

CLASS X PRE-BOARD EXAMINATION – 2024-25

Q.P. Code: 241/2/1

Roll  
No.

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Candidate must write the Q.P. Code  
on the title page of the answer-book.

- Please check that this question paper contains **8** printed pages.
- Please check that this question paper contains **38** questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

**MATHEMATICS (BASIC)***Time allowed : 3 hours**Maximum Marks : 80***General Instructions:**

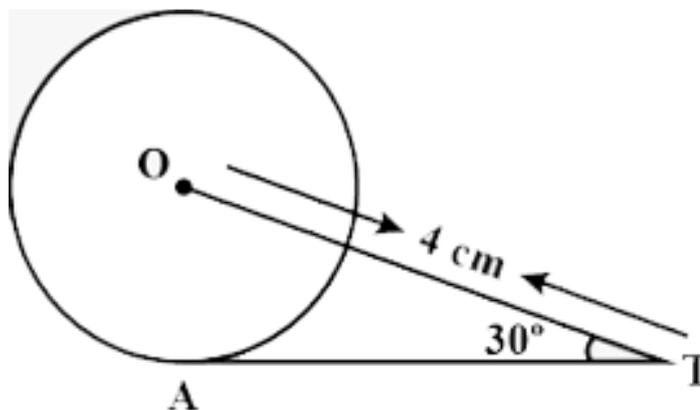
Read the following instructions very carefully and strictly follow them:

1. This question paper contains **38** questions. **All** questions are **compulsory**.
2. This Question Paper is divided into **5** Sections **A, B, C, D** and **E**.
3. In **Section A**, Questions no. **1 to 18** are multiple choice questions (MCQs) and questions no. **19 and 20** are Assertion- Reason based questions of **1** mark each.
4. In **Section B**, Questions no. **21 to 25** are very short answer (VSA) type questions, carrying **2** marks each.
5. In **Section C**, Questions no. **26 to 31** are short answer (SA) type questions, carrying **3** marks each.
6. In **Section D**, Questions no. **32 to 35** are long answer (LA) type questions, carrying **5** marks each.
7. In **Section E**, Questions no. **36 to 38** are case-study based questions carrying **4** marks each. Internal choice is provided in **2** marks question in each case-study.
8. There is no overall choice. However, an internal choice is provided in **2** Question of Section **B**, **2** Questions of Section **C** and **2** Questions of Section **D** and **3** questions of **2** marks in Section **E** has been provided. An internal choice has been provided in all the **2** marks questions of Section **E**.
9. Draw neat and clean figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.
10. Use of calculators is **NOT allowed**.

## SECTION A

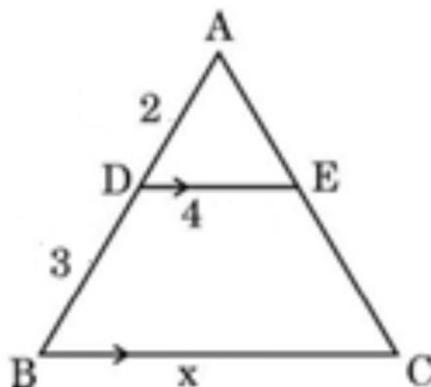
Section A consists of 20 questions of 1 mark each.

1. If  $a = 2^2 \times 3^3 \times 5^4$  and  $b = 2^3 \times 3^2 \times 5$ , then HCF (a,b) is 1  
A) 90                      B) 180                      C) 360                      D) 540
2. Three numbers are in AP, having sum 24. Its middle term is 1  
A) 6                      B) 3                      C) 8                      D) 2
3. In figure AT is tangent to the circle, with centre O.  $OT = 4\text{cm}$ ,  $\angle OTA = 30^\circ$ , the length of AT is 1



