FIITJEE

POTENTIAL DISCOVERY TEST

CLASS- X (going to XI)

Paper Code
1181A

Time: 90 Min. ***Maximum Marks: 130***

A. Question Paper Format

1. The question paper consists of **3 Sections** (**Section-A, Section-B** and **Section-C**)
2. **Section - A** contains **24** multiple choice questions. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **only one is correct.**
3. **Section - B** contains **2** questions. Each question has four statements (A, B, C and D) given in column I and four statements (p, q, r, and s) in Column II. Any given statement in column I has correct matching with **one** statement given in column II.
4. **Section - C** contains **9** questions. The answer to each of the questions is a **single – digit integer,** ranging from 0 to 9. The answer will have to be appropriately bubbled in the ORS as per the instructions given at the beginning of the section.

B. Marking Scheme:

5. For questions **(1 to 18)** in **Section A:** you will be awarded **3 marks** if you darken only the bubble corresponding to the correct answer and **zero mark** if no bubbles are darkened. In all other cases, minus one **(–1) mark** will be awarded. For questions **(19 to 24)** you will be awarded **4 marks** for the correct response, there will be no negative marking.
6. For each question in **Section B:** you will be awarded **2 marks** for each row in which you have darkened the bubble corresponding to the correct answer **ONLY** and zero marks otherwise. These questions in this section carry a maximum of **8 marks**. There are **no negative marks** in this Section.
7. For each question in **Section C:** you will be awarded **4 marks** if you darken only the bubble corresponding to the correct answer and zero mark if no bubbles are darkened. **No negative marks** will be awarded in this Section.

Registration No. | | | | | | | | | | | | | | | | | | | | | | |

Name : . . . . . .

Class (Presently Study in) : . . . . . **Date:**. . . . . .

Test Centre : . . . . . .

Mathematics

Part – I

Section – A
Single Correct Answers Type

This section contains **18 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct.**

1. If the sum of two positive integers is 5 and their product is 6, then the numbers are
   (A) 2, 3 (B) 3, 4
   (C) 4, 5 (D) 5, 6

2. The solution of the equation $\frac{2}{x} - 3 = \frac{1}{x}$ is
   (A) -3 (B) 1/3
   (C) 1 (D) -1

3. If the equation $x^2 - (a^2 + 2)x + 9 = 0$ has positive real and equal roots, then the value of a, is
   (A) -2 (B) -1
   (C) 1 (D) 2

4. The roots of equation $3^x - 4^x = 0$ is
   (A) -1 (B) 0
   (C) 1 (D) 2

5. If α, β are the roots of equation $x^2 + 3x + 2 = 0$, then the equation whose roots are $\alpha + 1$, $\beta + 1$ is
   (A) $x^2 - 5x + 6 = 0$ (B) $x^2 + 5x - 6 = 0$
   (C) $x^2 + 5x + 6 = 0$ (D) none of these

6. The value of m if the product of the roots of the equation $mx^2 + 6x + (2m - 1) = 0$ is -1, is
   (A) 3 (B) 1
   (C) 1/2 (D) 1/3

Space for rough work

7. The values of x such that $(x - 1)(x + 2) \leq 0$
(A) $x \in [-2, 1]$ (B) $x \in [0, 3]$
(C) $x \in [5, 6]$ (D) none of these

8. The values of x such that $x(x + 1) \leq 0$
(A) $x \in [-1, 5]$ (B) $x \in [-1, 0]$
(C) $x \in (-\alpha, 1]$ (D) none of these

9. The value of k for which the equation $2x^2 - 10x + k = 0$ has real and equal roots, is
(A) $\frac{15}{2}$ (B) $\frac{25}{2}$
(C) $\frac{27}{2}$ (D) $\frac{35}{2}$

10. The discriminant of equation $5x^2 - 7x + 1 = 0$ is
(A) 29 (B) 39
(C) 49 (D) 17

11. The solution set of equation $2x^2 + x + 4 = 0$ are
(A) (1, 2) (B) (– 2, 1)
(C) (3, – 1) (D) not real roots

12. The value of x in the equation $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = \frac{5}{2}$ if $x \neq -\frac{1}{2}, 1$ is
(A) 2 (B) 1/2
(C) – 1 (D) 1/3

13. A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places, then the number is
(A) 92 (B) 39
(C) 64 (D) 48

Space for rough work

14. The sum of two numbers is 15. If the sum of their reciprocals is $\frac{3}{10}$, then the numbers are

(A) 12, 3 (B) 8, 7
(C) 10, 15 (D) 11, 4

15. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, then the value of k is

(A) $\frac{7}{5}$ (B) $\frac{7}{4}$
(C) $\frac{11}{3}$ (D) $\frac{15}{2}$

16. The nature of roots of the equation $2x^2 + 5x + 3 = 0$ is

(A) real and equal (B) real
(C) imaginary (D) none of these

17. The value of $\sqrt{6+\sqrt{6+\sqrt{6+}.....}}$ is

(A) 5 (B) 3
(C) -4 (D) 2.5

18. If the roots of the equation $(a^2 + b^2)x^2 - 2b(a + c)x + (b^2 + c^2) = 0$ are equal, then

(A) $2b = a + c$ (B) $b^2 = ac$
(C) $\frac{2ac}{a+c}$ (D) $b = ac$

Space for rough work

Paragraph Type

This section contains **2 paragraphs.** Based upon these paragraphs **6 multiple choice questions** have to be answered. Each of these questions has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Paragraph for Questions 19 to 21

