**Class -10**

**MATHEMATICS – PAPER I & II**

*MODEL PAPER – 2023*

# MODEL PAPER

**2**

**Time : 3.15 hours** **Max. Marks : 100**

**Instructions :**

1. In the duration of 3hrs. 15 min, 15 min of time is allotted to read the question paper.
2. All the answers shall be written in the separate answer booklet only.
3. Question paper consists of 4 Sections which includes 33 questions.
4. Internal choice is available in section IV only.
5. Answer shall be written neatly and legibly.

## SECTION – I

**Note : i) Answer all the questions in one word or phrase.**
**ii) Each question carries 1 mark.** **12 x 1 = 12M**

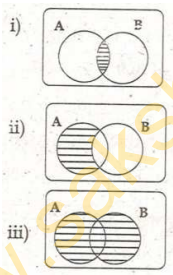
1. Express 0.75 in p/q form.

**2. Match the following :**

a) $A \cup B$

b) $A \cap B$

c) A-B




**choose the correct answer.**

a) a-ii, b-iii, c-i b) a-iii, b-i, c-ii c) a-i, b-ii, c-iii d) a-iii, b-ii, c-i

3. Number of zeroes of cubic polynomial If $p(x) = x^3 - 1 \, Then \; p(1) = .....$

4. As shown in the figure, a hemisphere is placed on a cone. How do you find the surface area of the figure ?

5. Which of the following numbers is a solution for the equation $2(x+3) = 18$ ?

a) 5 b) 6 c) 13 d) 21

6. What is the distance between A(4,0) and B (8,0).

7. Statement 'p' : A tangent to a circle intersects it in one point.

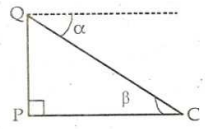
Statement 'q' : We can draw infinite tangents to a given circle.

A) Statement 'p' and 'q' both are true B) Statement 'p' and 'q' is false

C) Statement 'p' false 'q' both are true D) Statement 'p' and 'q' both are false

8. Write the relation between $Tan\theta$ *and* $\cot\theta$

9. Identify the angle of depression form the given figure.




10. From the given frequency distribution table, what is the class interval of highest frequency class ?

| Class interval | 1-3 | 3-5 | 5-7 | 7-9 | 9-11 |
|---|---|---|---|---|---|
| Frequency | 7 | 8 | 2 | 2 | 1 |

11. If P (E) = 0.4, then what is the probability of 'not E' ?

12. "In a right triangle, the square of hypotenuse is equal to the sum of the squares of the other two sides. "The above theorem is related to which Mathematician ?

A) Baudhayan B) Aryabhata C) Euclid D) Bhaskaracharya

## SECTION – II

**Note : i) Answer all the questions.**

**ii) Each question carries 2 marks.** **8 x 2 = 16M**

13. Use Euclid's division algorithm to find the HCF of 900 and 270

14. Check whether -2 and 2 are the zeroes of the polynomial $x^4 - 16$.

15. For what value of 'p' the following pair of equations has a unique solution.

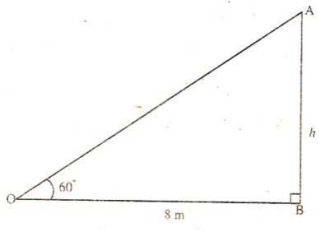
$2x + py = -5$ *and* $3x + 3y = -6$

16. Find the mid point of the line segment joining the points (3,0) and (-1, 4).

17. Find the volume of right circular cone with radius 6cm. and height 7cm.

18. Prove that the tangents to a circle at the end points of a diameter are parallel.

19. A boy observed the top of an electric pole at an angle of elevation of $60^0$ when the observation point is 8 meters away from the foot of the pole. Find the height of the pole.




20. Define Mode ?

## SECTION – III

**Note : i) Answer all the questions.**

**ii) Each question carries 4 marks.** **8 x 4 = 32 M**

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21. (i) If $A=\{1,2,3,4\}; B=\{1,2,3,5,6\}$ *then find* $A\cap B$ *and* $B\cap A.$ are they equal?

(ii) If A and B are two sets such that $A\subset B$ then what is $A\cup B$ ?

22. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.

