DALMIA HIGHER SECONDARY SCHOOL
DALMIAPURAM – 621651
Std : 12   MATHEMATICS   TIME: 1.50HRS
CHAPTER – 3   TEST -1   MARKS : 50
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2 MARKS : ANSWERS ALL THE QUESTIONS   **25 X 2 = 50**

1. If α and β are the roots of the quadratic equation $17x^2 + 43x - 73 = 0$, construct a quadratic equation whose roots are $\alpha + 2 \ and \ \beta + 2$.

2. Find the monic polynomial equation of minimum degree with real coefficients having as a root.

3. Find a polynomial equation of minimum degree with rational coefficients, having as a root.

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

5. Show that the equation $2x^2 - 6x + 7 = 0$ cannot be satisfied by any real values of x.

6. Show that, if p , q ,r are rational, the roots of the equation $x^2 - 2px + p^2 - q^2 + 2qr - r^2 = 0$ are rational.

7. Obtain the condition that the roots of $x^3 + px^2 + qx + r = 0$ are in A.P.

8. Discuss the nature of the roots of the following polynomials:

(i) $x^{2018} + 1947x^{1950} + 15x^8 + 26x^6 + 2019$

9. Construct a cubic equation with roots   1, 2 , and 3

10. Construct a cubic equation with roots   1,1, and -2

11. Construct a cubic equation with roots $2, \frac{1}{2}$ and 1.

12. If α , β and γ are the roots of the cubic equation $x^3 + 2x^2 + 3x + 4 = 0$, form a cubic equation whose roots are 2α , 2β , 2γ

13. If α , β and γ are the roots of the cubic equation $x^3 + 2x^2 + 3x + 4 = 0$, form a cubic equation whose roots are $\frac{1}{\alpha}, \frac{1}{\beta}, \frac{1}{\gamma}$

14. If α , β and γ are the roots of the cubic equation $x^3 + 2x^2 + 3x + 4 = 0$, form a cubic equation whose roots are $-\alpha, -\beta, -\gamma$

15. Solve the equation $3x^3 - 16x^2 + 23x - 6 = 0$ if the product of two roots is 1.

16. Find the sum of squares of roots of the equation $2x^4 - 8x^3 + 6x^2 - 3 = 0$

17. If p and q are the roots of the equation $x^2 + nx + n = 0$, show that $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{l}} = 0$

18. If k is real, discuss the nature of the roots of the polynomial equation $2x^2 + kx + k = 0$, in terms of k .

19. Find a polynomial equation of minimum degree with rational coefficients, having $2 + i\sqrt{3}$ as a root.

20. Find a polynomial equation of minimum degree with rational coefficients, having 2 i + 3 as a root.

21. Solve the cubic equations :

(i) $2x^3 - 9x^2 + 10x = 3$,

(ii) $8x^3 - 2x^2 - 7x + 3 = 0$

22. Solve the equation : $x^4 - 14x^2 + 45 = 0$

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

24. Determine the number of positive and negative roots of the equation $x^9 - 5x^8 - 14x^7 = 0$

25. Find the exact number of real zeros and imaginary of the polynomial
$x^9 + 9x^7 + 7x^5 + 5x^3 + 3x$

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CHAPTER – 3   TEST -2   MARKS : 50
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3 MARKS : ANSWERS ANY 10 Q   10 X 3 = 30

1.If α and β are the roots of the quadratic equation $2x^2 - 7x - 13 = 0$, construct a quadratic equation whose roots are α^2 and β^2 .

2. If p is real, discuss the nature of the roots of the equation $4x^2+4px+p+2 = 0$, in terms of p .

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

4. Solve the equation $x^3 - 3x^2 - 33x + 35 = 0$

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

6. If α , β and γ are the roots of the polynomial equation $ax^3 + bx^2 + cx + d = 0$, find the value of $\sum \frac{\alpha}{\beta\gamma}$ in terms of the coefficients.

7. If , β ,γ and δ are the roots of the polynomial equation $2x^4+5x^3 - 7x^2 + 8 = 0$, find a quadratic equation with integer coefficients whose roots are $\alpha + \beta + \gamma + \delta$ and $\alpha\beta\gamma\delta$

8. If the equations $x^2 + px + q = 0$ and $x^2 + p'x + q' = 0$ have a common root, show that it must be equal to $\frac{pq'-p'q}{q-p}$ or $\frac{q-q'}{p'-p}$.

9. Find a polynomial equation of minimum degree with rational coefficients, having $\sqrt{5} - \sqrt{3}$ as a root.

10. Solve the equation $9x^3 - 36x^2 + 44x - 16 = 0$if the roots form an arithmetic progression.

11. Solve the equations $sin^2x - 5sinx + 4 = 0$

12. Show that the equation $x^9 - 5x^5 + 4x^4 + 2x^2 + 1 = 0$ has atleast 6 imaginary solutions.

5 MARKS : ANSWERS ANY 1 Q   4 X 5 = 20

13. Find the condition that the roots of cubic equation$x^3+ax^2+bx+c= 0$ are in the ratio p: q: r.

14. Solve the equation $3x^3-16x^2+23x-6 = 0$ if the product of two roots is 1.

15.Find a polynomial equation of minimum degree with rational coefficients, having$\sqrt{5} - \sqrt{3}$ as a root.

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.

17.Determine k and solve the equation $2x^3-6x^2+3x+k = 0$ if one of its roots is twice the sum of the other two roots.

18.Find all zeros of the polynomial $x^6-3x^5-5x^4+22x^3-39x^2-39x+135$, if it is known that $1+2i$ and $\sqrt{3}$ are two of its zeros.

19. Solve the equation $(x-2)$ $(x-7)$ $(x-3)$ $(x+2)$ + 19 = 0.

20. Solve the equation $(2x-3)$ $(6x-1)$ $(3x-2)$ $(x-2)$ -5 = 0.

21.Solve: (i) $(x-5)$ $(x-7)$ $(x+6)$ $(x+4)$ = 504, (ii) $(x-4)$ $(x-7)$ $(x-2)$ $(x+1)$ = 16.

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

23. Solve the equation $7x^3-43x^2= 43x -7$.

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

25. Solve the equation $6x^4-5x^3-38x^2-5x+6= 0$ if it is known that $\frac{1}{3}$ is a solution.