POLYNOMIAL

I. Competency Focused Questions (MCQs)

Q1. Which of these is a factor of the polynomial $p(x) = x^3 + 4x + 5$?
(a) (x - 1) (b) (x + 1)
(c) (x - 2) (d) x + 2)

Q2. The polynomial (x - a), where a > 0, is a factor of the polynomial $q(x) = 4\sqrt{2}x^2 - \sqrt{2}$?

Which of these is a polynomial whose factor is $\left(x - \dfrac{1}{a}\right)$?

(a) $x^2 + x + 6$ (b) $x^2 - 5x + 4$
(c) $x^2 + 4x - 3$ (d) $x^2 + x - 6$

Q3. The polynomial (x - a) is a factor of the polynomial $x^4 - 2x^2 + kx + k$, where k is a constant. Which of these is the correct relation between a and k?

(a) $k = \dfrac{a^2(2 - a^2)}{1+a}$ (b) $k = \dfrac{a^2(2 + a^2)}{1+a}$

(c) $k = \dfrac{a^2(2 + a^2)}{1-a}$ (d) $k = \dfrac{a^2(2 - a^2)}{1-a}$

Q4. Which of the following is a factor of $p(x) = 3x^2 - 5x - 2$?
(a) x – 1 (b) x + 1
(c) x – 3 (d) 3x + 1

Q5. If x - 2 is a factor of $x^3 - 2ax^2 + ax - 1$, then the value of a is:
(a) 1/6 (b) 7/6
(c) 5/6 (d) - 5/6

Q6. The value of k, if x - 1 is a factor of $p(x) = kx^2 - \sqrt{2}x + 1$ is:
(a) $\sqrt{2}$ (b) $\sqrt{2} + 1$
(c) $\sqrt{2} – 1$ (d) $\sqrt{3} / 2$

Q7. If $(x - a)$ is a factor of $x^3 - mx^2 - 2anx + na^2$; $a \neq 0$, then $a =$

    (a) m + n   (b) m – n   (c) m / n   (d) mn

II. Select Response Questions (MCQs)

Q8. The common quantity that must be added to each term of $a^2 : b^2$ to make it equal $a : b$, is:

    (i) ab   (ii) a + b   (iii) – ab   (iv) a - b

    Choose the correct option from the following:

    (a) Only (i)   (b) Only (ii)

    (c) (i) and (iii)   (d) (i) and (iv)

Q9. The factors of $2x^3 - 3x^2 - 8x - 3$ are:

    (i) $(2x + 1)$ (ii) $(x + 1)$ (iii) $(x - 3)$ (iv) $(x - 1)$

    Choose the correct option from the following:

    (a) Only (i) and (ii)   (b) Only (ii) and (iii)

    (c) (i), (ii) and (iii)   (d) (i), (iii) and (iv)

Q10. The values of a and b so that the polynomial $x^3 - ax^2 - 13x + b$ has $(x - 1)$ and $(x + 3)$ as factors are:

    (i) $a = 5$ (ii) $b = 15$ (iii) $a = 3$ (iv) $b = 13$

    Choose the correct option from the following:

    (a) (ii) and (iii)   (b) (i) and (ii)

    (c) (iii) and (iv)   (d) (i) and (iv)

III. Competency Focused & Inference Based Questions (A-R)

The following question is Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to this question from the codes (a), (b), (c) and (d) as given below.

(a) Both A and R are true, and R is the correct explanation of A.

(b) Both A and R are true, but R is not the correct explanation of A.

(c) A is true, but R is false.

(d) A is false, but R is true.

Q11. **Assertion (A):** If $p(x) = (x - 2)(x + 3)(x - 4)$, then $2, -3$, and 4 are zeroes of $p(x)$.

Reason (R) : If $x - c$ is a factor of $p(x)$, then $x = c$ satisfies $p(x) = 0$.

III. Very Short Answer Questions (VSAQs)

Q12. (i) If $x + 1$ is a factor of $ax^3 + x^2 - 2x + 4a - 9$, find the value of a.

[NCERT Exemplar]

(ii) If $x - a$ is a factor of $x^3 - ax^2 + 2x + a - 1$, find the value of a.

(iii) If $x + 2a$ is a factor of $x5 - 4a^2x^3 + 2x + 2a + 3$, find the value of a.

[NCERT Exemplar]

Q13. If $(x - a)$ is a factor of $3x^2 - mx - nx$, then prove that $a = (m+n)/3$.

Q14. Without actual division, show that $2x^3 + 13x^2 + x - 70$ is exactly divisible by $x - 2$.

Q15. Use Factor Theorem to determine whether $g(x)$ is a factor of $p(x)$ or not in each of the following:
(i) $p(x) = 2x^3 + x^2 - 2x - 1, g(x) = x + 1$
(ii) $p(x) = x^3 - 4x^2 + x + 6, g(x) = x - 3$
(iii) $p(x) = x^3 - x + 1, g(x) = 2 - 3x$

IV. Short Answer Questions (Constructed Response Questions)

Q16. Using Factor Theorem, show that $(m - n)$, $(n - p)$ and $(p - m)$ are factors of
$m(n^2 - p^2) + n(p^2 - m^2) + p(m^2 - n^2)$

Q17. Find the value of m so that $2x - 1$ is a factor of $8x4 + 4x^3 - 16x^2 + 10x + m$.

[NCERT Exemplar] [HOTS]

Q18. If $(x - 3)$ and $(x - 1/3)$ are both factors of $ax^2 + 5x + b$, show that $a = b$.

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