23. A man travels 370 km partly by train and partly by car. If he covers 250 km by train and the rest by car, it takes him 4 hours. But if he travels 130km by train and the rest by car, it takes 18 minutes more. Find the speed of the train and that of the car.

24. State and prove Pythagoras theorem ?

25. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}}=\operatorname{cosec}\theta+\cot\theta$

26. From the top of a building, the angle of elevation of the top of a cell tower is $60^0$ and the angle of depression to its foot is $45^0$. If distance of the building from the tower is 7m, then find the height of the tower.

27. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) white ? (iii) not green ?

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

## SECTION – IV

**Note : i) Answer all the questions.**

**ii) Each question carries 8 marks.**

**iii) Each question. There is an internal choice.** **5 x 8 = 40 M**

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29. a) If $x^2 + y^2 = 25xy$, then prove that $2\log(x+y) = 3\log 3 + \log x + \log y$.

OR

b) i) Show that $\cot\theta + \tan\theta = \sec\theta \cos ec\theta$.

ii) Show that $\tan^2\theta + \tan^4\theta = \sec^4\theta - \sec^2\theta$

30. a) State which of the following sets are finite or infinite.

(i) $\{x : x \in N \text{ and } (x-1)(x-2) = 0\}$ (ii) $\{x : x \in N \text{ and } x^2 = 4\}$

(iii) $\{x : x \in N \text{ and } 2x - 2 = 0\}$ (iv) $\{x : x \in N \text{ and } x \text{ is prime}\}$

(v) $\{x : x \in N \text{ and } x \text{ is odd}\}$

OR

b) Find the 12th term of a G.P. whose 8th term is 192 and the common ratio is 2.

31. a) Prove that the points A (7,3), B (6,1), C (8,2) and D (9,4) taken in order are the corners of a parallelogram.

OR

b) The median of the following data is 525. Find the values of $x$ and $y$, if the total frequency is 100. Here, CI stands for class interval and Fr for frequency.

| CI | 0-100 | 100-200 | 200-300 | 300-400 | 400-500 | 500-600 | 600-700 | 700-800 | 800-900 | 900-1000 |
|---|---|---|---|---|---|---|---|---|---|---|
| Fr | 2 | 5 | x | 12 | 17 | 20 | y | 9 | 7 | 4 |

32. a) A sphere, a cylinder and a cone are of the same radius and same height. Find the ratio of their curved surface areas.

OR

b) One card is drawn from a well – shuffled deck of 52 cards. Find the probability of getting :

i) A face card of diamond ii) Ace card

iii) Spade card iv) A jack of red

33. a) Draw the graph of the given polynomial $p(x) = x^2 - 4x + 5$ and find the zeroes.

OR

b) Draw a circle of radius 4 cm. From a point 6 cm away from its center, construct the pair of tangents to the circle.

**Class -10**

**MATHEMATICS – PAPER I & II**

*MODEL PAPER – 2023*

# MODEL PAPER

**1**

**Time : 3.15 hours** **Max. Marks : 100**

**Instructions :**

1. In the duration of 3hrs. 15 min, 15 min of time is allotted to read the question paper.
2. All the answers shall be written in the separate answer booklet only.
3. Question paper consists of 4 Sections which includes 33 questions.
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5. Answer shall be written neatly and legibly.

## SECTION – I

**Note : i) Answer all the questions in one word or phrase.**

**ii) Each question carries 1 mark.** **12 x 1 = 12M**

1. "The cost of 2 pens and 5 pencils is Rs. 20". Express this data as a linear equation.
2. Choose the correct answer satisfying the following statements.

   Statement (A) : Number of maximum zeroes of a cubic polynomial is 3.

   Statement (B) : Zero of a linear polynomial $x+4$ $is-4$

   i) Both (A) and (B) are TRUE.

   ii) (A) is True, (B) is FALSE

   iii) (A) is False, (B) is TRUE.

   iv) Both (A) and (B) are FALSE.
3. Find the value of $\log_5 125$
4. Find the discriminant of quadratic equation $x^2-4x+3=0$
5. Find the volume of a cylinder whose base radius is 3 cm and height is 7 cm.
6. If $n(A)=10, n(B)=6$ *and* $n(A\cup B)=12,$ *then* $n(A\cap B)=$.....
7. Given two examples of pair of similar figures.

