

## 1. Factorise

a. (i)  $a^3 + 27b^3 + 8c^3 - 18abc$  (ii)  $a^6 + 4a^3 - 1$  (iii)  $1331a^3 + 125b^3 - 8c^3 + 330abc$

b. (iv)  $343x^3 - 8y^3 - 125z^3 - 210xyz$  (v)  $p - q^3 + q - r^3 + r - p^3$

2. Evaluate  $x - a^3 + x - b^3 + x - c^3 - 3x - a^3 - b^3 - c^3$  given  $3x = a + b + c$ 

## 3. Find remainder using remainder theorem

a. (i)  $x^3 + x^2 - 2x + 1 \div x - 3$  (ii)  $x^3 - 9x^2 + 45x - 63 \div x - 2$

(iii)  $x^3 - 12x^2 + 11x - 5 \div 2x - 1$

4. Using factor theorem show (i)  $x - 3$  is a factor of  $x^3 + x^2 - 17x + 15$ 5. (ii) Using factor theorem show  $x - 2$  is a factor of  $x^6 - 64$ 

## 6. Factorise using factor theorem

a.  $2x^3 + 7x^2 - 9$  (ii)  $4z^3 + 23z^2 - 41z - 42$  (iii)  $6x^3 - x^2 - 12x - 5$

7. (iv)  $6x^2 - 13x + 6$  (v)  $p^3(q-r)^3 + q^3(r-p)^3 + r^3(p-q)^3$

## 8. Find value using suitable identity

9. (a)  $999^3$  (b)  $99.8^3$  (c)  $x^3 - 8y^3 - 36xy - 216$  when  $x = 2y + 6$ . (d)  $70^3 - 50^3 - 20^3$

10.  $x^3 + y^3 + z^3 - 3xyz = (x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$

11. Find the remainder when  $x^3 - 5x + 8$  is divided by  $x - 2$ 12. Find m if  $x - 3$  is a factor of  $x^3 + x^2 - mx + 15$ 13. Find dimensions of a Cuboid if its volume is  $15ax^2 + 10ax - 25a$ 14. Factorise:  $2x^2 + 3y^2 + 8z^2 - 2\sqrt{6}xy - 4\sqrt{6}yz + 8zx$ 

15.  $x = \frac{1}{2}\sqrt[3]{3}$ , then find  $x + \frac{1}{x}$

16. If  $27^x = \frac{9}{3^x}$ , find the value of x.

17. 15. Factorise a)  $x^9 - y^9$  b)  $x^6 - 7x^3 - 8$

18. 16. Find value of 'a' for which  $(x - 4)$  is a factor of  $(2x^3 - 3x^2 - 18x + a)$ .19. 17. Find the constant k if  $2x - 1$  is a factor of  $f(x) = 4x^2 + kx + 1$ . Using this value of k, factorize  $f(x)$  completely.20. 18. The expression  $2x^3 + ax^2 + bx - 2$  leaves remainders of 7 and 0 when divided by  $2x - 3$  and  $x + 2$  respectively. Calculate the values of a and b. With these values of a and b, factorize the expression completely.21. 19. If  $x + 1$  and  $x - 1$  are factors of  $f(x) = x^3 + 2ax + b$ , calculate the values of a and b. Using these values of a and b, factorize  $f(x)$  completely.22. 20. If  $x^2 - 1$  is a factor of  $f(x) = x^4 + ax + b$ , calculate the values of a and b. Using these values of a and b, factorize  $f(x)$ .23. 21. Given that  $x^2 - x - 2$  is a factor of  $x^3 + 3x^2 + ax + b$ , calculate the values of a and b and hence find the remaining factor.24. 22. The polynomial  $x^4 + bx^3 + 59x^2 + cx + 60$  is exactly divisible by  $x^2 + 4x + 3$ . Find the values of b and c.25. Show that  $x - 1$  is a factor of  $2x^2 + x - 3$ . Hence factorize  $2x^2 + x - 3$  completely.26. Show that  $2x + 3$  is a factor of  $6x^2 + 5x - 6$ . Hence find the other factor.27. Show that  $x + 2$  is a factor of  $f(x) = x^3 + 2x^2 - x - 2$ . Hence factorize  $f(x)$  completely.28. Show that  $x - 1$  is a factor of  $x^5 - 1$  while  $x^5 + 1$  is not divisible by  $x - 1$ .29. Using remainder theorem, find the value of a if the division of  $x^3 + 5x^2 - ax + 6$  by  $(x - 1)$  leaves the remainder 2