**SET - 01**

**Roll No.** ☐☐☐☐☐☐

Candidates must write the Set No on the title page of the answer book.

# SAHODAYA PRE BOARD EXAMINATION – 2025-26

♦ Please check that this question paper contains 06 printed pages.
♦ Set number given on the right-hand side of the question paper should be written on the title page of the answer book by the candidate.
♦ Check that this question paper contains 38 questions.
♦ Write down the Serial Number of the question in the left side of the margin before attempting it.
♦ 15 minutes time has been allotted to read this question paper. The question paper will be distributed 15 minutes prior to the commencement of the examination. The students will read the question paper only and will not write any answer on the answer script during the period. Students should not write anything in the question paper.

# CLASS – X
## MATHEMATICS (BASIC) - 241

**Time Allowed:3 hours**      **Maximum Marks: 80**

General Instructions:
1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi$=22/7 wherever required if not stated.

**SECTION-A**

1. H.C.F of two numbers is 27 and their L.C.M is 162. If one of the numbers is 54, then other number is **[1]**
   A) 36      B) 35      C) 9      D) 81

2. The system of linear equations $x + 2y = 3$ and $5x + ky + 7 = 0$ is inconsistent if $k$ is **[1]**
   A) $-\frac{14}{3}$      B) $\frac{2}{5}$      C) 5      D) 10

3. If one zero of the polynomial $f(x) = (k^2+4) x^2 +13x + 4k$ is reciprocal of other, then k is equal to **[1]**
   A) 2      B) -2      C) 1      D) – 1

4.      **[1]**
   A quadratic equation can have:
   A) at least two roots    B) at most two roots    C) exactly two roots    D) any number of roots

5. If 18, a, b, -3 are in AP, then $a+b =$ **[1]**
   A) 19      B) 7      C) 11      D) 15

6. The sum of first 16 terms of the AP: 10,6,2,…. is **[1]**
   A) $-320$  B) $320$  C) $-352$  D) $-400$

7. Ponit $P\left(\frac{a}{8}, 4\right)$ is the mid point of the line joining the points A(−5,2) and B(4,6). The value of **[1]** `a` is
   A) $-4$  B) $4$  C) $8$  D) $-2$

8. The fourth vertex D of a parallelogram ABCD, whose three vertices are $A(-2,3)$, $B(6,7)$ and **[1]** $C(8,3)$ is
   A) $(0,-1)$  B) $(0,1)$  C) $(-1,0)$  D) $(1,0)$

9. If in two triangles ΔDEF and ΔPQR, $\angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is **[1]** not true?
   A) $\frac{EF}{PR} = \frac{DF}{PQ}$  B) $\frac{EF}{RP} = \frac{DE}{PQ}$  C) $\frac{DE}{QR} = \frac{DF}{PQ}$  D) $\frac{EF}{RP} = \frac{DE}{QR}$

10. The distance between the point of contact of two parallel tangents of a given circle of radius 6 **[1]** cm is
    A) 6 cm  B) 9 cm  C)18 cm  D)12 cm

11. In the given figure, PA and PB are the tangents to the circles with centre `O` such that **[1]** $\angle APB=80^0$, the value of $\angle OAB$ is

    A) $80^0$  B) $40^0$

    C) $90^0$  D) $30^0$
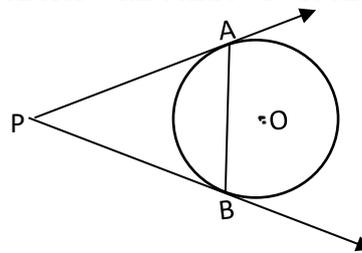
12. $5 \tan^2 A - 5 \operatorname{Sec}^2 A +1$ is equal to **[1]**
    A) 6  B) -5  C) 1  D) -4

13. The radii of two cylinders are in the ratio 5: 7 and their heights are in the ratio 3: 5, then the ratio **[1]** of their curved surface area is
    A) 3: 7  B) 7: 3  C) 4: 7  D) 7: 4

14. The mean and median of a statistical data are 21 and 23 respectively. The value of mode is **[1]**
    A) 27  B) 29  C) 18  D) 28

15. In the given figure, AP is a tangent to the circle with centre O such that OP = 4 cm and **[1]** $\angle OPA = 30°$ ,then AP is
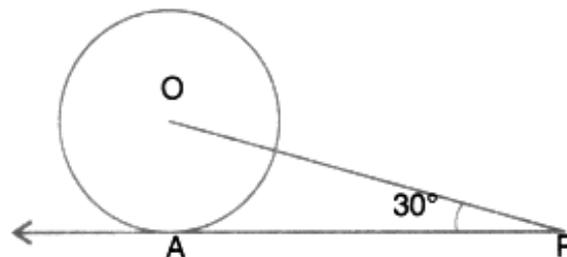
    A) $2\sqrt{2}$cm  B) 2 cm  C) $2\sqrt{3}$ cm  D) $3\sqrt{2}$ cm

