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PRACTICE PAPER 04 (2023-24)
CHAPTER 04 QUADRATIC EQUATIONS

SUBJECT: MATHEMATICS

MAX. MARKS : 40

CLASS : X

DURATION : 1½ hrs

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 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 a and b are the roots of the equation $x^2 + ax - b = 0$, then find a and b .
(a) $a = -1$ and $b = 2$ (b) $a = 1$ and $b = 2$
(c) $a = -2$ and $b = 1$ (d) $a = 2$ and $b = -1$
2. Which of the following are the roots of the quadratic equation, $x^2 - 9x + 20 = 0$?
(a) 3, 4 (b) 4, 5 (c) 5, 6 (d) 6, 7
3. If $(1 - p)$ is a root of the equation $x^2 + px + 1 - p = 0$, then roots are
(a) 0, 1 (b) $-1, 1$ (c) 0, -1 (d) $-1, 2$
4. Which of the following equations has two distinct real roots?
(a) $2x^2 - 3\sqrt{2}x + \frac{9}{4} = 0$ (b) $x^2 + x - 5 = 0$
(c) $x^2 + 3x + 2\sqrt{2} = 0$ (d) $5x^2 - 3x + 1 = 0$
5. Which of the following equations has no real roots ?
(a) $x^2 - 4x + 3\sqrt{2} = 0$ (b) $x^2 + 4x - 3\sqrt{2} = 0$
(c) $x^2 - 4x - 3\sqrt{2} = 0$ (d) $3x^2 + 4\sqrt{3}x + 4 = 0$
6. If the roots of $ax^2 + bx + c = 0$ are equal in magnitude but opposite in sign, then
(a) $a = 0$ (b) $b = 0$ (c) $c = 0$ (d) none of these
7. If the roots of equation $3x^2 + 2x + (p + 2)(p - 1) = 0$ are of opposite sign then which of the following cannot be the value of p ?
(a) 0 (b) -1 (c) $\frac{1}{2}$ (d) -3
8. The value of k for which the equation $x^2 + 2(k + 1)x + k^2 = 0$ has equal roots is
(a) -1 (b) $-\frac{1}{2}$ (c) 1 (d) none of these

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):** If one root of the quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$, then the value of k is 2.

Reason (R): The quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ has almost two roots.

10. **Assertion (A):** The roots of the quadratic equation $x^2 + 2x + 2 = 0$ are imaginary

Reason (R): If discriminant $D = b^2 - 4ac < 0$ then the roots of quadratic equation $ax^2 + bx + c = 0$ are not real i.e. imaginary.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Solve for x : $4x^2 - 2(a^2 + b^2)x + a^2 b^2 = 0$.

12. The sum of the squares of three consecutive positive integers is 50. Find the integers.

13. Find the value of α such that the quadratic equation $(\alpha - 12)x^2 + 2(\alpha - 12)x + 2 = 0$, has equal roots.

14. Find the value of p, for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, find the value of k.

16. If the equation $(1 + m^2)x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots, then show that $c^2 = a^2(1 + m^2)$.

17. Solve the following for x : $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$

SECTION – D

Questions 18 carry 5 marks.

18. In a flight of 600 km, an aircraft was slowed due to bad weather. Its average speed for the trip was reduced by 200 km/hr and time of flight increased by 30 minutes. Find the original duration of flight.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Raj and Ajay are very close friends. Both the families decide to go to Ranikhet by their own cars. Raj's car travels at a speed of x km/h while Ajay's car travels 5 km/h faster than Raj's car. Raj took 4 hours more than Ajay to complete he journey of 400 km.



- (a) What will be the distance covered by Ajay's car in two hours? (1)
- (b) Which of the following quadratic equation describe the speed of Raj's car? (2)
- (c) What is the speed of Raj's car? (1)

20. John and Jivanti are playing with the marbles. They together have 45 marbles. Both of them lost 5 marbles each, and the product of the number of marbles they now have is 124.



- (a) Find the quadratic equation related to the given problem (2)
- (b) Find the Number of marbles John had. (2)

