MATHEMATICS

POLYNOMIALS

1. If α and β are the zeros of the polynomial $f(x) = x^2 + px + q$, then a polynomial having $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is its zeros is

(A) $x^2 + qx + p$
(B) $x^2 - px + q$
(C) $qx^2 + px + 1$
(D) $px^2 + qx + 1$

SOL : Clearly required polynomial will be $qx^2 + px + 1$.

ANS : C

2. If α, β are the zeros of polynomial $f(x) = x^2 - p(x + 1) - c$, then $(\alpha + 1)(\beta + 1) =$

(A) $c - 1$
(B) $1 - c$
(C) c
(D) $1 + c$

SOL : $\alpha + \beta = p$, $\alpha.\beta = - p - c$

now $(\alpha + 1)(\beta + 1) = 0$

$\Rightarrow \alpha\beta + \alpha + \beta + 1 = 0$
$\Rightarrow - p - c + p + 1 \Rightarrow 0$
$\Rightarrow c = 1.$

ANS : A

3. If $f(x) = ax^2 + bx + c$ has no real zeros and $a + b + c < 0$, then

(A) $c = 0$
(B) $c > 0$
(C) $c < 0$
(D) c is undefined

SOL : $a < 0$, (since graph is a down word parabola)

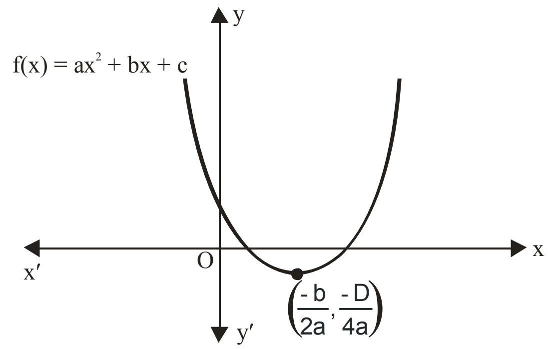
now $-\frac{b}{2a} < 0 \Rightarrow \frac{b}{2a} > 0 \Rightarrow b < 0$

$f(0) > 0$

$\Rightarrow c > 0$

ANS : C

*4. In the following figure shows the graph of the polynomial $f(x) = ax^2 + bx + c$. Then



(A) a > 0, b > 0 and c > 0

(B) a > 0, b < 0 and c > 0

(C) a > 0, b < 0 and c < 0

(D) a > 0, b > 0 and c < 0

SOL : a > 0 (since graph is a upward parabola).

$$-\frac{b}{2a} > 0 \Rightarrow \frac{b}{2a} < 0 \Rightarrow b < 0$$

$f(0) > 0 \Rightarrow c > 0$

Hence a > 0, b < 0, c > 0

ANS : B

5. For the equation$3x^2 + px + 3 = 0$, $p > 0$, if one of the roots is square of other, then p =

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

(B) 1

(C) 3

(D) $\frac{2}{3}$

SOL : $\alpha + \alpha^2 = -\frac{p}{3}$

$$\alpha^3 = \frac{10}{-8}$$

ANS : C

6. If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum of squares of their reciprocals, then $\frac{a}{c}, \frac{b}{a}, \frac{c}{b}$ are in

(A) A.P.

(B) G.P.

(C) H.P.

(D) A.G.P.

ANS : C

7. If the product of zeros of the polynomial $f(x) = ax^3 - 6x^2 + 11x - 6$ is 4, then a =

(A) $\frac{3}{2}$ (B) $-\frac{3}{2}$

(C) $\frac{2}{3}$ (D) $-\frac{2}{3}$

SOL : $ax^3 - 6x^2 + 11x - 6$

Let the zero's be α, β, γ

$$\alpha\beta\gamma = \frac{6}{a} \Rightarrow \frac{6}{a} = 4$$

$$\Rightarrow \quad a = \frac{2}{3}$$

ANS : A

8. If zeros of the polynomial $f(x) = x^3 - 3px^2 + qx - r$ are in A.P., then

(A) $2p^3 = pq - r$ (B) $2p^3 = pq + r$

(C) $p^3 = pq - r$ (D) none of these

SOL : $f(x) = x^3 - 3px^2 + qx - r$

$$\alpha - d + \alpha + \alpha + d = 3p$$

$$\Rightarrow \quad \alpha = p$$

now $f(\alpha) = 0 \Rightarrow p^3 - 3p^3 + pq - r = 0$

$$\Rightarrow \quad 2p^3 = pq - r$$

ANS : A

9. If α, β, γ are the zeros of the polynomial $f(x) = ax^3 + bx^2 + cx + d$, then $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma} =$

