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PRACTICE PAPER 02 - CHAPTER 02 POLYNOMIALS (2023-24)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**
CLASS : X **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv). There is no overall choice.
(v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. If one of the zeroes of the quadratic polynomial $(k – 1)x^2 + kx + 1$ is –3, then the value of k is
(a) 4/3 (b) -4/3 (c) 2/3 (d) -2/3

2. If the zeroes of the quadratic polynomial $x^2 + (a + 1) x + b$ are 2 and –3, then
(a) a = –7, b = –1 (b) a = 5, b = –1 (c) a = 2, b = –6 (d) a = 0, b = –6

3. Zeroes of a polynomial p(x) can be determined graphically. No. of zeroes of a polynomial is equal to no. of points where the graph of polynomial
(a) intersects y-axis (b) intersects x-axis
(c) intersects y-axis or intersects x-axis (d) none of these

4. If graph of a polynomial p(x) does not intersects the x-axis but intersects y-axis in one point, then no. of zeroes of the polynomial is equal to
(a) 0 (b) 1 (c) 0 or 1 (d) none of these

5. If $p(x) = ax^2 + bx + c$ and a + b + c = 0, then one zero is
(a) -b/a (b) c/a (c) b/c (d) none of these

6. The number of polynomials having zeroes as –2 and 5 is
(a) 1 (b) 2 (c) 3 (d) more than 3

7. The quadratic polynomial, the sum of whose zeroes is –5 and their product is 6, is
(a) $x^2 + 5x + 6$ (b) $x^2 – 5x + 6$ (c) $x^2 – 5x – 6$ (d) $–x^2 + 5x + 6$

8. If zeroes of $p(x) = 2x^2 – 7x + k$ are reciprocal of each other, then value of k is
(a) 1 (b) 2 (c) 3 (d) 4

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

9. **Assertion (A):** $x^2 + 4x + 5$ has two real zeroes.
Reason (R): A quadratic polynomial can have at the most two zeroes.

10. Assertion (A): If the sum of the zeroes of the quadratic polynomial $x^2 - 2kx + 8$ are is 2 then value of k is 1.
Reason (R): Sum of zeroes of a quadratic polynomial $ax^2 + bx + c$ is $-b/a$

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Find the zeroes of $\sqrt{3}x^2 + 10x + 7\sqrt{3}$

12. Find a quadratic polynomial whose zeroes are -9 and $-\frac{1}{9}$.

13. If the sum of the zeroes of the quadratic polynomial $ky^2 + 2y - 3k$ is equal to twice their product, find the value of k.

14. If the product of the zeroes of the polynomial $ax^2 - 6x - 6$ is 4, then find the value of a. Also find the sum of zeroes of the polynomial.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Find the zeroes of $p(x) = 4x^2 + 24x + 36$ quadratic polynomials and verify the relationship between the zeroes and their coefficients.

16. If α and β are zeroes of the quadratic polynomial $4x^2 + 4x + 1$, then form a quadratic polynomial whose zeroes are 2α and 2β.

17. If α, β re zeros of quadratic polynomial $2x^2 + 5x + k$, find the value of k such that $(\alpha + \beta)^2 - \alpha\beta = 24$

SECTION – D

Questions 18 carry 5 marks.

18. If α, β are zeroes of polynomial $p(x) = 5x^2 + 5x + 1$ then find the value of
(i) $\alpha^2 + \beta^2$ (ii) $\alpha^{-1} + \beta^{-1}$ (iii) $\alpha^3 + \beta^3$

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Case Study-1 : Lusitania Bridge

Quadratic polynomial can be used to model the shape of many architectural structures in the world. The Lusitania Bridge is a bridge in Merida, Spain. The bridge was built over the Guadiana River in 1991 by a Spanish consortium to take the road traffic from the Romano bridge. The architect was Santiago Calatrava. The bridge takes its name from the fact that Emerita Augusta (present day Merida) was the former capital of Lusitania, an ancient Roman province.

Based on the above information, answer the following questions.

(i) If the Arch is represented by $10x^2 – x – 3$, then find its zeroes. (2)

(ii) Find the quadratic polynomial whose sum of zeroes is 0 and product of zeroes is 1. (2)

OR

(ii) Find the sum and product of zeroes of the polynomial $\sqrt{3}\, x^2 – 14x + 8\sqrt{3}$ (2)

20. The figure given alongside shows the path of a diver, when she takes a jump from the diving board. Clearly it is a parabola. Annie was standing on a diving board, 48 feet above the water level. She took a dive into the pool. Her height (in feet) above the water level at any time 't' in seconds is given by the polynomial h(t) such that $h(t) = -16t^2 + 8t + k$.

(i) What is the value of k? (2)

(ii) At what time will she touch the water in the pool? (2)

OR

(ii) Rita's height (in feet) above the water level is given by another polynomial p(t) with zeroes -1 and 2. Then find p(t) (2)