

- i) *Approximately 15 minutes is allotted to read the question paper and revise the answers.*
- ii) *The question paper consists of 22 questions.*
- iii) *All questions are compulsory.*
- iv) *Internal choice has been provided in some questions.*
- v) *Marks allocated to every question are indicated against it.*

N.B: Check that all pages of the question paper is complete as indicated on the top left side.

1. Choose the correct answer from the given alternatives.

- (a) If the sum of squares of zeros of the quadratic polynomial $3x^2 + 5x + k$ is $\frac{-2}{3}$, then the value of k is
- (i) $\frac{31}{6}$ (ii) $\frac{25}{7}$ (iii) $\frac{35}{6}$ (iv) $\frac{27}{7}$
- (b) The pair of equations $x = 4$ and $y = 3$ graphically represent lines which are
- (i) parallel (ii) coincident
(iii) intersecting at $(3, 4)$ (iv) intersecting at $(4, 3)$
- (c) If one root of the quadratic equation $ax^2 + bx + c = 0$ is three times the other, then $b^2 : ac$ is equal to
- (i) $16 : 3$ (ii) $14 : 3$ (iii) $16 : 9$ (iv) $25 : 3$
- (d) If the sum of n terms of an A.P. is $2n^2 + 5n$, then its n^{th} term is
- (i) $4n - 3$ (ii) $3n - 4$ (iii) $4n + 3$ (iv) $3n + 4$
- (e) If the distance between the points A $(2, -3)$ and B $(2, a)$ is 5, then the negative value of a is
- (i) -2 (ii) -3 (iii) -4 (iv) -8
- (f) If $\sin \theta = x$ and $\sec \theta = y$, then the value of $\cot \theta$ is
- (i) xy (ii) $x+y$ (iii) $\frac{1}{xy}$ (iv) $x-y$

- (g) A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q such that OQ = 12 cm. The length PQ is 1
 (i) 8.5 cm (ii) $\sqrt{119}$ cm (iii) 12 cm (iv) 13 cm
- (h) If the perimeter of a semicircle is 36 cm, then its radius is 1
 (i) 21 cm (ii) 14 cm (iii) 7 cm (iv) 3.5 cm
- (i) The number of cubes of side 2 cm which can be cut from a cube of side 6 cm is 1
 (i) 56 (ii) 54 (iii) 28 (iv) 27
- (j) A die is thrown once. The probability of getting a number less than 3 is 1
 (i) $\frac{1}{3}$ (ii) $\frac{2}{3}$ (iii) $\frac{1}{6}$ (iv) 1

Section – B

2. Prove that $6 + \sqrt{2}$ is irrational. 2
3. Find the quadratic equation whose one root is $1 + \sqrt{2}$ and the sum of its roots is 2. 2
4. ABCD is a trapezium in which $AB \parallel DC$, $AB = 2DC$ and the diagonals intersect each other at O. If $ar(\triangle AOB) = 84 \text{ cm}^2$, find $ar(\triangle COD)$. 2
5. Find the point on the x -axis which is equidistant from (2, -5) and (-2, 9). 2
6. Find the area of a quadrant of a circle whose circumference is 22 cm. 2

Section – C

7. If α and β are the zeros of the quadratic polynomial $6x^2 - (k + 1) - 7x$ such that one zero is $\frac{11}{6}$ more than the other, find the value of k . 3
8. a. Solve the following pair of linear equations by elimination method:
 $3x - 5y - 4 = 0$ and $9x = 2y + 7$. 3
- Or**
- b. Find the roots of the quadratic equation $x - \frac{1}{x} = 3, (x \neq 0)$ by applying the quadratic formula.
9. a. Find the 31st term of an A.P. whose 11th term is 38 and the 16th term is 73. 3

Or

- b. If the sum of the first 7 terms of an A.P. is 49 and that of 17 terms is 289, find the sum of the first n terms.
10. a. Find the coordinates of a point A, where AB is the diameter of a circle whose centre is $(2, -3)$ and B is $(1, 4)$.

Or

3

- b. If $P(x, y)$ is any point on the line joining the points A $(a, 0)$ and B $(0, b)$, then show that $\frac{x}{a} + \frac{y}{b} = 1$.
11. If $\cot \theta = \frac{7}{8}$, evaluate $\frac{(1 + \sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(1 - \cos \theta)}$ with the help of a right triangle. **3**
12. a. Evaluate: $\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$

Or

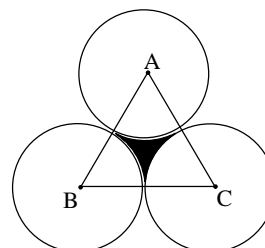
3

- b. Prove that $\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$
13. Draw a triangle ABC with side $BC = 6$ cm, $AB = 5$ cm and $\angle ABC = 60^\circ$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC. **3**
14. a. The wheels of a car are of diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?

Or

3

- b. In the adjoining figure, the area of an equilateral $\triangle ABC$ is 17320.5 cm^2 . With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle. Find the area of the shaded region.
[Use $\pi = 3.14$ and $\sqrt{3} = 1.73205$]



15. The table below shows the daily expenditure on food of 25 households in a locality.

Daily expenditure (in `)	100-150	150-200	200-250	250-300	300-350
Number of households	4	5	12	2	2

Find the mean daily expenditure on food by the Assumed Mean Method.
[Take assumed mean, $a = 225$]

3

16. A die is thrown once. Find the probability of getting:

(i) a prime number (ii) a number lying between 2 and 6 (iii) an odd number

3

Section – D

17. a. Mary travels 300 km to her home partly by train and partly by bus. She takes 4 hours if she travels 60 km by train and the remaining by bus. If she travels 100 km by train and the remaining by bus, she takes 10 minutes longer. Find the speed of the train and the bus separately.

Or

5

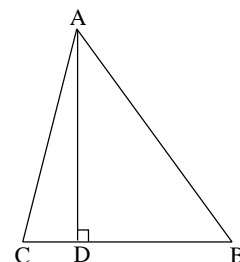
- b. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank. [Use quadratic equation]

18. a. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

Or

5

- b. In the adjoining figure, the perpendicular from A on side BC of a $\triangle ABC$ intersects BC at D such that $DB = 3CD$. Prove that $2AB^2 = 2AC^2 + BC^2$



19. a. From the top of a 7 m high building, the angle of depression of the foot of a cable tower $(7\sqrt{3} + 7)$ m high is 45° . Find the angle of elevation of the cable tower from the top of the building.

Or

5

- b. From a point on the ground, the angles of elevation of the top and the bottom of a flagstaff fixed at the top of a 20 m high pillar are 60° and θ respectively. If the height of the flagstaff is $(\sqrt{3}-1)$ times the height of the pillar, find the value of θ .

20. a. Prove that the parallelogram circumscribing a circle is a rhombus.

Or

5

- b. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

21. a. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively and the slant height of top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of ₹ 500 per m^2 .

Or

5

- b. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment.

22. a. If the median of the given data is 28.5, find the values of x and y .

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	20	15	y	5	60

Or

5

- b. The following distribution gives the daily income of 50 workers of a factory.

Daily income (in ₹)	100-120	120-140	140-160	160-180	180-200
Number of workers	12	14	8	6	10

Convert the distribution above to a less than type cumulative frequency distribution and draw its ogive.
