[120]

*** Given section consists of questions of 3 marks each.**

1. If α and β are the zeros of the quadratic polynomial f(x) = $6x^2$ + x − 2, find the value of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$
2. If α and β are the zeroes of the quadratic polynomial f(x) = ax^2 + bx + c, find evaluate: $a\left(\frac{\alpha^2}{\beta}+\frac{\beta^2}{\alpha}\right)+b\left(\frac{\alpha}{\beta}+\frac{\beta}{\alpha}\right)$
3. If α and β are the zeroes of the quadratic polynomial f(x) = x^2 + px + q, find a quadratic polynomial whose zeroes are:
   i. $\alpha+2, \beta+2$
   ii. $\frac{\alpha-1}{\alpha+1}, \frac{\beta-1}{\beta+1}$.
4. If α and β are the zeroes of the quadratic polynomial such that $\alpha+\beta=24$ and $\alpha-\beta=8$, find a quadratic polynomial have α and β as its zeroes.
5. If α and β are the zeroes of the quadratic polynomial f(x) = x^2 - x - 2, find the value of $\frac{1}{\alpha}-\frac{1}{\beta}$
6. If one zero of the quadratic polynomial f(x) = $4x^2$ - 8kx - 9 is negative of the other, find the value of k.
7. Find the zeros of the following quadratic polynomial and verify the relationship between the zeros and their coefficients:
   $p(x)=x^2+2\sqrt{2x}-6$
8. If α and β are the zeros of the quadratic polynomial f(t) = t^2 - 4t + 3, find the value of $\alpha^4\beta^3+\alpha^3\beta^4$.
9. If α and β are the zeroes of the quadratic polynomial p(s) = $3s^2$ - 6s + 4, find the value of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}+2\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)+3\alpha\beta$.
10. For what value of k, is -2 a zero of the polynomial $3x^2$ + 4x + 2k?
11. If α and β are the zeros of the quadratic polynomial f(x) = x^2 - p(x + 1) - c, show that $(\alpha+1)(\beta+1)=1-c$
12. If α and β are the zeroes of the quadratic polynomial f(x) = ax^2 + bx + c, then evaluate:
    $\frac{1}{a\alpha+b}+\frac{1}{a\beta+b}$
13. For the following, find a quadratic polynomial whose sum and product respectively of the zeroes are as given. Also, find the zeroes of these polynomials by factorization.
    $-\frac{8}{3}, \frac{4}{3}$
14. For what value of k, is -3 a zero of the polynomial x^2 + 11x + k?
15. If 1 is a zero of the polynomial p(x) = ax^2 - 3(a - 1) x - 1, then find the value of a.
16. If α and β are the zeros of the quadratic polynomial p(x) = $4x^2$ - 5x - 1, find the value of $\alpha^2\beta+\alpha\beta^2$.
17. If α and β are the zeros of the quadratic polynomial f(x) = x^2 - 1, find a quadratic polynomial whose zeroes are $\frac{2\alpha}{\beta}$ and $\frac{2\beta}{\alpha}$.
18. If α and β are the zeroes of the quadratic polynomial f(x) = x^2 - x - 4, find the value of $\frac{1}{\alpha}+\frac{1}{\beta}-\alpha\beta$
19. If the sum of the zeros of the quadratic polynomial f(t) = kt^2 + 2t + 3k is equal to their product, find the value of k.
20. Given that $\sqrt{2}$ is a zero of the cubic polynomial $6x^3+\sqrt{2}x^2-10x-4\sqrt{2}$, find its other two zeroes.
21. Write the coefficient of the polynomial p(z) = z^5 - $2z^2$ + 4.
22. If α and β are the zeroes of the quadratic polynomial f(x) = x^2 - 5x + 4, find the value of $\frac{1}{\alpha}+\frac{1}{\beta}-2\alpha\beta$.
23. Apply division algorithm to find the quotient q(x) and remainder r(x) in dividing f(x) by g(x) in the following:
    f(x) = $4x^3$ + 8x + $8x^2$ + 7, g(x) = $2x^2$ - x + 1
24. For what value of k, is 3 a zero of the polynomial $2x^2$ + x + k?
25. Write the zeros of the polynomial x^2 - x - 6.

26. For the following, find a quadratic polynomial whose sum and product respectively of the zeroes are as given. Also, find the zeroes of these polynomials by factorization.
$\frac{-3}{2\sqrt{5}}, -\frac{1}{2}$

27. For the following, find a quadratic polynomial whose sum and product respectively of the zeroes are as given. Also, find the zeroes of these polynomials by factorization.
$-2\sqrt{3}, -9$

28. If the squared difference of the zeroes of the quadratic polynomial f(x) = x^2 + px + 45 is equal to 144, find the value of p.

29. Find the cubic polynomial with the sum, sum of the product of its zeros taken two at a time, and product of its zeros as 3, -1 and -3 respectively.

30. If α and β are the zeroes of the quadratic polynomial p(y) = $5y^2$ - 7y + 1, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$

31. What must be added to the polynomial f(x) = x^4 + $2x^3$ - $2x^2$ + x - 1 so that the resulting polynomial is exactly divisible by x^2 + 2x - 3?

32. If a - b, a and b are zeros of the polynomial f(x) = $2x^3$ - $6x^2$ + 5x - 7, write the value of a.

33. For the following, find a quadratic polynomial whose sum and product respectively of the zeroes are as given. Also, find the zeroes of these polynomials by factorization.
$\frac{21}{8}, \frac{5}{16}$

34. If α and β are the zeroes of the quadratic polynomial f(x) = ax^2 + bx + c, then evaluate:
$\alpha^4 + \beta^4$

35. Give an example of polynomials f(x), g(x), q(x) and r(x) satisfying f(x) = g(x), q(x) + r(x), where degree r(x) = 0.

36. If α, β are the zeros of the polynomial f(x) = x^2 - 5x + k such that $\alpha - \beta = 1,$ find the value of k.

37. Very-Short-Answer Question:
If the product of the zeros of the quadratic polynomial x^2 - 4x + k is 3 then write the value of k.

38. Using remainder theorem, find the remainder when p(x) = x^3 + $3x^2$ - 5x + 4 is divided by (x - 2).

39. Very-Short-Answer Question:
If (x + a) is a factor of ($2x^2$ + 2ax + 5x + 10), find the value of a.

40. Find the zeros of the following quadratic polynomial and verify the relationship between the zeros and the coefficients:
$2\sqrt{3}x^2 - 5x + \sqrt{3}$

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