16. In the given figure, AB is a chord of the circle and AOC is a diameter such that $\angle ACB = 50°$. If **[1]** AT is the tangent to the circle at point A, then $\angle BAT$ is equal to
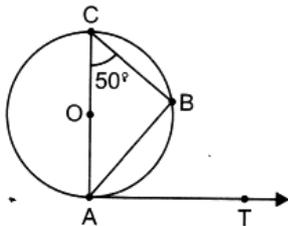


    A) 40°             B) 50°             C) 45°             D) $60^0$

17. The area of a circle that can be inscribed in a square of side 14 cm is **[1]**
    A) 154 cm$^2$      B) 160 cm$^2$      C) 150cm$^2$      D) 256 cm$^2$

18. If P(A) denotes the probability of an event A, then **[1]**
    A) $P(A) < 0$      B) $P(A) > 1$      C) $0 \leq P(A) \leq 1$      D) $-1 \leq P(A) \leq 1$

Each of the following questions contains two statements i.e., ASSERTION and REASON, and has following four choices. Only one of which is the correct answer.

19. **ASSERTION (A):** In two triangles if corresponding angles are equal then the triangles are **[1]** similar.
    **REASON (R):** Two similar triangles are always congruent.
    A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
    B) Both Assertion (A) and Reason (R) are true but Reason ( R) is not the correct explanation of Assertion (A).
    C) Assertion (A) is true but Reason (R) is false.
    D) Assertion (A) is false but Reason (R) is true

20. **ASSERTION (A):** Two coins are tossed simultaneously. Possible outcomes are two heads, one **[1]** head and one tail, two tails. Hence, the probability of getting two heads is $\frac{1}{3}$ .

    **REASON (R):** Probabilities of 'equally likely' outcomes of an experiment are always equal.
    A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
    B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
    C) Assertion (A) is true but Reason (R) is false.
    D) Assertion (A) is false but Reason (R) is true.

<div align="center"><b>SECTION-B</b></div>

21. (A) Find the largest number which divides 853 and 385 leaving remainder 7 in each case. **[2]**

<div align="center"><b>OR</b></div>

(B) Show that $12^n$ cannot end with digit 0 for any natural number `n'.

22. From an external point P, two tangents PA and PB are **[2]** drawn to a circle with centre O. At a point E on the circle, a tangent is drawn to intersect PA and PB at C and D respectively. If PA = 10 cm, find the perimeter of $\Delta$PCD.
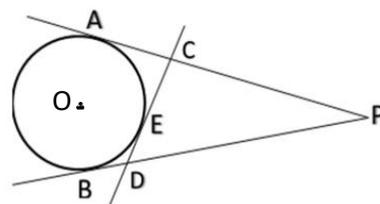
23. If the zeros of polynomial $x^2 + px + q$ are 3 and 2, find the values of $p$ and $q$. **[2]**

24. Find the value of k for which roots of the equation $x^2 - 8kx + 2k$ are real and equal. **[2]**

25. (A) Find the value of $\sin^3 60°.\cot 30° - 2\sec^2 45° + 6\cos 60° \tan 45°$. **[2]**

<div align="center">**OR**</div>

(B) If $\tan(A+B) = \sqrt{3}$ and $\cot(A - B) = \sqrt{3}$, find the value of A and B, $0^0 < A + B \le 90^0, A > B$

<div align="center">### SECTION-C</div>

26. Prove that $\sqrt{7}$ is an irrational number. **[3]**

27. The mean of following frequency distribution is 25. Find the value of P. **[3]**

| Class Interval | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 |
|---|---|---|---|---|---|
| Frequency | 5 | P | 15 | 16 | 6 |

<div align="center">**OR**</div>

Find the median of the following frequency distribution.

| Class Interval | 25 – 35 | 35 – 45 | 45 – 55 | 55 – 65 | 65 - 75 | 75 – 85 |
|---|---|---|---|---|---|---|
| Frequency | 7 | 31 | 33 | 17 | 11 | 1 |

28. Prove that the parallelogram circumscribing a circle is a rhombus. **[3]**

29. (A) A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days and an additional charge for each day thereafter. Latika paid ₹22 for a book kept for six days, while Anand paid ₹16 for the book kept for four days. Find the fixed charge and the charge for each extra day. **[3]**

<div align="center">OR</div>

(B) Solve the following pair of equations graphically .

    *2x + y = 6* and *2x – y + 2 = 0*.

30. Prove that : $(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$ **[3]**

31. The sum of the 2nd and the 7th term of an AP is 30. If its 15th term is 1 less than twice its 8th term, then find the AP. **[3]**

<div align="center">### SECTION-D</div>

32. State and prove Basic Proportionality Theorem. **[5]**

33. (A) A passenger train takes 2 hours less for a journey of 300 km, if its speed is increased by 5 km/hr from usual speed. Find its usual speed. **[5]**

<div align="center">OR</div>

(B) ₹9000 were divided equally among a certain number of persons. Had there been 20 more persons, each would have got ₹160 less. Find the original number of persons.