(A) $-\frac{b}{d}$ (B) $\frac{c}{d}$

(C) $-\frac{c}{d}$ (D) $-\frac{c}{a}$

SOL : $f(x) = ax^3 + bx^2 + cx + d$

now $\frac{1}{\alpha}+\frac{1}{\beta}+\frac{1}{\gamma}=\frac{\beta\gamma+\gamma\alpha+\alpha\beta}{\alpha\beta\gamma}$

where $\alpha\beta+\beta\gamma+\gamma\alpha=\frac{c}{a}$

$\alpha\beta\gamma=-\frac{d}{a}$

ANS : C

10. If α, β, γ are the zeros of the polynomial f(x) $ax^3 + bx^2 + cx + d$, then $\alpha^2 + \beta^2 + \gamma =$

(A) $\frac{b^2-ac}{a^2}$ (B) $\frac{b^2-2ac}{a}$

(C) $\frac{b^2+2ac}{b^2}$ (D) $\frac{b^2-2ac}{a^2}$

SOL : $f(x) = ax^3 + bx^2 + cx + d$

$\alpha+\beta+\gamma=-\frac{b}{a},\ \alpha\beta+\beta\gamma+\gamma\alpha=\frac{c}{a}$

now $\alpha\beta\gamma=-\frac{d}{a}$

$(\alpha^2+\beta^2+\gamma^2)=(\alpha+\beta+\gamma)^2-2(\alpha\beta+\beta\gamma+\gamma\alpha)$

$=\frac{b^2}{a^2}-\frac{2c}{a}=\frac{b^2-2ac}{a^2}$

ANS : D

11. What must be subtracted from $4x^4 - 2x^3 - 6x^2 + x - 5$, so that the result is exactly divisible by $2x^2 + x - 1$ is

(A) – 5 (B) – 3

(C) – 6 (D) – 8

ANS : C

*12. The quadratic polynomial whose zeroes are $5 + \sqrt{2}$ and $5 - \sqrt{2}$ is

(A) $x^2 - 10x + 21$ (B) $x^2 + x + 1$

(C) $x^2 + x + 2$ (D) $x^2 + x + 3$

SOL : Let α, β are zeroes of quadratic polynomial p(x).

$\therefore$ $p(x) = x^2 - (\alpha + \beta)x + \alpha\beta$

ANS : A

13. If the product of the roots of the equation $(a + 1)x^2 + (2a + 3)x + (3a + 4) = 0$ is 2, then the sum of roots is

(A) 1 (B) – 1

(C) 2 (D) – 2

SOL : We have $(a + 1)x^2 + (2a + 3)x + (3a + 4) = 0$

Let α and β be the roots of the equation.

According to the given condition

$\alpha\beta = 2$

$$\Rightarrow \quad \frac{3a+4}{a+1} = 2 \Rightarrow 3a + 4 = 2a + 2$$

$\Rightarrow \quad a = -2$

Also $\alpha + \beta = -\dfrac{2a+3}{a+1}$

$$= -\frac{-4+3}{-2+1} = -1$$

ANS : B

14. If α, β are the roots of the equation $ax^2 + bx + c = 0$, then $\dfrac{\alpha}{\alpha\beta + b} + \dfrac{\beta}{a\alpha + b}$ is equal to

(A) $\dfrac{2}{a}$ (B) $\dfrac{2}{b}$

(C) $\dfrac{2}{c}$ (D) $-\dfrac{2}{a}$

SOL : Since, α and β are the roots of the equation $ax^2 + bx + c = 0$

$$\therefore \quad \alpha + \beta = -\frac{b}{a}, \ \alpha\beta = \frac{c}{a}$$

and $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$

$$= \frac{(b^2 - 2ac)}{a^2}$$

$$= \frac{a(\alpha^2 + \beta^2) + b(\alpha + \beta)}{\alpha\beta a^2 + ab(a + \beta) + b^2}$$

$$= \frac{b^2 - 2ac - b^2}{a^2c - ab^2 + ab^2}$$

$$= \frac{-2ac}{a^2c} = -\frac{2}{a}$$

ANS : D

15. If α, β are the roots of the equation $ax^2 + bx + c = 0$, $\alpha\beta = 3$ and a, b, c are in A.P. then $\alpha + \beta$ is equal to

