. (C)	14. (C)	15. (A)	16. (A)	17. (A, C)	18. (B,D)
19. (A,B,C,D)	20. (A,B,C)	21. (B,C)	22. (A,B,C,D)	23. (A,C)	24. (C)
25. (B)	26. (B)	27. (D)	28. (C)	29. (D)	30. (B)
31. (D)	32. (A,D)	33. (A,B,D)	34. (A-P B-Q,R,C-P,Q,R,S D-S)		
35. (A-T B-T,C-Q D-P)	36. (0)	37. (6)	38. (0)	39. (1)	40. (5)
41. (1)	42. (3)	43. (51)			

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