**8. Match the following:**

| | |
|---|---|
| A) Tan $45^0$ | i) $\frac{\sqrt{3}}{2}$ |
| B) $Sin60^0$ | ii) O |
| C) $Sino^0$ | iii) 1 |

a) A → (i), B → (ii), C → (iii)

b) A→ (ii), B → (iii), C → (i)

c) A → (iii), B → (i), C → (ii)

d) A → (ii), B → (i), C → (iii)

9. Midpoint of a line joining the two points (0,0) and (4,6) is .....

10. Draw a rough diagram to the given situation.

"A person observed a top of a tree 10 m away from its foot at the angle of elevation is $45^0$".

11. The wickets taken by a bowler in 10 cricket matches are as follows : 2,6,4,5,0, 2,1,3,2,3

12. The number of common tangents can be drawn to two concentric circles is .....

## SECTION – II

**Note : i) Answer all the questions.**

**ii) Each question carries 2 marks.** **8 x 2 = 16M**

13. Half the perimeter of a rectangular garden, whose length is 4m more than its width, is 36m. Find the dimensions of the garden.

14. Find the volume and surface area of a sphere of radius 2.1 cm $(\pi = \frac{22}{7})$

15. If $A = \{p, q, r\}$ and $B = \{q, p, r\}$, then check whether A=B or not.

16. Find the HCF of 96 and 72 by using Euclid Division Lemma.

17. Draw a circle and two lines parallel to a given line such that one is a tangent and the other is a secant to the circle.

18. If $\tan\theta = \frac{7}{24}$, then find the value of $\sec\theta$ .

19. Write the formula to find mean of grouped data in direct method and explain the terms in it.

20. Show that the centroid of a triangle formed by the vertices (0,0), (2,0) and (1,3) is (1,1).

## SECTION – III

**Note : i) Answer all the questions.**

**ii) Each question carries 4 marks.** **8 x 4 = 32 M**

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21. Find the zeroes of the polynomial $x^2 - 3$ and verify the relationship between the zeroes and the coefficients.

22. Mary told her daughter, "Seven years ago, I was seven times as old as you were then. Also, three years from now, I shall be three times as old as you will be." Find the present age of Mary and her daughter.

23. State whether each of the following statement is true or false. Justify you answers.

(i) $\{2,3,4,5\}$ *and* $\{3,6\}$ are disjoint sets.

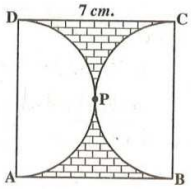
(ii) $\{a,e,i,o,u\}$ *and* $\{a,b,c,d\}$ are disjoint sets.

(iii) $\{2,6,10,14\}$ *and* $\{3,7,11,15\}$ are disjoint sets.

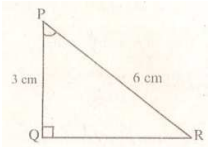
(iv) $\{2,6,10\}$ *and* $\{3,7,11\}$ are disjoint sets.

24. In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed ?

25. Find the area of the shaded region in figure, if ABCD is a square of side 7cm. and APD and BPC are semicircles. (use $\pi = \frac{22}{7}$).




26. In $\Delta PQR$, right angle is at Q. PQ = 3 cm and PR = 6cm. Determine $\angle QPR$ and $\angle PRQ$.




27. When a die is thrown once, find the probability of getting on its face :

i) 8 ii) a number less than 6

iii) a prime number iv) a composite number

28. ABCD is a trapezium in which $AB \| DC$ and its diagonals intersect each other at the point '$O$'. Show that $\frac{AO}{BO} = \frac{CO}{DO}$.

## SECTION – IV

**Note : i) Answer all the questions.**

**ii) Each question carries 8 marks.**

**iii) Each question has internal choice.** **5 x 8 = 40 M**

---

29. a) Prove that $\sqrt{2} + \sqrt{3}$ is an irrational.

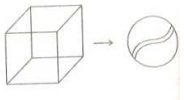
OR

b) The $17^{th}$ term of an AP exceeds its $10^{th}$ term by 7. Find the common difference.

30. a) 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.