(A) – 4 (B) – 1 (C) 4 (D) – 2

ANS : D

16. If $4x^4 - 3x^3 - 3x^2 + x - 7$ is divided by $1 - 2x$ then remainder will be

(A) $\frac{57}{8}$ (B) $-\frac{59}{8}$ (C) $\frac{55}{8}$ (D) $-\frac{55}{8}$

ANS : B

17. The polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by $(x - 4)$ leaves remainders R_1 & R_2 respectively then value of 'a' if $2R_1 - R_2 = 0$.

(A) $-\frac{18}{127}$ (B) $\frac{18}{127}$ (C) $\frac{17}{127}$ (D) $-\frac{17}{127}$

ANS : B

18. A quadratic polynomial is exactly divisible by (x + 1) & (x + 2) and leaves the remainder 4 after division by (x + 3) then that polynomial is

(A) $x^2 + 6x + 4$ (B) $2x^2 + 6x + 4$ (C) $2x^2 + 6x - 4$ (D) $x^2 + 6x - 4$

ANS : B

19. The values of a & b so that the polynomial $x^3 - ax^2 - 13x + b$ is divisible by (x - 1) & (x + 3) are

(A) a = 15, b = 3 (B) a = 3, b = 15 (C) c = - 3, b = 15 (D) a = 3, b = - 15

ANS : B

20. Graph of quadratic equation is always a -

(A) straight line (B) circle (C) parabola (D) Hyperbola

ANS : C

21. If the sign of 'a' is positive in a quadratic equation then its graph should be =

(A) parabola open upwards (B) parabola open downwards

(C) parabola open leftwards (D) can't be determined

ANS : A

22. The graph of polynomial $y = x^3 - x^2 + x$ is always passing through the point -

(A) (0, 0) (B) (3, 2) (C) (1, -2) (D) all of these

ANS : A

23. How many time, graph of the polynomial $f(x) = x^3 - 1$ will intersect X-axis -

(A) 0 (B) 1 (C) 2 (D) 4

ANS : B

24. Which of the following curve touches X-axis -

(A) $x^2 - 2x + 4$ (B) $3x^2 - 6x + 1$ (C) $4x^2 - 16x + 9$ (D) $25x^2 - 20x + 4$

ANS : D

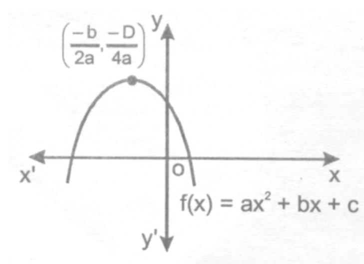
25. In the diagram given below shows the graphs of the polynomial $f(x) = ax^2 + bx + c$, then

(A) $a < 0$, $b < 0$ and $c > 0$

(B) $a < 0$, $b < 0$ and $c < 0$

(C) $a < 0$, $b > 0$ and $c > 0$

(D) $a < 0$, $b > 0$ and $c < 0$



ANS : A

26. Quadratic polynomial having zeros 1 and –2 is -

(A) $x^2 - x + 2$ (B) $x^2 - x - 2$

(C) $x^2 + x - 2$ (D) None of these

ANS : C

27 . If $(x - 1)$ is a factor of $k^2x^3 - 4kx - 1$, then the value of k is –

(A) 1 (B) – 1

(C) 2 (D) – 2

ANS : A

28. For what value of a is the polynomial $2x^4 – ax^3 = 4x^2 + 2x + 1$ divisible by $1 – 2x$?

(A) a = 25 (B) a = 24 (C) a = 23 (D) a = 22

ANS : A

29. If one of the factors of $x^2 + x – 20$ is $(x + 5)$, then other factor is -

(A) (x – 4) (B) (x – 5) (C) (x – 6) (D) (x – 7)

