MATHEMATICS

Sample Question Paper



Section 'A'

Question numbers 1 to 10 carry 1 mark each. For each of these questions four alternative choices have been provided of which only one is correct. Select the correct choice.

- 1. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is:
 - (a) 13.

(b) 65.

(c) 875.

- **(d)** 1,750.
- 2. The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after :
 - (a) one decimal place.
- **(b)** two decimal places. **(c)** three decimal places. **(d)** four decimal places.

- 3. The number of polynomials having zeroes as -2 and 5 is :
 - (a) 1

(b) 2

(c) 3

(d) more than 3

4. Graphically, the pair of equations

$$6x - 3y + 10 = 0$$

$$2x - y + 9 = 0$$

represents two lines which are

- (a) intersecting at exactly one point
- **(b)** intersecting at exactly two points

(c) coincident

(d) parallel

OR

One equation of a pair of dependent linear equations is -5x + 7y = 2. The second equation can be :

(a) 10x + 14y + 4 = 0

(b) -10x - 14y + 4 = 0

(c) -10x + 14y + 4 = 0

- (d) 10x 14y = -4
- 5. Which of the following is not a quadratic equation?
 - (a) $2(x-1)^2 = 4x^2 2x + 1$

(b) $2x - x^2 = x^2 + 5$

(c) $(\sqrt{2}x + \sqrt{3})^2 + x^2 = 3x^2 - 5x$

- (d) $(x^2 + 2x)^2 = x^4 + 3 + 4x^3$
- **6.** Which term of the progression 20, $19\frac{1}{4}$, $18\frac{1}{2}$, $17\frac{3}{4}$ is the first negative term :
 - (a) 27^{th} term
- **(b)** 28th term
- **(c)** 26th term
- (**d**) 25th term

(b) 7

What is the common difference of an A.P., in which $a_{21} - a_7 = 84$?

OR

OR

(d) 3

- 7. The distance of the point P(2, 3) from the x-axis is :
 - (a) 2

(a) 6

(b) 3

(c) 1

(d) 5

The area of a triangle with vertices A (3, 0), B(7, 0) and C (8, 4) is:

(a) 14

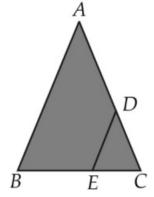
(b) 28

(c) 8

- (d) 6
- 8. If the radii of two concentric circles are 4 cm and 5 cm, then the length of each chord of one circle which is the tangent to the other circle is:
 - (a) 3 cm
- **(b)** 6 cm
- (c) 9 cm
- (d) 1 cm
- 9. If the circumference of a circle and the perimeter of a square are equal, then:
 - **(a)** Area of the circle = Area of the square
 - **(b)** Area of the circle > Area of the square
 - **(c)** Area of the circle < Area of the square
 - (d) Nothing definite can be said about the relation between the areas of the circle and square.
- **10.** During conversion of a solid from one shape to another, the volume of new shape will:
 - (a) increase
- **(b)** decrease
- (c) remains unaltered
- (d) be doubled

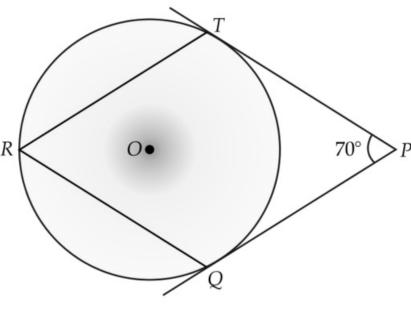
Question numbers 11 to 20 carry 1 mark each.

- 11. Find a rational number between $\sqrt{2}$ and $\sqrt{3}$.
- **12.** Two positive integers a and b can be written as $a = x^3y^2$ and $b = xy^3$, x, y are prime number. Find LCM (a, b).
- **AI** 13.