- A) 4cm                      B) 2cm                      C)  $4\sqrt{3}\text{cm}$                       D)  $2\sqrt{3}\text{cm}$
4. If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $2x^2 + 7x - 3$ , then the value of  $\alpha^2 + \beta^2$  1  
A)  $\frac{49}{4}$                       B)  $\frac{37}{4}$                       C)  $\frac{61}{4}$                       D)  $\frac{61}{2}$
5. If a pole 6m high casts a shadow  $2\sqrt{3}\text{m}$  long on the ground, then the sun's elevation is 1  
A)  $60^\circ$                       B)  $45^\circ$                       C)  $30^\circ$                       D)  $90^\circ$
6. One ticket is drawn at random from a bag containing tickets numbered 1 to 40. The probability that the selected ticket has a number which is a multiple of 5 is 1  
A)  $\frac{3}{5}$                       B)  $\frac{4}{5}$                       C)  $\frac{1}{5}$                       D)  $\frac{1}{3}$
7. The product of the HCF and LCM of the smallest prime number and smallest composite number 1  
A) 2                      B) 6                      C) 8                      D) 4
8. The distance between the points (a,b) and (-a,b) is 1  
A)  $2\sqrt{a^2 + b^2}$                       B)  $\sqrt{2a}$                       C) 2b                      D) 2a

9. In fig: if  $DE \parallel BC$ , then the value of  $x$  is 1



- A) 6                      B) 10                      C) 12.5                      D) 8
10. The zeroes of the polynomial  $3x^2 + 11x - 4$  are 1  
 A)  $\frac{1}{3}, -4$                       B)  $-\frac{1}{3}, 4$                       C)  $\frac{1}{3}, 4$                       D)  $-\frac{1}{3}, -4$
11. For which values of  $p$ , will the lines represented by the following pair of Linear equations  $3x - y - 5 = 0$ ,  $6x - 2y - p = 0$  will be parallel? 1  
 A) 10                      B)  $\frac{5}{2}$                       C)  $\frac{1}{2}$                       D) all real numbers except 10
12. The quadratic equation  $2x^2 - \sqrt{5}x + 1 = 0$  has 1  
 A) Two distinct real roots                      B) two equal real roots  
 c) No real roots                      D) More than two real roots
13. The value of  $\frac{2 \tan 30^\circ}{1 + \tan^2 30^\circ}$  is equal to 1  
 A)  $\sin 60^\circ$                       B)  $\cos 60^\circ$                       C)  $\tan 60^\circ$                       D)  $\sin 30^\circ$
14. Daily wages of a factory workers are recorded as 1
- |                 |         |         |         |         |         |
|-----------------|---------|---------|---------|---------|---------|
| Daily wages (₹) | 131-136 | 137-142 | 143-148 | 149-154 | 155-160 |
| No. of workers  | 5       | 27      | 20      | 18      | 12      |
- The lower limit of the modal class is  
 A) 137                      B) 143                      C) 142.5                      D) 136.5
15. The line segment joining the points  $P(-3, 2)$  and  $Q(5, 7)$  is divided by the  $y$  axis in the ratio. 1  
 A) 3:5                      B) 3:1                      C) 3:4                      D) 3:2
16. How many tangents can a circle have ? 1  
 A) 1                      B) 2                      C) Infinitely many                      D) None of these

17. If  $\tan\theta = \frac{a}{b}$ , then the value of  $\frac{a\sin\theta - b\cos\theta}{a\sin\theta + b\cos\theta}$  is 1

- A)  $\frac{a^2 - b^2}{a^2 + b^2}$       B)  $\frac{a^2 + b^2}{a^2 - b^2}$       C)  $\frac{a}{a^2 + b^2}$       D)  $\frac{b}{a^2 + b^2}$

18. The value (s) of K for which the quadratic equation  $2x^2 + kx + 3 = 0$  has equal roots. 1

- A)  $\pm 6\sqrt{2}$       B)  $\pm 2\sqrt{6}$       C)  $\pm 4\sqrt{3}$       D)  $\pm 3\sqrt{5}$

**DIRECTION:** In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

**Choose the correct option**

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 and 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.