ANS : A

30. If α, β be the zeros of the quadratic polynomial $2x^2 + 5x + 1$, then value of $\alpha + \beta + \alpha\beta =$

(A) – 2 (B) – 1 (C) 1 (D) None of these

ANS : A

31. If α, β be the zeros of the quadratic polynomial $2 – 3x – x^2$, then $\alpha + \beta =$

(A) 2 (B) 3 (C) 1 (D) None of these

ANS : D

32. Quadratic polynomial having sum of it's zeros 5 and product of it's zeros – 14 is-

(A) $x^2 – 5x – 14$ (B) $x^2 – 10x – 14$

(C) $x^2 – 5x + 14$ (D) None of these

ANS : A

33. If x = 2 and x = 3 are zeros of the quadratic polynomial $x^2 + ax + b$, the values of a and b respectively are :

(A) 5, 6 (B) – 5 , – 6 (C) –5, 6 (D) 5, 6

ANS : C

34. If 3 is a zero of the polynomial $f(x) = x^4 – x^3 – 8x^2 + kx + 12$, then the value of k is -

(A) – 2 (B) 2 (C) – 3 (D) $\frac{3}{2}$

ANS : B

35. The sum and product of zeros of the quadratic polynomial are – 5 and 3 respectively the quadratic polynomial is equal to -

(A) $x^2 + 2x + 3$ (B) $x^2 - 5x + 3$ (C) $x^2 + 5x + 3$ (D) $x^2 + 3x - 5$

ANS : C

36. On dividing $x^3 - 3x^2 + x + 2$ by polynomial g(x), the quotient and remainder were x – 2 and 4 – 2x respectively then g(x) :

(A) $x^2 + x + 1$

(B) $x^2 + x - 1$

(C) $x^2 - x - 1$

(D) $x^2 - x + 1$

ANS : D

37. If the polynomial $3x^3$ – x3 – 3x + 5 is divided by another polynomial x – 1 – x2 , the remainder comes out to be 3, then quotient polynomial is –

(A) 2 – x (B) 2x – 1 (C) 3x + 4 (D) x – 2

ANS : D

38. If sum of zeros $= \sqrt{2}$, product of its zeros $= \frac{1}{3}$. The quadratic polynomial is –

(A) $3x^2 - 3\sqrt{2}x + 1$

(B) $\sqrt{2}x^2 + 3x + 1$

(C) $3x^2 - 2\sqrt{3}x + 1$

(D) $\sqrt{2}x^2 + x + 3$

ANS : A

39. If $-\frac{1}{3}$ is the zeros of the cubic polynomial $f(x) = 3x^3 - 5x^2 - 11x - 3$ the other zeros are :

(A) – 3 , –1 (B) 1, 3 (C) 3, –1 (D) –3, 1

ANS : C

40. If α and β are the zeros of the polynomial $f(x) = 6x^2 - 3 - 7x$ then $(\alpha + 1)(\beta + 1)$ is equal to –

(A) $\frac{5}{2}$ (B) $\frac{5}{3}$ (C) $\frac{2}{5}$ (D) $\frac{3}{5}$

ANS : B

41. Let p(x) = $ax^2 + bx + c$ be q quadratic polynomial. It can have at most –

(A) One zero (B) Two zeros

(C) Three zeros (D) None of these

ANS : B

42. The graph of the quadratic polynomial $ax^2 + bx + c$, $a \neq 0$ is always-

(A) Straight line (B) Curve

(C) Parabola (D) None of these

ANS : C

43. If 2 and $-\frac{1}{2}$ as the sum and product of its zeros respectively then the quadratic polynomial f(x) is –

(A) $x^2 - 2x - 4$ (B) $4x^2 - 2x + 1$

(C) $2x^2 + 4x - 1$ (D) $2x^2 - 4x - 1$

ANS : D

44. If α and β are the zeros of the polynomial f(x) = $16x^2 + 4x - 5$ then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to –

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

ANS : D

45. If α and β are the zeros of the polynomial f(x) = $15x^2 - 5x + 6$ then $\left(1+\frac{1}{\alpha}\right)\left(1+\frac{1}{\beta}\right)$ is equal to

(A) $\frac{13}{3}$ (B) $\frac{13}{2}$ (C) $\frac{16}{3}$ (D) $\frac{15}{2}$

ANS : A

46. If α, β and γ are the zeros of the polynomial $2x^3 - 6x^2 - 4x + 30$. then the value of ($\alpha\beta + \beta\gamma + \gamma\alpha$) is