OR

b) How many spherical balls can be made out of a solid cube of lead whose edge measures 44cm and each ball being 4 cm. in diameter.



31. a) Find the area of the quadrilateral whose vertices, taken in order, are (-4,-2), (-3, -5), (3,-2) and (2,3).

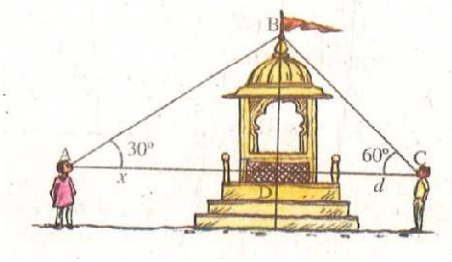
OR

b) A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household.

| Family Size | 1-3 | 3-5 | 5-7 | 7-9 | 9-11 |
|---|---|---|---|---|---|
| Number of families | 7 | 8 | 2 | 2 | 1 |

Find the mode of this data.

32. a) Two mean on either side of a temple of 30 meter height observe its top at the angles of elevation $30^0$ and $60^0$ respectively. Find the distance between the two men.




OR

b) One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting :

i) a queen of black colour ii) a face card

iii) a jack of diamond iv) a club card

33. a) Draw the graph of the polynomial $p(x) = x^2 - x - 12$ and find its zeroes.

OR

b) Construct an Isosceles triangle whose base is 8cm and altitude is 4cm. Then, draw another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.

**Class -10**

**MATHEMATICS – PAPER I & II**

*MODEL PAPER – 2023*

# MODEL PAPER

**3**

**Time : 3.15 hours** **Max. Marks : 100**

**Instructions :**

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4. Internal choice is available in section IV only.
5. Answer shall be written neatly and legibly.

## SECTION – I

**Note : i) Answer all the questions in one word or phrase.**

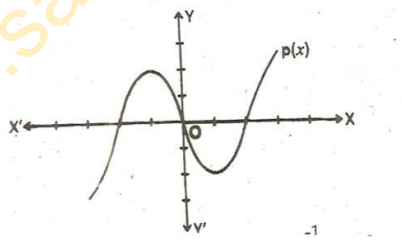
**ii) Each question carries 1 mark.** **12 x 1 = 12M**

1. Express $\frac{21}{25}$ in decimal form.

2. A is the set of factors of 12. Which one of the following is not a member of A.

   A) 1 B) 4 C) 5 D) 12

3. Fine the number of zeroes of the polynomial p(x), whose graph is given.




4. What is the common ratio of the G.P. 25, $-5, 1, \frac{-1}{5}, \ldots.?$

5. The equation $x-4y=5$ has

   a) No solution b) Unique solution

   c) two solutions d) Infinitely many solutions

6. **Assertion :** (0,2) is a point on Y- axis.

   **Reason :** Every point on Y- axis is at a distance of zero units from the Y-axis.

**Now, choose the correct answer.**

A) Both Assertion and Reason are true. Reason is supporting the Assertion.

B) Both Assertion and Reason are true but, Reason is not supporting the Assertion.

C) Assertion is True, but Reason is False.

D) Assertion is False, but Reason is True.

7. **Statement – I :** The lengths 3 cm, 4cm, 5cm form a right angled triangle.

**Statement – II :** If 'a' is the side of an equilateral triangle, then its height is $\sqrt{3}$ a.

**Now, choose the correct answer.**

A) Statement – I and statement – II both are true.
B) Statement – I and Statement – II both are false.
C) Statement – I is true. Statement – II is false.
D) Statement – I is false. Statement – II is true.

8. The tangents drawn at the end points of a diameter are .....

9. **Which of the following is NOT true ?**

A) $\sin 90^0 = 1$ B) $\sin^2\theta + \cos^2\theta = 1$

C) $\cos o^0 = 1$ D) $1 - Tan^2\theta = \sec^2\theta$

10. At a particular time, if the angle of elevation of the sun is $45^0$, then the length of the shadow of a 5 m high tree is .....

A) $5\sqrt{3}m$ B) 10m C) 5m D) $\frac{5}{\sqrt{3}}m$ h

11. If P(E) = 0.3, then P (not E) .....

A) 0.3 B) $\frac{1}{3}$ C) 0 D) 0.7

12. In the classes 35-39, 40-44, 45-49, ..... of a frequency distribution, then the upper boundary of the class 40-44 is .....

