



RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATIONS

MATRIC PRACTICE PAPER (2024)

(Mathematics)

Grade: XII
Chapter: Theory Of Equations

Marks: 40 marks
Time: 60 minutes

SECTION A

(10x1=10)

- A polynomial equation of degree n always has
 (a) Exactly n roots (b) n distinct roots
 (c) n real roots (d) n imaginary roots
- The number of real numbers in $[0, 2\pi]$ satisfying $\sin^4 x - 2\sin^2 x + 1$ is
 (a) 1 (b) 2 (c) ∞ (d) 4
- The number of positive zeros of the polynomial $\sum_{r=0}^n {}^n C_r (-1)^r x^r$ is
 (a) $< n$ (b) 0 (c) r (d) n
- If α, β, γ are the zeros of $x^3 + px^2 + qx + r$, then $\sum \frac{1}{\alpha}$ is
 (a) $\frac{q}{r}$ (b) $\frac{-q}{r}$ (c) $\frac{-q}{p}$ (d) $\frac{-p}{r}$
- The polynomial $x^3 - kx^2 + 9x$ has 3 zeros if and only if k satisfies
 (a) $|k| \leq 6$ (b) $k = 0$ (c) $|k| > 6$ (d) $|k| \geq 6$
- If $a, b, c \in \mathbb{Q}$ and $p + \sqrt{q}$ ($p, q \in \mathbb{Q}$) is an irrational root of $ax^2 + bx + c = 0$, then the other root is
 (a) $-p + \sqrt{q}$ (b) $p - iq$ (c) $p - \sqrt{q}$ (d) $-p - \sqrt{q}$
- Let $a, b, c > 0$, then both the roots of the equation $ax^2 + bx + c = 0$ are
 (a) Real and negative (b) real and positive
 (c) rational numbers (d) none
- The equation $\sqrt{x+1} - \sqrt{x-1} = \sqrt{4x-1}$ has
 (a) No solution (b) one solution
 (c) two solution (d) more than one solution

9. If $x^3+12x^2+10ax+1999$ definitely has a positive zero, if and only if
(a) $a \geq 0$ (b) $a > 0$ (c) $a < 0$ (d) $a \leq 0$

10. If α, β, γ are the roots of $9x^3-7x+6=0$, then $\alpha\beta\gamma$ is
(a) $\frac{-7}{9}$ (b) $\frac{7}{9}$ (c) 0 (d) $\frac{-2}{3}$

SECTION B

(3x2=6)

11. Form a polynomial equation with integer coefficient with $\sqrt{\frac{\sqrt{2}}{\sqrt{3}}}$ as a root.

12. Discuss the maximum possible number of positive and negative roots of the polynomial equation: $9x^9-4x^8+4x^7-3x^6+2x^5+x^3+7x^2+7x+2=0$

13. If α, β and γ are the roots of the equation $x^3+px^2+qx+r=0$, find the value of $\sum \frac{1}{\beta\gamma}$ in terms of the coefficients.

SECTION C

(3x3=9)

14. Solve the equation: $x^4-9x^2+20=0$

15. Solve the equation: $2x^3+11x^2-9x-18=0$.

16. If $2+i$ and $3-\sqrt{2}$ are roots of the equation $x^6-13x^5+62x^4-126x^3+65x^2+127x-140=0$, find all roots.

SECTION D

(3x5=15)

17. If the roots of $x^3+px^2+qx+r=0$ are in H.P., prove that $9pqr=27r^2+2q^3$.

18. Solve the equation: $x^4-10x^3+26x^2-10x+1=0$.

19. Solve: $(2x-1)(x+3)(x-2)(2x+3)+20=0$.