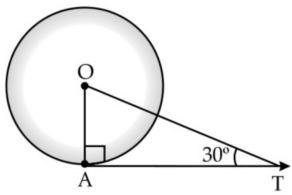
In the figure of $\triangle ABC$, the points D and E are on the sides CA, CB respectively such that DE | AB, AD = 2x, DC = x + 3, BE = 2x – 1 and CE = x. Then, find x.

14. In figure, *O* is the centre of a circle. *PT* and *PQ* are tangents to the circle from an external point *P*. If $\angle TPQ = 70^{\circ}$, find $\angle TRQ$.



OR

In given figure, if AT is a tangent to the circle with centre O, such that OT = 4 cm and $\angle OTA = 30^{\circ}$, then find the length of AT (in cm).



15. Evaluate: $\sin^2 60^\circ + 2\tan 45^\circ - \cos^2 30^\circ$.

It sin A = $\frac{3}{4}$, calculate sec A.

- **16.** Find the area (in cm²) of the circle that can be inscribed in a square of side 8 cm.
- 17. The curved surface area of a cylinder is 264 m² and its volume is 924 m³. Find the ratio of its height to its diameter.
- **18.** If the distance between the points (4, *k*) and (1, 0) is 5, then what can be the possible values of *k*?

OR

Write the co-ordinates of a point P on x-axis which is equidistant from the points A(-2, 0) and B(6, 0).

19. For the following distribution :

Class	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	
Frequency	10	15	12	20	9	

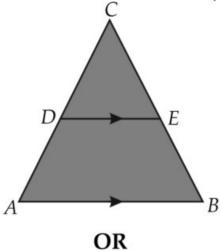
Find the sum of lower limits of median class and modal class.

20. A number is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3. What will be the probability that square of this number is less than or equal to 1.

Section 'B'

Question numbers 21 to 26 carry 2 marks each.

- **21.** Write the denominator of the rational number $\frac{257}{500}$ in the form $2^m \times 5^n$, where m and n are non-negative integers. Hence write its decimal expansion without actual division.
- **22.** In the given figure, $\angle A = \angle B$ and AD = BE. Show that $DE \mid AB$.

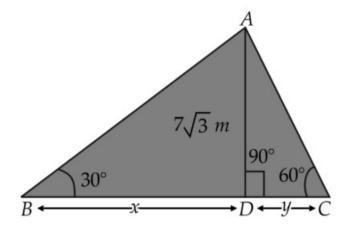


In a rectangle *ABCD*, *E* is a point on *AB* such that $AE = \frac{2}{3}$ *AB*. If AB = 6 km and AD = 3 km, then find *DE*.

- **AI** 23. If $\sin (A + B) = 1$ and $\sin (A B) = \frac{1}{2}$, $0 \le A + B = 90^{\circ}$ and A > B, then find A and B.
- **24.** An observer 1.5 m tall is 28.5 m away from a tower 30 m high. Find the angle of elevation of the top of the tower from his eye.

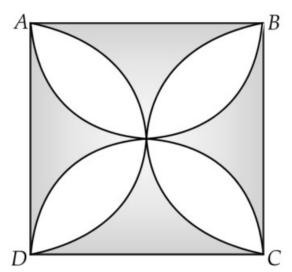
OR

In the given figure, if AD = $7\sqrt{3}$ m, then find the value of BC.



25. In Fig., ABCD is a square of side 14 cm. Semi-circles are drawn with each side of square as diameter.

Find the area of the shaded region. $\left(\text{Use }\pi = \frac{22}{7}\right)$



Section 'C'

Question numbers 27 to 34 carry 3 marks each.

27. The larger of two supplementary angles exceeds the smaller by 18°. Find the angles.

OR

A father's age in three times the sum of the ages of his two children. After 5 years his age will be two times the sum of their ages. Find the present age of the father.

- **28.** If one of the zeroes of a polynomial $3x^2 8x + 2k + 1$ is seven times the other, find the value of k.
- **29.** The ratio of the sums of first m and first n terms of an A.P. is $m^2 : n^2$. Show that the ratio of its m^{th} and n^{th} terms is (2m-1):(2n-1).