(A) – 2 (B) 2 (C) 5 (D) –30

ANS : A

47. If α, β and γ are the zeros of the polynomial f(x) = $ax^3 + bx^2 + cx + d$, then $\frac{1}{\alpha}+\frac{1}{\beta}+\frac{1}{\gamma}$ =

(A) $-\frac{b}{a}$ (B) $\frac{c}{d}$ (C) $-\frac{c}{d}$ (D) $-\frac{c}{a}$

ANS : C

48. If α, β and γ are the zeros of the polynomial f(x) = $ax^3 - bx^2 + cx - d$, then $\alpha^2 + \beta^2 + \gamma^2 =$

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

ANS : D

49. If α, β and γ are the zeros of the polynomial f(x) = $x^3 + px^2 - pqrx + r$, then $\frac{1}{\alpha\beta}+\frac{1}{\beta\gamma}+\frac{1}{\gamma\alpha} =$

(A) $\frac{r}{p}$ (B) $\frac{p}{r}$ (C) $-\frac{p}{r}$ (D) $-\frac{r}{p}$

ANS : B

50. If the parabola f(x) = $ax^2 + bx + c$ passes through the points (-1, 12), (0, 5) and (2, -3) , the value of a + b + c is –

(A) - 4 (B) -2 (C) Zero (D) 1

ANS : C

51. If a, b are the zeros of $f(x) = x^2 + px + 1$ and c, d are the zeros of $f(x) = x^2 + qx + 1$ the value of $E = (a - c)(b - c)(a + b)(b + d)$ is –

(A) $p^2 - q^2$ (B) $q^2 - p^2$ (C) $q^2 + p^2$ (D) None of these

ANS : B

52. If α, β are zeros of $ax^2 + bx + c$ then zeros of $a^3x^2 + abcx + c^3$ are -

(A) $\alpha\beta, \alpha + \beta$ (B) $\alpha^2\beta, \alpha\beta^2$ (C) $\alpha\beta, \alpha^2\beta^2$ (D) α^3, β^3

ANS : B

53. Let α, β be the zeros of the polynomial $x^2 - px + r$ and $\frac{\alpha}{2}, 2\beta$ be the zeros of $x^2 - qx + r$, Then the value of r is –

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

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

ANS : D

54 . When $x^{200} + 1$ is divided by $x^2 + 1$, the remainder is equal to –

(A) x + 2 (B) 2x – 1 (C) 2 (D) - 1

ANS : C

55 . If $a(p+q)^2 + 2bpq + c = 0$ and also $a(q + r)^2 + 2bqr + c = 0$ then pr is equal to –

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

ANS : B

56 . If a, b and c are not all equal and α and β be the zeros of the polynomial $ax^2 + bx + c$, then value of $(1+\alpha+\alpha^2)(1+\beta+\beta^2)$ is :

(A) 0 (B) positive (C) negative (D) non-negative

ANS : D

57. Two complex number α and β are such that $\alpha + \beta = 2$ and $\alpha^4 + \beta^4 = 272,$ then the polynomial whose zeros are α and β is –

(A) $x^2 – 2x – 16 = 0$ (B) $x^2 – 2x + 12 = 0$ (C) $x^2 – 2x – 8 = 0$ (D) None of theses

ANS : C

58. If 2 and 3 are the zeros of $f(x) = 2x^3 + mx^2 – 13x + n$, then the values of m and n are respectively –

(A) -5 , - 30 (B) -5, 30 (C) 5, 30 (D) 5, -30

ANS : B

59. If α, β are the zeros of the polynomial $6x^2 + 6px + p^2$, then the polynomial whose zeros are $(\alpha + \beta)^2$ and $(\alpha - \beta)^2$ is –

(A) $3x^2 + 4p^2x + p^4$ (B) $3x^2 + 4p^2x – p^4$

(C) $3x^2 – 4p^2x + p4$ (D) None of theses

ANS : C

60. If c, d are zeros of $x^2 – 10ax – 11b$ and a, b are zeros of $x^2 – 10cx – 11d$, then value of a + b + c + d is –

(A) 1210 (B) -1 (C) 2530 (D) -11

ANS : A

61. If the ratio of the roots of polynomial $x^2 + bx + c$ is the same as that of the ratio of the roots of $x^2 + qx + r$, then –