19. Assertion(A): If the product of two numbers is 5780 and their HCF is 17, then their LCM is 340. 1

Reason (R): HCF is always a factor of LCM

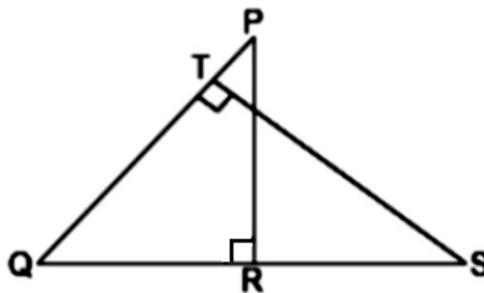
20. Assertion (A): The sum of first n even natural numbers is  $n(n+1)$  1

Reason (R) : The sum of first n odd natural numbers is  $n(n-1)$

### SECTION B

**Section B consist of 5 questions of 2 marks each**

21.(A) In the adjoining figure, PQR and QST are two right triangles, right angled at R and T respectively, prove that  $QR \times QS = QP \times QT$  2



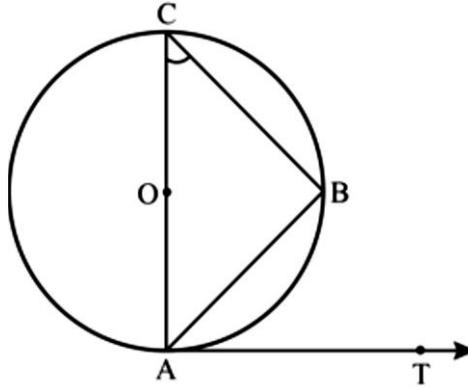
(OR)

The diagonals of a quadrilateral ABCD intersect each other at the point

O such that  $\frac{AO}{BO} = \frac{CO}{DO}$

21.(B) Using Basic proportionality theorem and its converse, prove that ABCD is a trapezium.

22. A toy is in the form of a cone of radius 3.5cm mounted on a hemisphere of base diameter 7cm. If the total height of the toy is 14.5 cm. Find the volume of the toy? 2
23. If  $\tan (A+B)=\sqrt{3}$ ,  $\tan (A-B)=\frac{1}{\sqrt{3}}$ ,  $0^{\circ}<A+B<90^{\circ}$ ,  $A>B$ , find A and B? 2
24. In figure, AB is a chord of a circle and AOC is its diameter such that  $\angle ACB=50^{\circ}$ . If AT is the tangent to the circle at the point A, find  $\angle BAT$  2



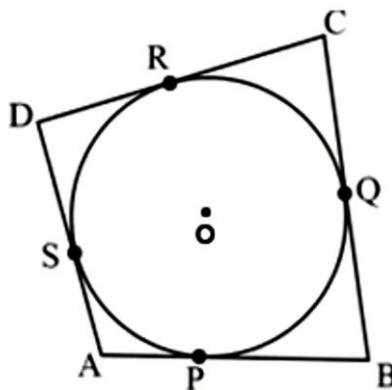
- 25.(A) The sum of n terms of an AP is  $3n^2+5n$ . Find the AP 2
- (OR)**
- 25.(B) For what value of n, are the  $n^{\text{th}}$  terms of two APs 63, 65, 67, ..... and 3, 10, 17,..... equal ?

### SECTION C

**Section C consists of 6 questions of 3 marks each.**

26. In an examination, the number of students in Hindi, English and Mathematics are 60,84 and 108 respectively. Find the minimum number of rooms required, if in each room, the same number of students are to be seated and all of them being of the same subject. 3
- 27.(A) Solve the following system of equations graphically. 3
- $$x+3y=6$$
- $$2x-3y=12$$
- (OR)**
- 27.(B) A fraction becomes  $\frac{1}{3}$ , when 2 is subtracted from the numerator and it becomes  $\frac{1}{2}$ , when 1 is subtracted from the denominator. Find the fraction
28. If one zero of the quadratic polynomial  $2x^2-3x+p$  is 3, find its other zero. Also find the value of p? 3
29. Prove that  $(\sin A + \operatorname{Cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$  3

- 30.(A) In the adjoining figure, a quadrilateral ABCD circumscribes a circle. Prove that  $AB+CD=AD+BC$  3



(OR)

- 30.(B) Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

31. A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 108cm and the diameter of the hemispherical ends is 36cm. Find the cost of polishing its surface at the rate of 7 paise per square cm. 3

