



**IPE MODEL :: MATHS-IIA**

**Syllabus: Partial Fractions, Quadratic Equations, Theory of Equations.**

**SECTION - A**

**I. VSAQ: Attempt All Questions**

**10 x 2 = 20 M**

1. Resolve into partial fraction  $\frac{5x+6}{(2+x)(1-x)}$ .
2. If  $\alpha, \beta$  are the roots of  $ax^2 + bx + c = 0$  then find the value of  $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ .
3. Find the Quadratic equation whose roots are  $7 \pm 2\sqrt{5}$ .
4. Find the maximum or minimum of the following expression is  $2x - 7 - 5x^2$ .
5. If the product of the roots of  $4x^3 + 16x^2 - 9x - a = 0$  is 9, then find 'a'.
6. If  $-1, 2, \alpha$  are the roots  $2x^3 + x^2 - 7x - 6 = 0$  then find  $\alpha$ .
7. Find the equation whose roots are '3' times the roots of  $x^3 + 2x^2 - 4x + 1 = 0$ .
8. If  ${}^n P_3 = 1320$ , find 'n'.
9. If  ${}^n P_7 = 42 {}^n P_5$ , find 'n'.
10. Find the number of (i) 6 (ii) 7 letter palindrome that can be formed using the letters of the word EQUATION.

**SECTION - B**

**II. SAQ: Answer any FIVE of the following questions.**

**5 x 4 = 20 M**

11. Resolve into partial fractions  $\frac{x^3}{(x-a)(x-b)(x-c)}$ .
12. Find the coefficient of  $x^4$  in the expansion of  $\frac{3x}{(x-2)(x+1)}$  specifying the region in which the expansion is valid.
13. Find the range of  $\frac{x^2 + x + 1}{x^2 - x + 1}$ .
14. If x is real prove that  $\frac{x}{x^2 - 5x + 9}$  lies between  $\frac{-1}{11}$  and 1.
15. Solve the equation  $8x^3 - 36x^2 - 18x + 81 = 0$  the roots being in A.P.
16. Solve the reciprocal equation  $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$ .
17. If the letters of the word MASTER are permuted in all possible ways and the words thus formed are arranged in the dictionary order, then find the Rank of the word 'MASTER'.

**SECTION - C**

**III. LAQ: Answer any FIVE of the following questions.**

**5 x 7 = 35 M**

18. Solve the equation  $x^4 - 4x^2 + 8x + 35 = 0$ , given that  $2 + i\sqrt{3}$  is a root.
19. If  $\frac{x-p}{x^2 - 3x + 2}$  takes all real values for  $x \in R$ , Show that  $1 < p < 2$ .
20. Solve the equation  $2x^3 + 3x^2 - 8x + 3 = 0$ , one root being double the another root.
21. Solve the equation  $18x^3 + 81x^2 + 121x + 60 = 0$ , one root being half the sum of the other two.
22. Solve the reciprocal equation of  $2x^5 + x^4 - 12x^3 - 12x^2 + x + 2 = 0$ .
23. Find the equation whose roots are the translates of the roots of  $x^4 - 5x^3 + 7x^2 - 17x + 11 = 0$  by  $-2$ .
24. Find the sum of all 4 digit numbers that can be formed using the digits 1, 3, 5, 7, 9.