If $f(x) = (x-\alpha)(x-\beta)(x-\gamma) > 0$ for $x = a$, then $g(x) = \dfrac{(x-\alpha)}{(x-\beta)(x-\gamma)} > 0$ for $x = a$ if $a \neq \beta, \gamma$ and also $p(x) = \dfrac{1}{(x-\alpha)(x-\beta)(x-\gamma)} > 0$ for $x = a$, if $a \neq \alpha, \beta, \gamma$

19. If $f(x) = \left(\dfrac{x^2+x}{x-1}\right) > 0$, then x is

(A) $x \in (-1, 0) \cup (1, \infty)$ (B) $x \in [-2, 0]$
(C) $x \in (-\infty, 1]$ (D) none of these

20. If $f(x) = \left(\dfrac{x+1}{x(x-1)}\right) \leq 0$, then x is

(A) $x \in [-1, 1]$ (B) $x \in (-\infty, -1] \cup (0, 1)$
(C) $x \in (-\infty, 1]$ (D) none of these

21. If $f(x) = \dfrac{1}{(x^2+x)(x-1)} > 0$, then

(A) $x \in (-1, 0) \cup (1, \infty)$ (B) $x \in [-2, 0]$
(C) $x \in (-\infty, 1]$ (D) none of these

Space for rough work

Paragraph for Questions 22 to 24

Let f (x) be polynomial in x of degree not less than 1 and 'a' be a real number. If f (x) is divided by (x – a), then the remainder is f (a). If x – a is a factor of f (x), then f (a) = 0.

22. The remainder when $x^4 + x^3 - x^2 + 2x + 3$ is
(A) 106 (B) 93
(C) 103 (D) 108

23. If $x - 3$ is a factor of $x^3 + 3x^2 + 3x + p$, then the value of p is
(A) 74 (B) 75
(C) 63 (D) – 63

24. $x^n - y^n$ is divisible by x + y when n is
(A) even positive integer (B) odd positive integer
(C) any whole number (D) none of these

Section – B
Match Type

This section contains **2 questions**. These questions have **four statements** (A, B, C and D) given in **Column I** and **four statements** (p, q, r, and s) in **Column II.** Any given statement in **Column I** have correct matching with one statement in **Column II.** For example, if for a given question, statement B matches with the statements given is q, then for that particular question, against statement B, darken the bubble corresponding to q in the ORS.

1. Match the following:

	Column – I		**Column – II**
(A)	If sum of roots of the equation $x^2 + (a + 3) x + b = 0$, a, b $\in$ R is – 2, then the value of a is	(p)	1
(B)	If one of the equation $x^2 + 2x + (a - 1) = 0$ is zero, then the value of a is	(q)	– 2
(C)	If the root of the equation $x^2 - px + q = 0$ differ by unity, then 2 $(p^2 - 4q)$ is	(r)	– 1
(D)	If x = 2 is the root of the equation $x^2 - (a + 3) x + a = 0$, then the value of a is	(s)	2

Space for rough work

2. Match the following:

	Column – I		Column – II
(A)	Sum of roots of the equation $3x^2 - 5x + 7 = 0$ is	(p)	$\frac{1}{4}$
(B)	Product of roots of equation $-4x^2 + 3x - 2 = 0$ is	(q)	$\frac{5}{3}$
(C)	The roots of equation $4x^2 - 2x + \frac{1}{4} = 0$ is	(r)	-31
(D)	The discrimianant of the equation $5x^2 - 3x + 2 = 0$ is	(s)	$\frac{1}{2}$

Section –C
Integer Answer Type

This section contains **9 questions**. The answer to each of the questions is a **single-digit integer**, ranging from 0 to 9. The correct digit below the question number in the ORS is to be bubbled.

1. If $x = 2$ is the root of the equation $ax^2 + bx + 2c = 0$, then the value of $2a + b + c$ is _____

2. The number of real and distinct roots of the equation $ax^2 - 3bx - 4a = 0$ is _____ (given $a \neq b$)

3. If α and β are the roots of the equation $x^2 + 3x + 2 = 0$, then the value of $\left(\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}\right) + 3\left(\frac{\alpha}{\beta} + \frac{\beta}{\alpha}\right)$ is _____

4. If (α, β), (β, γ), (γ, α) are respectively the roots of the equation $x^2 - 2px + 2 = 0$, $x^2 - 2qx + 3 = 0$ and $x^2 - 2rx + 6 = 0$ (given α, β, γ are the natural numbers), then the value of $p + q + r$ is _____

Space for rough work

5. If α, β are the roots of $x^2 - 2x + 4 = 0$, then $\frac{1}{16}\left(\alpha^5 + \beta^5\right)$ is equal to _____

6. If α, β are the roots of $x^2 - x + 2 = 0$, then the value of $\frac{1}{2}\left(\alpha^2\beta + \alpha\beta^2\right)$ is _____

7. If roots of the equation $x^2 - bx + c = 0$ be two consecutive integers, then $b^2 - 4c$ is equal to _____

8. If α, β are the roots of $x^2 + x + 1 = 0$, then $-\left(\frac{\alpha}{\beta} + \frac{\beta}{\alpha}\right)$ is equal to _____

9. The positive value of $\frac{k}{8}$ for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots is equal to _____

Space for rough work