EXERCISE # 1

A. Very Short Answer Type Questions

Factorize each of the following expression

Q.1 $x^2 - x - 42$

Q.2 $6 - 5y - y^2$

Q.3 $a^2 + 46a + 205$

Q.4 $ab + ac - b^2 - bc$

Q.5 $p^4 - 81q^4$

Use remainder theorem to find remainder, when p(x) is divided by q(x) in following questions.

Q.6 $p(x) = 2x^2 - 5x + 7$, $q(x) = x - 1$

Q.7 $p(x) = x^9 - 5x^4 + 1$, $q(x) = x + 1$

Q.8 $p(x) = 2x^3 - 3x^2 + 4x - 1$, $q(x) = x + 2$

B. Short Answer Type Questions

Q.9 Find positive square root of $36x^2 + 60x + 25$

Q.10 Simplify : $\sqrt{2a^2 + 2\sqrt{6}ab + 3b^2}$

Q.11 $(x^2 + 4y)^2 + 21\,(x^2 + 4y) + 98$

Q.12 Find the value of k if $(x - 2)$ is a factor of $2x^3 - 6x^2 + 5x + k$.

Q.13 Find the value of k if $(x + 3)$ is a factor of $3x^2 + kx + 6$.

Q.14 $p(x) = 3x^6 - 7x^5 + 7x^4 - 3x^3 + 2x^2 - 2$, $q(x) = x - 1$

Q.15 For what value of k is $y^3 + ky + 2k - 2$ exactly divisible by $(y + 1)$?

C. Long Answer Type Questions

Q.16 If $x + 1$ and $x - 1$ are factors of $mx^3 + x^2 - 2x + n$, find the value of m and n.

Q.17 Find the zeros of the polynomial $f(x) = 2x^2 + 5x - 12$ and verify the relation between its zeroes and coefficients.

Q.18 Find the zeroes of the polynomial $f(x) = x^2 - 2$ and verify the relation between its zeroes and coefficients.

Q.19 Obtain the zeroes of the quadratic polynomial $\sqrt{3}\,x^2 - 8x + 4\sqrt{3}$ and verify the relation between its zeroes and coefficients.

Q.20 Find a cubic polynomial with the sum of its zeroes, sum of the products of its zeroes taken two at a time and the product of its zeroes as 2, –7 and –14 respectively.

Q.21 Find a cubic polynomial whose zeroes are 3, 5 and – 2.

Q.22 Divide $5x^3 - 13x^2 + 21x - 14$ by $(3 - 2x + x^2)$ and verify the division algorithm.

Q.23 What real number should be subtracted from the polynomial $(3x^3 + 10x^2 - 14x + 9)$ so that $(3x - 2)$ divides it exactly?

Q.24 Find all the zeroes of $(2x^4 - 3x^3 - 5x^2 + 9x - 3)$, it being given that two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$.

ANSWER KEY

A. VERTY SHORT ANSWER TYPE :

1. $(x + 6)(x - 7)$ **2.** $(6 + y)(1 - y)$ **3.** $(a + 41)(a + 5)$ **4.** $(a - b)(b + c)$

5. $(p + 3q)(p - 3q)(p^2 + 9q^2)$ **6.** 4 **7.** – 5 **8.** –37

B. SHORT ANSWER TYPE :

9. $6x + 5$ **10.** $(\sqrt{2}\,a + \sqrt{3}\,b)$ **11.** $(x^2 + 4y + 7)(x^2 + 4y + 14)$ **12.** –2

13. 11 **15.** 3

C. LONG ANSWER TYPE :

16. $m = 2,\ n = -1$ **17.** $-4, \frac{3}{2}$ **18.** $-\sqrt{2}, \sqrt{2}$ **19.** $2\sqrt{3}, \frac{2}{\sqrt{3}}$

20. $x^3 - 2x^2 - 7x + 14$ **21.** $x^3 - 6x^2 - x + 30$ **22.** quotient = $5x - 3$, Remainder = –5

23. 5 **24.** $\sqrt{3}, -\sqrt{3}, 1, \frac{1}{2}$

EXERCISE # 2

Q.1 If $\left(x+\frac{1}{x}\right) = 3$, then find value of $\left(x^2+\frac{1}{x^2}\right)$.

Q.2 If $\left(x-\frac{1}{x}\right) = \frac{1}{2}$, then find $\left(4x^2+\frac{4}{x^2}\right)$.