- If the p^{th} term of an A.P. is $\frac{1}{q}$ and q^{th} term is $\frac{1}{p}$. Prove that the sum of first pq term of the A.P. is $\left\lceil \frac{pq+1}{2} \right\rceil$.
- **30.** One fourth of a herd of camels was seen in forest. Twice of square root of the herd had gone to mountains and remaining 15 camels were seen on the bank of a river, find the total number of camels.
- **31.** A vertical row of trees 12 m long casts a shadow 8 m long on the ground, At the same time a tower casts the shadow 40 m long on the ground.
 - (i) Determine the height of the tower.
 - (ii) Which mathematical concept is used in this problem?
- **32.** Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.
- **33.** Prove that : $\frac{\tan \theta}{1 \cot \theta} + \frac{\cot \theta}{1 \tan \theta} = 1 + \tan \theta + \cot \theta.$
- **34.** A bag contains 18 balls out of which *x* balls are red.
 - (i) If one ball is drawn at random from the bag, what is the probability that it is not red?
 - (ii) If 2 more red balls are put in the bag, the probability of drawing a red ball will be $\frac{9}{8}$ times the probability of drawing a red ball in the first case. Find the value of x.

OR

Cards numbered 1 to 30 are put in a bag. A card is drawn at random. Find the probability that the drawn card is

- (i) prime number > 7
- (ii) not a perfect square.

Section 'D'

Question numbers 35 to 40 carry 4 marks each.

35. Solve for
$$x: \frac{x-1}{2x+1} + \frac{2x+1}{x-1} = 2$$
, where $x \neq \frac{-1}{2}$, 1

OR

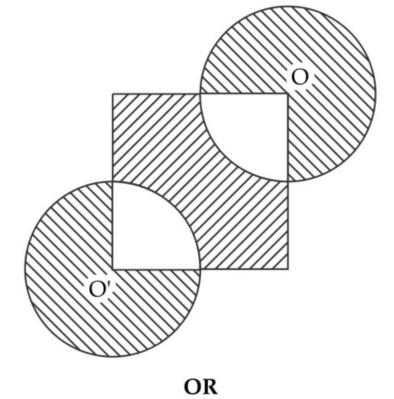
A dealer sells a toy for ₹ 24 and gains as much percent as the cost price of the toy.

- (i) Find the cost price of the toy.
- (ii) Which mathematical concept is used in the above problem?
- **36.** Show that $\triangle ABC$, where A (-2, 0), B (2, 0), C (0, 2) and $\triangle PQR$ where P (-4, 0), Q (4, 0), R(0, 4) are similar triangles.
- 37. Construct a $\triangle ABC$ in which CA = 6 cm, AB = 5 cm and $\angle BAC = 45^{\circ}$. Then construct a triangle whose sides are $\frac{3}{5}$ of the corresponding sides of $\triangle ABC$.

OR

Construct a $\triangle ABC$ in which AB = 4 cm, BC = 5 cm and AC = 6 cm. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of $\triangle ABC$.

- **38.** A moving boat is observed from the top of a 150 m high cliff, moving away from the cliff. The angle of depression of the boat changes from 60° to 45° in 2 minutes. Find the speed of the boat.
- **39.** In the given figure, the side of square is 28 cm and radius of each circle is half of the length of the side of the square, where O and O' are centres of the circle. Find the area of shaded area.



A solid is in the form of a cylinder with hemispherical ends. The total height of the solid in 20 cm and the diameter of the cylinder is 7 cm. Find the total volume of the solid (use $\pi = \frac{22}{7}$)

40. In annual day of a school, age-wise participation of students is shown in the following frequency distribution:

Age of student (in years)	5 – 7	7-9	9 – 11	11 – 13	13–15	15–17	17–19
Number of students	20	18	22	25	20	15	10

Draw a 'less than type' ogive for the above data and from it find the median age.

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