(A) $br^2 = qc^2$ (B) $cq^2 = rb^2$ (C) $q^2c^2 = b^2r^2$ (D) bq = rc

ANS : B

62. The value of p for which the sum of the squares of the roots of the polynomial $x^2 – (p – 2) x – p – 1$ assume the least value is -

(A) -1 (B) 1 (C) 0 (D) 2

ANS : B

63. If the roots of the polynomial $ax^2 + bx + c$ are of the form $\frac{\alpha}{\alpha - 1}$ and $\frac{\alpha + 1}{\alpha}$ then the value of $(a + b + c)^2$ is-

(A) $b^2 - 2ac$ (B) $b^2 - 4ac$ (C) $2b^2 - ac$ (D) $4b^2 - 2ac$

ANS : B

64. If α, β and γ are the zeros of the polynomial $x^3 + a_0x^2 + a_1x + a_2$, then $(1-\alpha^2)\,(1-\beta^2)\,(1-\gamma)$ is

(A) $(1 - a_1)^2 + (a_0 - a_2)^2$ (B) $(1 + a_1)^2 - (a_0 + a_2)^2$

(C) $(1 + a_1)^2 + (a_0 + a_2)^2$ (D) None of these

ANS : B

65 . If α, β, γ are the zeros of the polynomial $x^3 - 3x + 11$, then the polynomial whose zeros are $(\alpha+\beta)(\beta+\gamma)$ and $(\gamma+\beta)$ is –

(A) $x^3 + 3x + 11$ (B) $x^3 - 3x + 11$

(C) $x^3 + 3x - 11$ (D) $x^3 - 3x - 11$

ANS : D

66. If α, β, γ are such that $\alpha+\beta+\gamma = 2,\ \alpha^2+\gamma^2 = 6,\ \alpha^3+\beta^3+\gamma^3 = 8,$ then $\alpha^4+\beta^4+\gamma^4$ is equal to –

(A) 10 (B) 12 (C) 18 (D) None of these

ANS : C

67. If α, β are the roots of $ax^2 + bx + c$ and $\alpha + k,\ \beta + k$ are the roots of $px^2 + qx + r$, then k =

(A) $-\frac{1}{2}\left[\frac{a}{b} - \frac{p}{q}\right]$ (B) $\left[\frac{a}{b} - \frac{p}{q}\right]$ (C) $\frac{1}{2}\left[\frac{b}{a} - \frac{q}{p}\right]$ (D) (ab – pq)

ANS : C

68. If α, β are the roots of the polynomial $x^2 - px + q$, then the quadratic polynomial, the roots of which are $(\alpha^2 - \beta^2)(\alpha^3 - \beta^3)$ and $\alpha^3\beta^2 + \alpha^2\beta^3$:

(A) $px^2 - (5p + 7q)x - (p^6q^6 + 4p^2q^6) = 0$

(B) $x^2 - (p^5 - 5p^3q + 5pq^2)x + (p^6q^2 - 5p^4q^3 + 4p^2q^4) = 0$

(C) $x^2 - (p^3q - 5p^5 + p^4q) - (p^6q^2 - 5p^2q^6) = 0$

(D) All of the above

ANS : B

69. The condition that $x^3 - ax^2 + bx - c = 0$ may have two of the roots equal to each other but of opposite signs is :

(A) ab = c (B) $\frac{2}{3}a = bc$ (C) $a^2b = c$ (D) None of these

ANS : A

70. If the roots of polynomial $x^2 + bx + ac$ are α, β and roots of the polynomial $x^2 + ax + bc$ are α, γ then the values of α, β, γ respectively are –

(A) a,b,c (B) b,c,a (C) c,a,b (D) None of these

ANS : C

71. If one zero of the polynomial $ax^2 + bx + c$ is positive and the other negative then ($a, b, c \in R, a \neq 0$)

(A) a and b are of opposite signs.

(B) a and c are of opposite signs.

(C) b and c are of opposite signs.

(D) a,b,c are all of the same sign.

