X Class

MODEL PAPER 1

MATHEMATICS

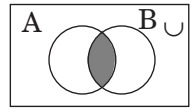
Time : 3.15 Hrs Max. Marks : 100

Instructions : 1. 15 minutes are allotted for reading the question paper in addition to 3.00 hours for writing the answers.
2. All answers should be written in the separate answer booket.
3. There are four sections in the questions.
4. There is internal choice in Section-IV.
4. Write answers should be visible and legibly.

Section I

Note: 1. Answer all the questions.
2. Each question carries 1 mark. **(12 × 1 = 12)**

1. If $x + \frac{1}{x} = \frac{17}{4}$ then find the value of x.
2. Write the decimal form of $\frac{17}{8}$.
3. The cost of a note book is twice the cost of pen. Write a linear equation in two variables to represent this statement.
4. If α, β, γ are the zeroes of the cubic polynomial $4x^3 + 8x^2 - 6x - 2$ then find $\alpha\beta\gamma$.
5. In a cone $l = 10$ cm, $r = 5$ cm then find the CSA of a cone.
6. In the adjacent Venn-diagram, write the set represented by the shaded region.



7. Find the height of an equilateral triangle of side $2\sqrt{3}$ units.
8. What is the value of $\tan^2 30° + 2\cot^2 60°$?
9. If (1, 2), (–1, b) (–3, – 4) are collinear, then find the value of b.
10. Can mode be calculated for grouped data with unequal class sizes ?
11. In a well shuffled deck of 52 cards, find the probability of not a face card.
12. Draw a rough diagram of two externally touching circles and their tangents.

Section II

Note: 1. Answer all the questions.
2. Each question carries 2 marks. **(8 × 2 = 16)**

13. Given that $a = 5$, $d = 3$, $a_n = 50$ find n.
14. A sphere of maximum volume is cut out from a solid hemisphere of radius 6 cm. Find the volume of the cut out sphere.

15. The larger of two complimentary angles is double the smaller. Find the angles.

16. Find the surface area of a sphere of radius 14 *cm* $\left(\text{Take } \pi = \frac{22}{7}\right)$

17. What is the difference between secant of the circle and tangent to the circle ?

18. Is it right to say $\cos(60° + 30°) = \cos 60°. \cos 30° - \sin 60° . \sin 30°$?

19. Explain the formula for mode for a grouped data.

20. If the shadow of a tower is $\sqrt{3}$ times its height, then find the angle of of the sun's altitude.

Section III

Note: 1. Answer all the questions.
2. Each question carries 4 marks. **(8 × 4 = 32)**

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

22. Explain why $7 \times 11 \times 13 + 13$ and $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.

23. State the reasons for the following :

    (1) $(1, 2, 3, \ldots 10) \neq \{x / x \in \text{N and } 1 < x < 10\}$

    (2) $(2, 3, 5, 7, 9) \neq \{x / x \text{ is a prime number}\}$

24. Find whether the equations $x^2 - 4x + 1.5 = 0$ and $2x^2 + 3 = 8x$ are consistent or not.

25. Given that $\cot\theta = \frac{7}{8}$. Then evaluate $\frac{(1 + \sin\theta)(1 - \sin\theta)}{(1 + \cos\theta)(1 - \cos\theta)}$.

26. In right angle triangle ABC, 8 cm, 15 cm and 17 cm are the lenghs of AB, BC and CA respectvely. Then, find out sin A, cos A and tan A.

27. In what ratio does the point (–4, 6) divide the line segment joining the points A (–6, 10), B (3, –8) ?

28. Length of the shadow of a 15 meter high pole is $5\sqrt{3}$ meters at 10 O' clock in the morning. Then what is the angle of elevation of the sun rays with the ground at the time ?

Section IV

Note: 1. Answer all the questions.
2. Each question carries 8 marks.
3. There is internal choice for each question. **(5 × 8 = 40)**

29. (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) Subba Rao started to work in 1995 at an annual salary of Rs. 5000 and received an increment of Rs. 200 each year. In which year did his income reach Rs. 7000 ?

30. (a) A toy is made in the form of hemisphere surmounted by a right cone whose circular base is joined with the plane surface of the hemisphere. The radius of the base of the cone is 7 cm and its volume is $\frac{3}{2}$ of the hemisphere. Calculate the height of the cone and the surface area of the toy correct to 2 places of decimal $\left(\text{Take } \pi = 3\frac{1}{7}\right)$.

(Or)

(b) If two of the zeroes of the polynomial $x^4 + 3x^3 - 7x^2 - 27x - 18$ are -1 and -2, find the other zeroes.

31. (a) Prove that $\sqrt{\dfrac{1 + \cos\theta}{1 - \cos\theta}} = \operatorname{cosec}\theta + \cot\theta$

(Or)

(b) Find the value of y for which the distance between the points P (2, –3) and Q (10, y) is 10 units.

32. (a) In a retail market, fruit vendors were selling oranges kept in packing baskets. These baskets contained varying number of oranges. The following was the distribution of oranges according to the number of baskets :

Number of oranges	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34
Number of baskets	15	110	135	114	25

Find the mean number of oranges kept in each basket. Which method of finding the mean did you choose ?

(Or)

(b) A car has two wipers which do not overlap. Each wiper has a blade of length 25 cm sweeping through an angle of 115°. Find the total area cleaned at each sweep of the blades. $\left(\text{use } \pi = \dfrac{22}{7}\right)$.

33. (a) Draw the graph of $p(x) = x^2 + 3x - 4$. Using the graph find the zeroes. Justify your answer.

(Or)

(b) The annual profits earned by 30 shops in a locality give rise to the following distribution :

Profit (in lakhs)	Number of shops (frequency)
More than or equal to 5	30
More than or equal to 10	28
More than or equal to 15	16
More than or equal to 20	14
More than or equal to 25	10
More than or equal to 30	7
More than or equal to 35	3

Draw both ogives for the above data. Hence obtain the median profit.