#### SECTION D

**Section D consists of 4 questions of 5 marks each.**

32. A chord of a circle of radius 10cm subtends a right angle at the centre. Find the area of the corresponding. 5
- Minor segment
  - Major sector (use  $\pi = 3.14$ )

- 33.(A) A peacock is sitting on the top of a pillar, which is 9m high. From a point 27m away from the bottom of a pillar, a snake is coming to its hole at the base of a pillar. Seeing the snake, the peacock pounces on it. If their speeds are equal. At what distance from the hole is the snake caught? 5

(OR)

- 33.(B) A train travels at a certain average speed for a distance of 54km and then travels a distance of 63 km at an average speed of 6km/hr more than the first speed . If it takes 3 hours to complete the journey, what is its first speed?

- 34.(A) The median of the following data is 525. Find the values of x and y, if the total frequency is 100. 5

Class Interval	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Frequency	2	5	x	12	17	20	y	9	7	4

(OR)

- 34.(B) The marks obtained by 100 students in a Mathematics test consisting of 100 marks are given in the following table.

Marks obtained	0-14	14-28	28-42	42-56	56-70
No.of students	8	20	28	18	26

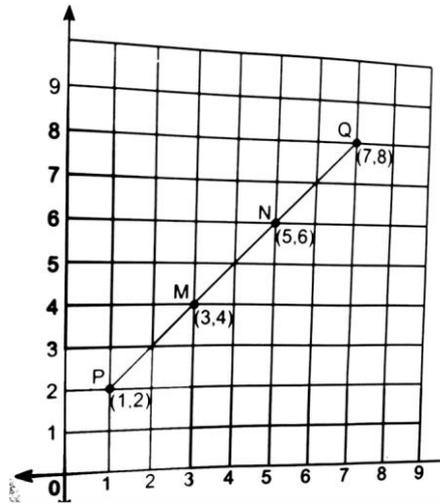
Find the mean marks obtained by the students.

35. State and prove Basic Proportionality Theorem. 5

### SECTION E

**Section E consists of 3 questions of 4 marks each.**

36. SOM, a firm organized an Athletic meet. They made a rectangular grid on their ground.



Points P (1,2) and Q (7,8) were marked for disc throw competition. Disc were made to throw from point P towards point Q.

- (i) Find PM 1
- (ii) Find PN 1
- (iii) Find the ratio in which M divides PQ 2

**(OR)**

- (iii) Find PM : QN

37. Group of friends playing with cards bearing numbers 5 to 50. All cards placed in a box and are mixed thoroughly. One friend withdrawn the card from the box at random and then replace it.

**Answer the following questions based on above.**

- (i) What is the probability that the card withdrawn from the box bears a prime number less than 10? 1
- (ii) What is the probability that the card drawn from the box bears a number which is a perfect square? 1

- (iii) What is the probability that the card drawn from the box bears a number which is a multiple of 7 between 5 and 50?

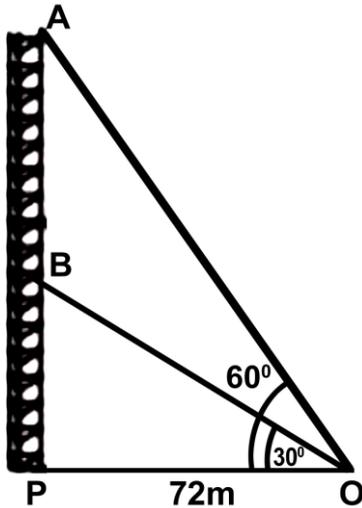
2

(OR)

- (iii) Find the probability of drawing a card bearing numbers from 5 and 50.

38.

Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure. On a similar concept, a radio station tower was built in two Sections A and B. Tower is supported by wires from a point O. Distance between the base of the tower and point O is 72 m. From point O, the angle of elevation of the top of the Section B is  $30^\circ$  and the angle of elevation of the top of Section A is  $60^\circ$ .



Based on the given information, solve the following questions:

- (i) Find the length of the wire from the point O to the top of Section B. 1  
(ii) Find the height of the Section A from the base of the tower. 1  
(iii) Find the distance AB. 2

OR

- (iii) Find the area of  $\triangle OPB$