ANS : B

72. If α, β are the zeros of the polynomial $x^2 - px + q$. then $\frac{\alpha^2}{\beta^2} + \frac{\beta^2}{\alpha^2}$ is equal to -

(A) $\frac{p^4}{q^2} + 2 - \frac{4p^2}{q}$ (B) $\frac{p^4}{q^2} - 2 + \frac{4p^2}{q}$ (C) $\frac{p^4}{q^2} + 2q - \frac{4p^2}{q}$ (D) None of these

ANS : A

73. If α, β are the zeros of the polynomial $x^2 - px + 36$ and $\alpha^2 + \beta^2 = 9,$ then p =

(A) ± 6 (B) $\pm$ 3 (C) $\pm$ 8 (D) ± 9

ANS : D

74. If α, β are zeros of $ax^2 + bx + c$, ac $\neq$ 0, then zeros of $cx^2 + bx + a$ are –

(A) $-\alpha, \ -\beta$ (B) $\alpha, \frac{1}{\beta}$ (C) $\beta, \frac{1}{\alpha}$ (D) $\frac{1}{\alpha}, \frac{1}{\beta}$

ANS : D

75. A real number is said to be algebraic if it satisfies a polynomial equation with integral coefficients. Which of the following numbers is not algebraic :

(A) $\frac{2}{3}$ (B) $\sqrt{2}$ (C) 0 (D) π

ANS : D

76. The bi-quadratic polynomial whose zeros are $1, \ 2, \ \frac{4}{3}, -1$ is :

(A) $3x^4 - 10x^3 + 5x^2 + 10x - 8$ (B) $3x^4 + 10x^3 - 5x^2 + 10x - 8$

(C) $3x^4 + 10x^3 + 5x^2 - 10x - 8$ (D) $3x^4 - 10x^3 - 5x^2 + 10x - 8$

ANS : A

77. The cubic polynomials whose zeros are $4, \frac{3}{2}$ and -2 is :

(A) $2x^3 + 7x^2 + 10x - 24$ (B) $2x^3 + 7x^2 - 10x - 24$

(C) $2x^3 - 7x^2 - 10x + 24$ (D) None of these

ANS : C

78. If the sum of zeros of the polynomial $p(x) = kx^3 - 5x^2 - 11x - 3$ is 2, then k is equal to :

(A) $k = -\frac{5}{2}$ (B) $k = \frac{2}{5}$ (C) k = 10 (D) $k = \frac{5}{2}$

ANS : D

79. If f(x) = $4x^3 - 6x^2 + 5x - 1$ and α, β and γ are its zeros , then $\alpha\beta\gamma =$

(A) $\frac{3}{2}$ (B) $\frac{5}{4}$ (C) $-\frac{3}{2}$ (D) $\frac{1}{4}$

ANS : D

80. Consider f(x) = $8x^4 - 2x^2 + 6x - 5$ and $\alpha, \beta, \gamma . \delta$ are it's zeros then $\alpha + \beta + \gamma + \delta =$

(A) $\frac{1}{4}$ (B) $-\frac{1}{4}$ (C) $-\frac{3}{2}$ (D) None of these

ANS : D

81. If $x^2 - ax + b = 0$ and $x^2 = px + q = 0$ have a root in common and the second equation has equal roots, then –

(A) b + q = 2ap (B) $b + q = \frac{ap}{2}$ (C) b + q = ap (D) None of these

ANS : B

82. If the sum of the two zeros of $x^3 + px^2 + qx + r$ is zero, then pq =

(A) – r (B) r (C) 2r (D) –2r

ANS : B

83. Let $a \neq 0$ and p(x) be a polynomial of degree grater than 2. If p(x) leaves remainders a and – a when divided respectively by x + a and x – a , the remainder when p(x) is divided by $x^2 - a^2$ is

(A) 2x (B) – 2x (C) x (D) – x

ANS : D

84. If one root of the polynomial $x^2 + px + q$ is square of the other root, then

(A) $p^3 - q(3p - 1) + q^2 = 0$ (B) $p^3 - q(3p + 1) + q^2 = 0$

(C) $p^3 + q(3p - 1) - q^2 = 0$ (D) $p^3 + q(3p + 1) - q^2 = 0$

ANS : A

85. If α, β are the zeros of $x^2 + px + 1$ and γ, δ be those of $x^2 + qx + 1$, then the value of $(\alpha - \gamma)(\beta - \gamma)\ (\alpha + \delta)(\beta + \delta)$ =