## SECTION – II

**Note : i) Answer all the questions.**

**ii) Each question carries 2 marks.** **8 x 2 = 16M**

13. If sin A = cos B, then prove that A+B = $90^0$.

14. Check whether -3 and 3 are the zeroes of the polynomial $x^2$-9 or not.

15. The curved surface area of a cone is 4070 $cm^2$ and its diameter is 70cm. what is its slant height ?

16. Determine $x$ so that 2 is the slope of the line through P (2,5) and Q ($x$,3).

17. If ABC is an isosceles triangle, right angled at C, then prove that $AB^2=2AC^2$.

18. The length of the minute hand of a clock is 14cm. Find the area swept by the minute hand in 10 minutes.

19. A person is flying a kite at an angle of elevation $\alpha$ and the length of the thread from his hand to kite is "$l$". Draw a rough diagram for the above situation.

20. Median of the observations $\frac{x}{5}, x, \frac{x}{4}, \frac{x}{2}, \frac{x}{3}$ is 7. Find the value of $x$.

## SECTION – III

**Note : i) Answer all the questions.**

**ii) Each question carries 4 marks.** **8 x 4 = 32 M**

21. If $\log\left[\frac{x+y}{3}\right]=\frac{1}{2}(\log x+\log y)$, then find the value of $\frac{x}{y}+\frac{y}{x}$.

22. How many two – digit numbers are divisible by 3?

23. The sum of a two digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there ?

24. $\Delta ABC \sim \Delta DEF$ and their areas are respectively 64$cm^2$ and 121 $cm^2$.

    If EF = 15.4 cm., then find BC.

25. Find two consecutive odd positive integers, sum of whose squares is 290.

26. A tower stands vertically on the ground. From a point which is 15 meters away from the foot of the tower, the angle of elevation of the top of the tower is $45^0$. What is the height of the tower ?

27. A box contains 3 blue, 2 white, and 4 red marbles. If a marble is drawn at random from the box, what is the probability that it will be

(i) white ? (ii) blue ? (iii) red?

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

## SECTION – IV

**Note : i) Answer all the questions.**

**ii) Each question carries 8 marks.**

**iii) Each question has internal choice.** **5 x 8 = 40 M**

---

29. a) Prove that $\sqrt{p}+\sqrt{q}$ is irrational, where p, q are primes.

OR

b) If $\sec\theta+\tan\theta=p,$ then prove that $\sin\theta=\frac{p^2-1}{p^2+1}$

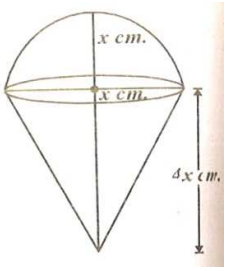
30. a) If A = $\{x: x \text{ is natural number}\}$, $B=\{x: x \text{ is an even natural number}\}$

C = $\{x: x \text{ is an odd natural number}\}$, and $D=\{x: x \text{ is a prime number}\}$

Find $A\cap B, A\cap C, A\cap D, B\cap C, B\cap D, C\cap D.$

OR

b) A cylindrical container is filled with ice – cream whose diameter is 12cm. and height is 15 cm. The whole ice – cream is distributed to 10 children in equal cones having hemispherical tops. If the eight of the conical portion is twice the diameter of its base, find the diameter of the ice – cream cone.




31. a) Find the value of 'k' for which the points (7,-2), (5,1), (3,k) are collinear.

OR

b) If the median of 60 observations, given below is 28.5, find the values of $x$ *and* $y$.

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

32. a) 5 pencils and 7 pens together cost Rs. 95. Whereas 7 pencils and 5 pens together cost Rs. 85. Find the cost of one pencil and that of one pen.

OR

b) One card is drawn from a well – shuffled deck of 52 cards. Find the probability of getting

i) a king of black colour ii) a face card

iii) a spade iv) a card not a heart

33. a) Draw the graph of the polynomial $p(x) = x^2 - 3x - 4$ and find the zeroes.

OR

b) Draw a pair of tangents to a circle of radius 4 cm which are inclined to each other at an angle $60^0$.