Chapter Name- QUADRATIC EQUATIONS

SUMMARY

For a Quadratic Equation $ax^2 + bx + c = 0$
1) Discriminant (D) = $b^2 - 4ac$ 2) The roots are: $\alpha = \frac{-b+\sqrt{D}}{2a}$, $\beta + \frac{-b-\sqrt{D}}{2a}$ 3) Sum of roots(S) = $-\frac{b}{a}$ 4) Product of roots (P) = $\frac{c}{a}$

SUBJECTIVE

1. Solve the following equation:
   $x - \frac{18}{x} = 6$. Give your answer correct to two significant figures.

2. Solve the quadratic equation and give your answer correct to two decimal places: $5x(x + 2) = 3$.

3. Five years ago, a woman's age was the square of her son's age. Ten years hence her age will be twice of her son's age. Find:
   (i) The age of the son five years ago.
   (ii) The present age of woman.

4. A positive number is divided into two parts such that the sum of the squares of the two parts is 208. The square of the larger part is 18 times the smaller part. Taking x as the smaller of the two parts, find the number.

5. Determine, whether the given quadratic equation has real roots, if so find them:
   $\sqrt{7}y^2 - 6y - 13\sqrt{7} = 0$.

6. Solve the given quadratic equation by using formula only and give their answer correct to two decimal places: $2(x-1)(x-5)=5$.

7. If – 1/5 is one root of the quadratic equation $5x^2-px-5=0$, then find the other root and value of p.

8. The sum of two numbers is 8 and the sum of their squares is 34. Find the numbers.

9. Determine value(s) of k for which the quadratic equation $(k+1)x^2+2(k+3)x+(k+4)=0$ has equal roots.

10. A person on tour has Rs. 360 for his expenses. If he extends his tour for 4 days, he has to cut down his daily expenses by Rs. 3. Taking the original duration of tour as x, form an equation in x and solve it.

11. Car A travels x km for every litre of petrol, while car B travels $(x+5)$ km for every litre of petrol.
    (i) Write down the number of litre of petrol, used by car A and car B in covering a distance of 400 km.
    (ii) If car A uses 4 litre of petrol more than car B in covering 400 km, write down an equation in x and solve it to determine the number of litres of petrol used by car B for the journey.

12. The hypotenuse of a right-angled triangle is 6 m more than twice the shortest side. If the third side is 2m less than the hypotenuse, find all sides of the triangle.

13. The total surface area of a hollow metal cylinder, open at both ends, of external radius 10cm and height 12cm is $512\pi\ cm^2$. Taking x to be inner radius, write down an equation in x and sole it to find the thickness of the metal in the cylinder.

14. Two circles touch each other externally. The sum of their area is $130\pi\ cm^2$ and the distance between their centres is 14cm. Find the radius of each circle.

15. $(2x)$ articles cost Rs. $(5x + 54)$ and $(x + 2)$ similar articles cost Rs. $(10x - 4)$. Find x.

16. The speed of an express train is x km/h and the speed of an ordinary train is 12 km/h less than that of the express train. If the ordinary train takes one hour longer than the express train to cover a distance of 240 km, find the speed of express train.

17. Shivika can row a boat at the rate of 4 km/h in still water. She takes 8 hours in going 12 km upstream and 12 km downstream. Find the speed of stream.

18. The product of Shubham's age 5 years ago and his age 9 years later is 15. Find his present age.

19. A takes 6 days less than the time taken by B to finish a work. If both can finish the work in 4 days, find the time taken by B to finish the work.

20. A tank can be filled by one pipe in $'x'$ minutes and emptied by another in $(x + 5)$ minutes. Both the pipes when opened together can fill an empty tank in 16.8 minutes. Find $'x'$.

21. The total surface area of a hollow metal cylinder, open at both ends, of external radius 18cm and height 20cm is $1568\pi\ cm^2$. Taking x to be inner radius, write down an equation in x and solve it to find the thickness of the metal in the cylinder.

22. In a mango groove the trees are planted in horizontal rows. There are 6 trees more in each horizontal row. Altogether there are 720 trees. Find the number of trees in horizontal rows.

23. Solve

$\sqrt{2x+7} = x+2$

24. From the quadratic equation whose roots are

$\left\{\frac{4}{3}, \frac{7}{5}\right\}$

25. If $5x^2 - 3y^2 = \frac{11}{2}xy$, find $\frac{x}{y}$.

26. Solve : $\frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15}$

ANSWERS

1) $x = \{0.46, 6.46\}$ 2) $x = 0.26, -2.26$ 3) *(i)* 5 years; *(ii)* 30 years 4) 20

5) $y = \frac{13}{\sqrt{7}}, -\sqrt{7}$ 6) $x = 5.55, 0.45$ 7) $p = 24$ 8) 3, 5

9) k=-5 10) 20 days 11) petrol use by car B = 16

12)10m, 24m, 26m 13) 4cm 14) 11cm, 3cm 15)$x = 61$

6) 60 km/h 17) 2 km/h 18) 6 years 19)12 days

20) $x = 7$ 21) 8 cm 22) 30