(A) $p^2 - q^2$ (B) $q^2 - p^2$ (C) p^2 (D) q^2

ANS : B

86. The quadratic polynomial whose zeros are twice the zeros of $2x^2 - 5x + 2 = 0$ is –

(A) $8x^2 - 10x + 2$ (B) $x^2 - 5x + 4$ (C) $2x^2 - 5x + 2$ (D) $x^2 - 10x + 6$

ANS : B

87. The coefficient of x in $x^2 + px + q$ was taken as 17 in place of 13 and it's zeros were found to be – 2 and – 15. The zeros of the original polynomial are -

(A) 3, 7 (B) – 3 , 7 (C) – 3 , – 7 (D) – 3, – 10

ANS : D

88. If $\alpha + \beta = 4$ and $\alpha^2 + \beta^2 = 44,$ then α, β are the zeros of the polynomial

(A) $2x^2 - 7x + 6$ (B) $3x^2 + 9x + 11$ (C) $9x^2 - 27x + 20$ (D) $3x^2 - 12x + 5$

ANS : D

89. If α, β, γ are the zeros of the polynomial $x^3 + 4x + 1$, then $(\alpha + \beta)^{-1} + (\beta + \gamma)^{-1} + (\gamma + \alpha)^{-1} =$

(A) 2 (B) 3 (C) 4 (D) 5

ANS : C

90. If α, β are the zeros of the quadratic polynomial $4x^2 - 4x + 1$, then $\alpha^3 + \beta^3$ is –

(A) $\frac{1}{4}$ (B) $\frac{1}{8}$ (C) 16 (D) 32

ANS : A

91. The value of 'a', for which one root of the quadratic polynomial $(a^2 - 5a + 3)x^2 + (3a - 1)x + 2$ is twice as large as the other, is -

(A) $-\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $-\frac{2}{3}$ (D) $\frac{1}{3}$

ANS : B

92. Let α, β be the zeros of $x^2 + (2 - \lambda)x - \lambda$. The values of λ for which $\alpha^2 + \beta^2$ is minimum is

(A) 0 (B) 1 (C) 2 (D) 3

ANS : B

93. If 1 + 2i is a zero of the polynomial $x^2 + bx + c$, b, c $\in$ R , then (b, c) is given by –

(A) (2. – 5) (B) (- 3, 1) (C) (-2, 5) (D) (3, 1)

ANS : C

94 . If 2 + i is a zero of the polynomial $x^3 - 5x^2 + 9x - 5$, the other zeros are –

(A) 1 and 2 – i (B) – 1 and 3 + i (C) 0 and 1 (D) None of these

ANS : A

95. The value of λ for which one zero of $3x^2 - (1 + 4\lambda) x + \lambda^2 + 2$ may be one-third of the other is –

(A) 4 (B) $\frac{33}{8}$ (C) $\frac{17}{4}$ (D) $\frac{31}{8}$

ANS : D

96. If 1 – i is a zero of the polynomial $x^2 + ax + b$, then the values of a and b are respectively .

(A) 2, 1 (B) – 2 , 2

(C) 2, 2 (D) 2, - 2

ANS : B

97. If the sum of the zeros of the polynomial $x^2 + px + q$ is equal to the sum of their squares, then –

(A) $P^2 - q^2 = 0$ (B) $p^2 + q^2 = 0$ (C) $p^2 + p = 2q$ (D) None of these

ANS : C

98. Let α, β be the zeros of the polynomial (x – a) (x – b) – c with $c \neq 0$. then the zeros of the polynomial $(x - \alpha)(x - \beta)$ + c are :

(A) a, c (B) b, c (C) a, b (D) a + c, b + c

ANS : C

99. If p, q are zeros of $x^2 + px + q$. then

(A) p = 1 (B) p = 1 or 0 (C) p = - 2 (D) p = - 2 or 0

ANS : B

100. If $\alpha \neq \beta$ and $\alpha^2 = 5\alpha - 3, \beta^2 = 5\beta - 3,$ then the polynomial whose zeros are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ is :

(A) $3x^2 - 25x + 3$

(B) $x^2 - 5x + 3$

(C) x2+5x – 3

(D) $3x^2 - 19x + 3$

ANS : D