

(General Instructions):

- (i) All questions are compulsory.
- (ii) This question paper consists of 30 questions divided into four sections – A, B, C and D.
- (iii) Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and 3 questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculator is not permitted.

SECTION - A

1. If $x = 3$ is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k .
2. What is the HCF of smallest prime number and the smallest composite number?
3. Find the distance of a point $P(x, y)$ from the origin.
4. In an AP , if the common difference (d) = -4 , and the seventh term (a_7) is 4, then find the first term.
5. What is the value of $(\cos^2 67^\circ - \sin^2 23^\circ)$?
6. Given $\triangle ABC \sim \triangle PQR$, if $\frac{AB}{PQ} = \frac{1}{3}$, then find $\frac{\text{ar } \triangle ABC}{\text{ar } \triangle PQR}$.

SECTION - B

7. Given that $\sqrt{2}$ is irrational, prove that $(5 + 3\sqrt{2})$ is an irrational number.
8. In Fig. 1, ABCD is a rectangle. Find the values of x and y .

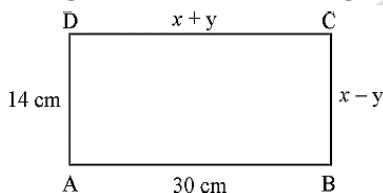


Fig. - 1

9. Find the sum of first 8 multiples of 3.
10. Find the ratio in which $P(4, m)$ divides the line segment joining the points $A(2, 3)$ and $B(6, -3)$. Hence find m .
11. Two different dice are tossed together. Find the probability:
 - (i) of getting a doublet
 - (ii) of getting a sum 10, of the numbers on the two dice.
12. An integer is chosen at random between 1 and 100. Find the probability that it is :
 - (i) divisible by 8. (ii) not divisible by 8.

SECTION - C

13. Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$.
14. Find all zeroes of the polynomial $(2x^4 - 9x^3 + 5x^2 + 3x - 1)$ if two of its zeroes are $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$.
15. If $A(-2, 1)$, $B(a, 0)$, $C(4, b)$ and $D(1, 2)$ are the vertices of a parallelogram $ABCD$, find the values of a and b . Hence find the lengths of its sides.

OR

If $A(-5, 7)$, $B(-4, -5)$, $C(-1, -6)$ and $D(4, 5)$ are the vertices of a quadrilateral, find the area of the quadrilateral $ABCD$.

16. A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time, it had to increase its speed by 100 km/h from the usual speed. Find its usual speed.
17. Prove that the area of an equilateral triangle described on one side of the square is equal to half the area of the equilateral triangle described on one of its diagonal.

OR

If the area of two similar triangles are equal, prove that they are congruent.

18. Prove that the lengths of tangents drawn from an external point to a circle are equal.

19. If $4\tan \theta = 3$, evaluate $\left(\frac{4\sin \theta - \cos \theta + 1}{4\sin \theta + \cos \theta - 1}\right)$

OR

If $\tan 2A = \cot(A - 18^\circ)$, where $2A$ is an acute angle, find the value of A .

20. Find the area of the shaded region in Fig. 2, where arcs drawn with centres A, B, C and D intersect in pairs at mid-points P, Q, R and S of the sides AB, BC, CD and DA respectively of a square ABCD of side 12 cm .
[Use $\pi = 3.14$]

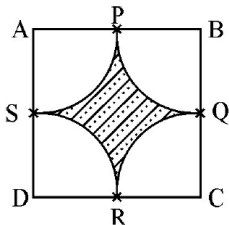


Fig. - 2

21. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in Fig. 3. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm. Find the total surface area of the article.

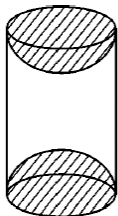


Fig. 3

OR

A heap of rice is in the form of a cone of base diameter 24 m and height 3.5 m. Find the volume of the rice. How much canvas cloth is required to just cover the heap?

22. The table below shows the salaries of 280 persons:

Salary (In thousand ₹)	No. of Persons
5-10	49
10-15	133
15-20	63
20-25	15
25-30	6
30-35	7
35-40	4
40-45	2
45-50	1

Calculate the median salary of the data.

SECTION - D

23. A motor boat whose speed is 18 km/hr in still water takes 1 hr more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

A train travels at a certain average speed for a distance of 63 km and then travels at a distance of 72 km at

an average speed of 6 km/hr more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed ?

24. The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last term to the product of two middle terms is 7: 15. Find the num
25. In an equilateral $\triangle ABC$, D is a point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9(AD)^2 = 7(AB)^2$

OR

Prove that, in a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.

26. Draw a triangle ABC with $BC = 6$ 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 $\triangle ABC$.
27. Prove that: $\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$.
28. The diameters of the lower and upper ends of a bucket in the form of a frustum of a cone are 10 cm and 30 cm respectively. If its height is 24 cm , find :
- (i) The area of the metal sheet used to make the bucket.
- (ii) Why we should avoid the bucket made by ordinary plastic? [Use $\pi = 3.14$]
29. As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships. [Use $\sqrt{3} = 1.732$]
30. The mean of the following distribution is 18 . Find the frequency f of the class 19 – 21.

Class	Frequency
11 – 13	3
13 – 15	6
15 – 17	9
17 – 19	13
19 – 21	F
21 – 23	5
23 – 25	4

OR

The following distribution gives the daily income of 50 workers of a factory:

Daily Income (in ₹)	Number of workers
10 – 120	12
12 – 140	14
14 – 160	8
160 – 180	6
180 – 200	10

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