34. (A) From the top of a 7 m high building the angle of elevation of the top of a cable tower is $60^0$ and angle of depression of its foot is $45^0$. Find the height of cable tower. **[5]**

<div align="center">OR</div>

(B) Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road the angles of elevation of the top of the poles are $60^0$ and $30^0$ respectively. Find the height of each pole and distances of the point from the poles.

35. A rocket is in the form of a right circular cylinder closed at the lower end and surmounted by a **[5]** cone with the same radius as that of the cylinder. The diameter and height of the cylinder are 6 cm and 12 cm, respectively. If the slant height of the conical portion is 5 cm, find the total surface area and volume of the rocket [Use $\pi = 3.14$]

## SECTION-E
### (Case-study Based Questions)

36. Rahul and Ravi planned to play Business(board game) in which they were supposed to use two **[4]** dice.
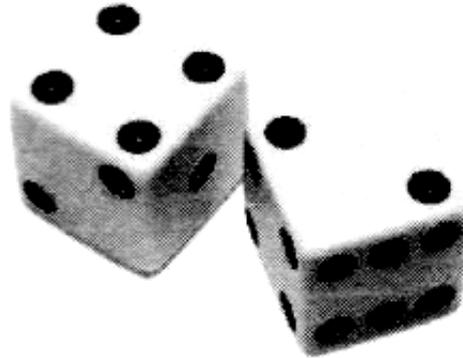


(i) Ravi got the first chance to roll the dice. What is the Probability that he got a doublet of odd numbers appearing on the top face of the two dice ?

(ii) Rahul got the next chance. What is the probability that the sum of the numbers appearing on the top faces of the two dice is 13?

(iii) (A) Now it was Ravi's turn. He rolled the dice. What is the probability that the sum of the numbers appearing on the top faces of the dice is less than or equal to 10?

**OR**

(B) in Rahul's second chance, what is the probability that the product of the numbers appearing on the top faces of the dice is a prime number?

37. Riya decided to sew a decorative cover for her round dining table. The round table cover has a **[4]** radius of 21 cm. She made six equal designs as shown in the figure.
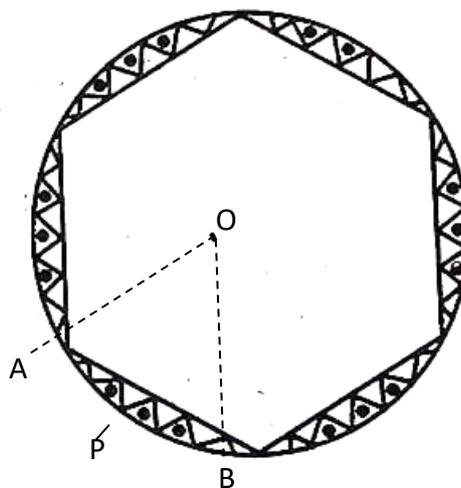


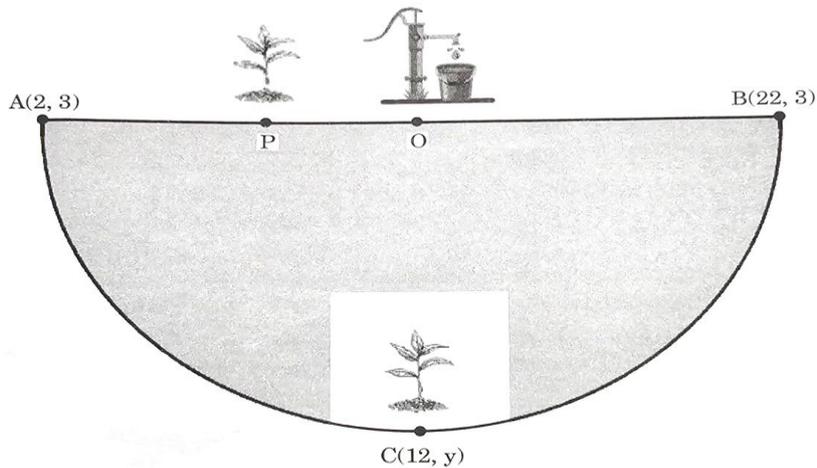Based on the above information, answer the following questions:

(i) Find the measure of the angle formed at the centre by each design.

(ii) Find the area of the sector OAPB (Use $\pi = \frac{22}{7}$)

(iii) (A)Find the perimeter of the minor segment formed by chord AB.

**OR**

    (B) Find the area of the minor segment formed by chord AB.

38. There is a semicircular park in Anand's Society. He wishes to plant saplings along the boundary **[4]** of the park. There is a borewell at the centre 'O' of the park along the diameter AB as shown in the figure below.



A(2, 3)      P      O      B(22, 3)

C(12, y)

  Based on the above information, answer the following questions:
(i) Find the coordinates of point O.
(ii) Find the radius of the semicircular park.
(iii) (A) One sapling is kept at point C (12, y). Find the coordinates of C.

**OR**

    (B) One sapling is kept at point P along AB so that $PA=\frac{1}{3}PB$.

       Find the coordinates of P.

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