

Short Answer Type II Questions

[3 Marks each]

25. Verify, whether the following are zeroes of the polynomial, indicated against them or not.
 $p(x) = (x+1)(x-2)$; $x = -1/2$
26. If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, then find the value of a . **NCERT Exemplar**
27. Factorise $\left(2x + \frac{1}{3}\right)^2 - \left(x - \frac{1}{2}\right)^2$. **NCERT Exemplar**
28. Factorise $a^3 - b^3 + 1 + 3ab$.
29. Without actual division, prove that $3x^4 - 2x^3 - 16x^2 - 14x - 3$ is exactly divisible by $x^2 - 2x - 3$.
30. Multiply $x^2 + 4y^2 + z^2 + 2xy + xz - 2yz$ by $(-z + x - 2y)$. **NCERT Exemplar**
31. Factorise $x^6 - y^6$.
32. Whether $x^3 - 3x^2 + 4$ is divisible by $(x - 2)$ or not.

33. In a garden, $(105)^3$ kg of flowers are grown. Then, find this value by using suitable identities.
34. Factorise $8x^3 + y^3 - 27z^3 + 18xyz$.
35. **HOTS** What are the possible expression for the dimensions of a cuboid, whose volume is given below?
 Volume = $12ky^2 + 8ky - 20k$
36. **HOTS** Find the value of $64x^3 + 125z^3$, if $4x + 5z = 19$ and $xz = 5$.
37. **HOTS** If $x + \frac{1}{x} = 7$, then find the value of $x^3 + \frac{1}{x^3}$.
38. **HOTS** If $a + b = 10$ and $a^2 + b^2 = 58$, find the value of $a^3 + b^3$.
39. **HOTS** If $a + b + c = 7$ and $ab + bc + ca = 15$, prove that $a^3 + b^3 + c^3 - 3abc = 28$.

Long Answer Type Questions

[5 Marks each]

40. If $p(x) = x^2 - 4x + 3$, find the value of $p(2) - p(-1) + p\left(\frac{1}{2}\right)$.
41. Simplify $(\sqrt{x} + \sqrt{y})(\sqrt{x} - \sqrt{y})(x + y)(x^2 + y^2)$.
42. Factorise $(2x + 3y)^3 - (2x - 3y)^3$.
43. Using long division method, show that the polynomial $p(x) = x^3 + 1$ is divisible by $q(x) = x + 1$. Verify your result using factor theorem.
44. The polynomial $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$, when divided by $x - 4$, leave the same remainder in each case. Then, find the value of a .
45. If the polynomial $5x^3 + 4x^2 - 31x + a$ is exactly divisible by $x - 2$, then find the value of a . Then, factorise the polynomial.
46. Without actually calculating the cubes, find the value of $\left(\frac{1}{2}\right)^3 + \left(\frac{1}{3}\right)^3 - \left(\frac{5}{6}\right)^3$.
47. Factorise $6x^3 - 7x^2 - 8x + 5$.
48. If $x = 2 - y$, show that $x^3 + 6xy + y^3 - 8 = 0$.
49. If $x + \frac{1}{x} = 6$, find the value of $x^4 + \frac{1}{x^4}$.
 [Hint $x^4 + \frac{1}{x^4} = (x^2)^2 + \left(\frac{1}{x^2}\right)^2 + 2 - 2 = \left(x^2 + \frac{1}{x^2}\right)^2 - 2$]
50. **HOTS** Without actual division, prove that $(x - 2)$ is a factor of the polynomial $(3x^3 - 13x^2 + 8x + 12)$. Also, factorise it completely.
51. **HOTS** If $x - y = 2$ and $xy = 15$, find $x^2 + y^2$ and $x^3 - y^3$.
52. **HOTS** Prove that $\frac{0.75 \times 0.75 \times 0.75 + 0.25 \times 0.25 \times 0.25}{0.75 \times 0.75 - 0.75 \times 0.25 + 0.25 \times 0.25} = 1$.
53. **HOTS** Factorise $(x^2 - 3x)^2 - 8(x^2 - 3x) - 20$.
54. **HOTS** If $a + b = 12$ and $ab = 27$, find the value of $a^3 + b^3$.
55. **HOTS** If $x - \frac{1}{x} = 3$, find the value of $x^4 + \frac{1}{x^4}$.
56. **HOTS** If $z^2 + \frac{1}{z^2} = 47$, find the value of $z^3 + \frac{1}{z^3}$, using only the positive value of $z + \frac{1}{z}$.