Q.3 If $\left(x+\frac{1}{x}\right) = 4$, then find $\left(x^4+\frac{1}{x^4}\right)$.

Q.4 If $(x - 2)$ is a factor of $(x^2 + 3qx - 2q)$, then find the value of q.

Q.5 If $x^3 + 6x^2 + 4x + k$ is exactly divisible by $(x + 2)$, then find the value of k.

Q.6 Let $f(x) = x^3 - 6x^2 + 11x - 6$. Then, which one of the following is not factor of f(x) ?

(A) $x - 1$ (B) $x - 2$

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

Q.7 If $x^{100} + 2x^{99} + k$ is divisible by $(x + 1)$, then find the value of k.

Q.8 On dividing $(x^3 - 6x + 7)$ by $(x + 1)$, find the remainder.

Q.9 Find the value of expression $(16x^2 + 24x + 9)$ for $x = -\frac{3}{4}$.

Q.10 If $2x^3 + 5x^2 - 4x - 6$ is divided by $2x + 1$, then find remainder.

Q.11 If $p(x) = x^2 - 2x - 3$, then find
(i) p(3); (ii) p(–1)

Q.12 Find the zeros of the quadratic polynomial $(6x^2 - 7x - 3)$ and verify the relation between its zeros and coefficients.

Q.13 Find the zeros of the quadratic polynomial $(5u^2 + 10u)$ and verify the relation between the zeros and the coefficients.

Q.14 Find the quadratic polynomial whose zeros are $\frac{2}{3}$ and $\frac{-1}{4}$. Verify the relation between the coefficients and the zeros of the polynomial.

Q.15 Find the quadratic polynomial, sum of whose zeros is 8 and their product is 12. Hence, find the zeros of the polynomial.

Q.16 Find the quadratic polynomial , the sum of whose zeros is –5 and their product is 6. Hence, find the zeros of the polynomial.

Q.17 Find the quadratic polynomial, the sum of whose zeros is 0 and their product is –1. Hence, find the zeros of the polynomial.

Q.18 Find a quadratic polynomial whose one zero is $5 + \sqrt{7}$.

Q.19 On dividing $(x^3 - 3x^2 + x + 2)$ by a polynomial g(x), the quotient and remainder are $(x - 2)$ and $(-2x + 4)$ respectively. Find g(x).

Q.20 If the polynomial $(x^4 + 2x^3 + 8x^2 + 12x + 18)$ is divided by another polynomial $(x^2 + 5)$, the remainder comes out to be $(px + q)$. Find the value of p and q.

Q.21 Obtain all zeros of the polynomial $(2x^3 - 4x - x^2 + 2)$, if two of its zeros are $\sqrt{2}$ and $-\sqrt{2}$.

Q.22 If 1 and –2 are two zeros of the polynomial $(x^3 - 4x^2 - 7x + 10)$, find its third zero.

Q.23 Find all the zeros of the polynomial $(2x^4 - 11x^3 + 7x^2 + 13x - 7)$, it being given that two if its zeros are $(3 + \sqrt{2})$ and $(3 - \sqrt{2})$.

Q.24 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.

Q.25 Show that the polynomial $f(x) = x^4 + 4x^2 + 6$ has no zero.

Q.26 Use remainder theorem to find the value of k, it being given that when $x^3 + 2x^2 + kx + 3$ is divided by $(x - 3)$, then the remainder is 21.

ANSWER KEY

1. 7 **2.** 9 **4. – 1** **5.** – 8 **6.** (C)

7. 1 **8.** 12 **9.** 0 **10.** – 3

11. (i) 0 , (ii) 0 **12.** $\frac{3}{2}, -\frac{1}{3}$ **13.** – 2, 0 **14.** $12x^2 - 5x - 2$

15. $(x^2 - 8x + 12)$, {6, 2} **16.** $(x^2 + 5x + 6)$, {– 3, – 2}

17. $(x^2 - 1)$, {1, –1} **18.** $x^2 - 10x + 18$ **19.** $x^2 - x + 1$ **20.** p = 2, q = 3

21. $\sqrt{2}, -\sqrt{2}, \frac{1}{2}$ **22.** 5 **23.** $(3+\sqrt{2}), (3-\sqrt{2}), \frac{1}{2}, -1$

24. k = 6 **26.** k = – 9