A. Very Short Answer Type Questions

Q.1 Which are polynomial and why

(a)
$$\frac{1}{x} + x + x^2 + x^3 - x^4 + \frac{1}{5}x^5$$

(b) $\frac{2}{\sqrt{3}}x + 7x^2$
(c) $\frac{2x}{\sqrt{3}} - 2x^3 + \frac{7}{3}$

(c)
$$\frac{1}{7} - 2y^{5} + \frac{1}{x^{-2}}$$

- (d) 1
- (e) $3\sqrt{x} + 5x 3$

Factorize each of the following expression

- **Q.2** $x^2 x 42$
- **Q.3** $6 5y y^2$
- **Q.4** $a^2 + 46a + 205$
- $\mathbf{Q.5} \qquad \mathbf{ab} + \mathbf{ac} \mathbf{b^2} \mathbf{bc}$
- **Q.6** $p^4 81q^4$

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

- **Q.7** $p(x) = 2x^2 5x + 7, q(x) = x 1$
- **Q.8** $p(x) = x^9 5x^4 + 1$, q(x) = x + 1
- **Q.9** $p(x) = 2x^3 3x^2 + 4x 1$, q(x) = x + 2

Use factor theorem to verify in each of the following that q(x) is a factor of p(x).

Q.10
$$p(x) = 2x^3 + 5x^2 + 3x - 4, q(x) = x - 1$$

Q.11 $p(x) = x^4 - 3x^2 + 2x + 1, q(x) = x - 1$

B. Short Answer Type Questions

Factorize each of the following expression

Q.12 125
$$a^3 + \frac{b^3}{27}$$

Q.13 If one of the factors of $x^2 + x - 20$ is (x + 5), find other factor.

Use factor theorem to verify in each of the following that q(x) is a factor of p(x).

- Q.14 Find the value of k if (x 2) is a factor of $2x^3 6x^2 + 5x + k$
- Q.15 Find the value of k if (x+3) is a factor of $3x^2 + kx + 6$.
- Q.16 $p(x) = 3x^6 7x^5 + 7x^4 3x^3 + 2x^2 2,$ q(x) = x - 1
- **Q.17** For what value of k is $y^3 + ky + 2k 2$ exactly divisible by (y + 1)?

C. Long Answer Type Questions

- Q.18 Prove that $a^{3} + b^{3} + c^{3} - 3abc$ $= \frac{1}{2} (a + b + c) [(a-b)^{2} + (b-c)^{2} + (c-a)^{2}]$
- Q.19 Prove that $(a + b)^3 + (b + c)^3 + (c + a)^3 - 3(a+b) (b+c)$ $(c + a) = 2 (a^3 + b^3 + c^3 - 3abc)$
- Q.20 If x + 1 and x 1 are factors of $mx^3 + x^2 - 2x + n$, find the value of m and n.

A. VERTY SHORT ANSWER TYPE :

1. (a) No :: in first term $\frac{1}{x} = x^{-1}$ but -1 is not

whole no.

- (b) Yes \therefore Power of x are 1 and 2.
- (c) Yes \therefore Power of x are 1 and 2 & y has 3.
- (d) Yes $\therefore 1 = x^0 \& 0$ is whole no.
- (e) No $\therefore \sqrt{x} = (x)^{1/2}$; $\frac{1}{2}$ is not a whole no.
- **2.** (x + 6) (x 7)**3.** (6 + y) (1 y)**4.** (a + 41) (a + 5)**5.** (a b) (b + c)**6.** $(p + 3q) (p 3q) (p^2 + 9q^2)$ **7.** 4**8.** -5**9.** -37

B. SHORT ANSWER TYPE :

12.
$$\left(5a + \frac{b}{3}\right) \left[25a^2 - \frac{5ab}{3} + \frac{b^2}{9}\right]$$

13. $(x - 4)$
14. -2
15. 11
17. 3

<u>C. LONG ANSWER TYPE :</u>

20. m = 2, n = -1

EXERCISE # 2

Short Answer Type Questions

Factorize each of the following expression

- **Q.1** Find positive square root of $36x^2 + 60x + 25$
- **Q.2** Simplify: $\sqrt{2a^2 + 2\sqrt{6}ab + 3b^2}$
- **Q.3** $(x^2 + 4y)^2 + 21(x^2 + 4y) + 98$
- **Q.4** $4(x-y)^2 12(x-y)(x+y) + 9(x+y)^2$
- **Q.5** Find the value of $1 a^2 + 14ab 4ab^2$.
- **Q.6** Find value of $a + b a^3 b^3$.
- **Q.7** $a^3 3a^2b + 3ab^2 + b^3 8$.
- **Q.8** If x-7 is a factor of $p(x) = x^3 9x^2 + kx + 693$ then find the value of k.
- **Q.9** Factorise $x^6 + y^6$.
- **Q.10** If (x 1) is a factor of $p(y) = y^3 7y + 6$ then find other two factors.
- Q.11 If $x^3 + mx^2 + nx + 6$ has x 2 as a factor and leaves a remainder 3, when divided by x-3, find use of m and n.

- Q.12 What must be subtracted from $4x^4 2x^3 6x^2$ + x - 5 so that the result is exactly divisible by $2x^2+x-1$
- **Q.13** Using factor theorem, factorize the polynomial $x^4 + x^3 7x^2 x + 6$.
- Q.14 Let A and B are the remainders when the polynomial $y^3 + 2y^2 5ay 7$ and $y^3 + ay^2 12y + 6$ are divided by y + 1 and y 2 respectively. If 2A + B = 6, find the value of a.
- Q.15 If $(3x 1)^4 = a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$, then find the value of $a_4 + 3a_3 + 9a_2 + 27a_1 + 81a_0$.
- **Q.16** Find the integral zeroes of $2x^3 + 3x^2 8x 12$.
- Q.17 If polynomial $x^3 + \ell x + m$ is dividing (x 1)& (x + 1) then remainder is 7. Find values of ℓ and m.
- Q.18 If $3y^3 + py^2 + 4y + q$ has a factor y + 2 and gives remainder -5 if it divided by (y 3). Find values of p and q.

Find the factors (Q. 19 to 24)

Q.19	$x^3 - 5x^2 + 2x + 8.$
Q.20	$x^{3}-6x^{2}+3x+10$
Q.21	$x^3 - 6x^2 + 32.$
Q.22	$x^{3} + 4x^{2} - 11x - 30.$
Q.23	$x^3 + 17x^2 + 95x + 175.$
Q.24	$2x^3 - x^2 - 13x - 6.$

SHORT ANSWER TYPE QUESTIONS :

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2. (\sqrt{2} a + \sqrt{3} b)
1. 6x + 5
3. (x^2 + 4y + 7)(x^2 + 4y + 14)
4. (x + 5y)^2
5. (1 + a - 7b)(1 - a + 7b)
6. (a+b)(1-a^2-b^2+ab)
7. (a-b-2)(a^2+b^2-2ab+2a-2b+4)
8. - 85
9. (x^2 + y^2)(x^4 + y^4 - x^2y^2)
10. (y + 3), (y - 2)
11. m = -3, n = -1
                                   12. – 6
13. (x-1)(x+1)(x-2)(x+3)
                                   14. a = x
15.0
                                    16. 2 and –2
17. \ell = -1, m = 7
18. p = -26, q = 136
19. (x-2)(x-4)(x+1)
20. (x + 1) (x - 2) (x - 5)
21. (x-4)^2 (x+2)
22. (x+2)(x-3)(x+5)
23. (x+5)^2 (x+7)
24. (x + 2) (x - 3) (2x + 1)
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