

**(Polynomials)**

**Q.1 Which one of the following algebraic expressions is a polynomial in variable x?**

- (a)  $x^2 + \frac{2}{x^2}$       (b)  $\sqrt{x} + \frac{1}{\sqrt{x}}$       (c)  $x^2 + \frac{3x^{3/2}}{\sqrt{x}}$       (d) None of these

**Q.2 Degree of the polynomial  $p(x) = 3x^4 + 6x + 7$  is**

- (a) 4      (b) 5      (c) 3      (d) 1

**Q.3 If  $8x^4 - 8x^2 + 7$  is divided by  $2x + 1$ , the remainder is**

- (a)  $\frac{11}{2}$       (b)  $\frac{13}{2}$       (c)  $\frac{15}{2}$       (d)  $\frac{17}{2}$

**Q.4 If  $a + b + c = 0$  then  $a^3 + b^3 + c^3 =$**

- (a)  $abc$       (b)  $3abc$       (c)  $2abc$       (d)  $-3abc$

**Q.5 Factorisation of  $a^{2x} - b^{2x}$  is**

- (a)  $(a^x + b^x)(a^x - b^x)$       (b)  $(a^x - b^x)^2$   
(c)  $(a^x + b^x)(a^2 - b^2)$       (d)  $(a^x - b^x)(a^2 + b^2)$

**Q.6 Factors of  $(a + b)^3 - (a - b)^3$  are**

- (a)  $2ab, (3a^2 + b^2)$       (b)  $ab, (3a^2 + b^2)$   
(c)  $2b, (3a^2 + b^2)$       (d)  $(3a^2 + b^2), 2a$

**Q.7 Find the value of  $x + y + z$  if  $x^2 + y^2 + z^2 = 18$  and  $xy + yz + zx = 9$**

- (a) 9      (b) 3      (c) 6      (d) 8

**Q.8 The value of  $a$  for which  $(x + a)$  is factor of the polynomial  $x^3 + ax^2 - 2x + a + 6$  is**

- (a) 4      (b) 2      (c) -4      (d) -2

**Q.9 If  $x = -2$  and  $x^2 + y^2 + 3xy = -5$  and find  $y$ .**

- (a) -2      (b) 3      (c) -4      (d) 9

**Q.10** If  $x + \frac{1}{x} = 5$  then find the value of  $x^2 + \frac{1}{x^2}$

- (a) 26                      (b) 23                      (c) 30                      (d) 22

**Q.11** Find the value of  $x^3 - 8y^3 - 36xy - 216$ , when  $x = 2y + 6$

- (a) -1                      (b) 2                      (c) 0                      (d) 3

**Q.12** Simplify :  $\frac{x^3 - 4 - x + 4x^2}{x^2 + 3x - 4}$

- (a)  $4 + x$                       (b)  $2 + x$                       (c)  $1 - x$                       (d)  $x + 1$

**Q.13** Which of the following is true if  $x + 1$  and  $x + 2$  are factors of  $P(x) = x^3 + 3x^2 - 2\alpha x + \beta$ ?

- (a)  $2\alpha + 3\beta = 2$                       (b)  $2\alpha - 3\beta = -2$                       (c)  $\alpha - 7\beta = 5$                       (d)  $7\alpha - \beta = 2$

**Q.14** If  $P(x) = x^3 + 3x^2 - 2x + 4$  then find the value of  $[p(2) + p(-2) - p(0)]$

- (a) 28                      (b) 14                      (c) 12                      (d) 16

**Q.15** If  $p = 2 - a$  then  $a^3 + 6ap + p^3 - 8 =$

- (a) 0                      (b) 1                      (c) 2                      (d) 3

**Q.16** The values of  $a$  and  $b$  so that the polynomial  $x^3 - ax^2 - 13x + b$  has  $(x-1)$  and  $(x+3)$  as factors respectively are

- (a) 3, 15                      (b) 5, 13                      (c) 15, 3                      (d) 5, 10

**Q.17** If both  $x = 2$  &  $x = \frac{1}{2}$  are factors of  $px^2 + 5x + r$  then  $p =$

- (a)  $\frac{3}{4}r$                       (b)  $2r$                       (c)  $\frac{r}{2}$                       (d) 2

**Q.18** If  $x$  &  $y$  be two positive real number such that  $x > 3y$ ,  $x^2 + 9y^2 = 369$  and  $xy = 60$  the value of  $x - 3y$  is

- (a) 4                      (b) 3                      (c) 2                      (d) 5

**Q.19** If  $x + y = 5$  and  $xy = 6$  the value of  $x^3 + y^3$  is

- (a) 35                      (b) 45                      (c) 30                      (d) 125

**Q.20** Number of zeroes of the zero polynomial is

- (a) 0                      (b) 1                      (c) 2                      (d) infinite

**Q.21** Find zeroes of polynomial  $x^2 - 3x$

**Q.22** Evaluate  $(x - y)^3 + (y - z)^3 + (z - x)^3$

**Q.23** Identify the polynomial  $2x^3 - x^2 + 5$  on the basis of terms.

**Q.24 Evaluate  $(99)^2$**

**Q.25 If volume of a cuboid is  $5x^2 - 125$ . Then find possible dimensions of cuboid.**

**Q.26 Find the value of k for which  $(x + k)$  is a factor of the polynomial  $x^4 - k^2x^2 + 3x - 6k$ .**

**Q.27  $p + q + r = 6$ ,  $pq + qr + rp = 5$  then find the value of  $p^3 + q^3 + r^3 - 3pqr$ .**

**Q.28 If  $x + 1$  is a factor of  $p(x) = 2x^2 + kx$  then find k.**

**Q.29 The polynomials  $ax^3 + 3x^2 - 13$  and  $2x^3 - 5x + a$  are divided by  $(x+3)$ . If the remainder in each case is the same, find the value of a.**

**Q.30 Factorise  $x^3 + 13x^2 + 32x + 20$  given that  $(x + 2)$  is a factor.**

**Q.31 Factorise :  $a^3 - b^3$**

**Q.32 Factorise by splitting the middle term  $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$**

**Q.33 Without actually cubing find the value of  $(28)^2 + (-15)^3 + (-13)^3$ .**

**Q.34 Find the zeroes of the polynomial  $x^3 + 6x^2 + 11x + 6$  which are integers.**

**Q.35 If  $x^2 - 1$  is a factor of  $ax^4 + bx^3 + cx^2 + dx + e$ , show that  $a + c + e = b + d = 0$**

**Q.36 If  $x^2 + \frac{1}{x^2} = 83$ , find the value of  $x^3 - \frac{1}{x^3}$**

**Q.37 Factorise :**

(i)  $12x^2 - 7x + 1$

(ii)  $2x^2 + 7x + 3$

(iii)  $6x^2 + 5x - 6$

(iv)  $3x^2 - x - 4$

**Q.38 Factorise:**

(i)  $8a^3 - b^3 + 12a^2b + 6ab^2$

(ii)  $27 - 125a^3 - 135a + 225a^2$

(ii)  $27x^3 + y^3 + z^3 - 9xyz$

**Q.39 Verify that  $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x-y)^2 + (y-z)^2 + (z-x)^2]$**

**Q.40 Verify : (i)  $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$**

(ii)  $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$