

# Kendriya Vidyalaya Sangathan, Chandigarh Region

## Pre-Board-II Examination (2025-26)

**Class- X**

**SUBJECT: MATHEMATICS STANDARD (041)**

**MAX.MARKS: 80**

**DURATION:3 Hours**

General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 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. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of section B, 2 Questions of section C and 2 Questions of section D 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.

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### SECTION – A

**Section A consists of 20 questions of 1 mark each.**

- 1) If two positive integers p and q can be expressed as  $p = ab^2$  and  $q = a^3b$ ; a, b being prime numbers, then LCM (p, q) is  
(A) ab                      (B)  $a^2b^2$                       (C)  $a^3b^2$                       (D)  $a^3b^3$
- 2) If  $\alpha$  and  $\beta$  are the zeroes of polynomial  $2x^2 - 9x + 5$ , then value of  $\alpha^2 + \beta^2$  is  
(A)  $\frac{1}{4}$                       (B)  $\frac{61}{4}$                       (C) 1                      (D)  $\frac{71}{4}$
- 3) If  $x=a$ ,  $y=b$  is the solution of the pair of equation  $x - y = 2$  and  $x + y = 8$  then what will be the values of a and b.  
(A) 2,1                      (B) 5,3                      (C) 4,6                      (D) 1,2
- 4) If one root of the equation  $x^2 + px + 12 = 0$  is 4, while the equation  $x^2 + px + q = 0$  has equal roots, the value of q is  
(A)  $\frac{49}{4}$                       (B)  $\frac{4}{49}$                       (C) 4                      (D) 49
- 5) The value of  $\cos 1^\circ \cdot \cos 2^\circ \cdot \cos 3^\circ \cdot \cos 4^\circ \dots \cos 90^\circ$  is  
(A) 1                      (B) -1                      (C) 0                      (D) 2
- 6) The circumferences of two circles are in the ratio 3 : 4. The ratio of their areas is:

A) 3 : 4

B) 4 : 3

C) 9 : 16

D) 16 : 9

7) What is the greatest possible speed at which a man can walk 52 km and 91 km in an exact number of hours?

(A) 17 km/hours

(B) 7 km/hours

(C) 13 km/hours

(D) 26 km/hours

8) The upper limit of the modal class of the given distribution is:

| HEIGHT (in cm) | Below 140 | Below 145 | Below 150 | Below 155 | Below 160 | Below 165 |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|
| No. of girls   | 4         | 11        | 29        | 40        | 46        | 51        |

(A) 165

(B) 160

(C) 155

(D) 150

9) The distance of point (-1,7) from Y-axis is

(A) 6unit

(B) 7unit

(C) 1 unit

(D)  $\sqrt{50}$ unit

10) In a bag containing 30 balls, 4 are blue, 11 are green and the rest are white. One ball is drawn at random.

The probability that drawn ball is white in colour is

(A) 0.25

(B) 0.75

(C) 0.5

(D) 1

11) If  $2\sin 5x = \sqrt{3}$ ,  $0^\circ \leq x \leq 90^\circ$ , then  $x$  is equal to

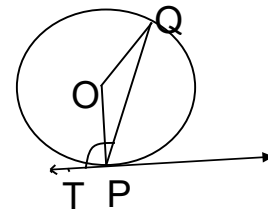
(A)  $10^\circ$ (B)  $12^\circ$ (C)  $20^\circ$ (D)  $50^\circ$ 

12) If in triangles ABC and DEF,  $\frac{AB}{DE} = \frac{BC}{FD}$ , then they will be similar, if

(A)  $\angle B = \angle E$ (B)  $\angle A = \angle D$ (C)  $\angle B = \angle D$ (D)  $\angle A = \angle F$ 

13) In the given figure, a tangent has been drawn at a point P on the circle centred at O.

If  $\angle TPQ = 110^\circ$  then  $\angle POQ$  is equal to

A)  $110^\circ$ B)  $70^\circ$ C)  $140^\circ$ D)  $55^\circ$ 

14) The area of sector is one twelfth that of the complete circle. The angle of the sector is

A)  $20^\circ$ B)  $30^\circ$ C)  $40^\circ$ D)  $50^\circ$ 

15) The length of the minute hand of a clock is 14 cm. The area swept by the minute hand in 5 minutes is

A)  $153.9 \text{ cm}^2$ B)  $102.6 \text{ cm}^2$ C)  $51.3 \text{ cm}^2$ D)  $205.2 \text{ cm}^2$ 

16) If  $\tan \theta = \frac{5}{2}$  then  $\frac{(4 \sin \theta + \cos \theta)}{(4 \sin \theta - \cos \theta)}$  is equal to

A)  $\frac{11}{9}$ B)  $\frac{3}{2}$ C)  $\frac{9}{11}$ 

D) 4

17) If mean is 130 and median is 140 then mode is

A) 130

B) 145

C) 160

D) 190

18) If  $\triangle ABC \sim \triangle PQR$  such that  $3AB = 2PQ$  and  $BC = 10$  cm, then length  $QR$  is equal to

- A) 10 cm                      B) 15 cm                      C)  $\frac{20}{3}$  cm                      D) 30 cm

19) **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.

20) **Assertion(A):**  $(2 + \sqrt{3})\sqrt{3}$  is an irrational number.

**Reason(R):** Product of two irrational numbers is always irrational.

21) **Assertion(A):** The distance of a point  $A(3, 7)$  from X-axis is 3 unit.

**Reason (R):** The distance of any point from X-axis is ordinate of that point.

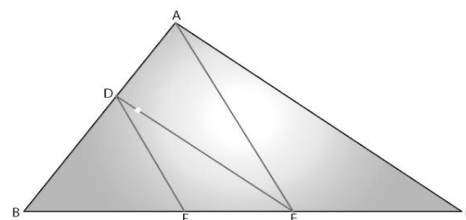
### SECTION – B

**Section B consists of 5 questions of 2 marks each.**

22) Find the value of  $p$  if the pair of equations  $2x + 3y - 5 = 0$  and  $px - 6y - 8 = 0$  has a unique solution.

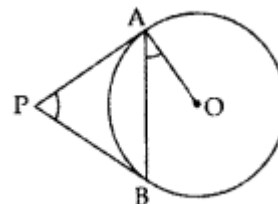
23) Evaluate :  $2\sin 30^\circ \tan 60^\circ - 3\cos^2 60^\circ \sec^2 30^\circ$

23) In the figure,  $DE \parallel AC$  and  $DF \parallel AE$ . Prove that  $\frac{BF}{FE} = \frac{BE}{EC}$



**OR**

E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that  $\triangle ABE \sim \triangle CFB$ .



24) In the given figure, PA and PB are tangents to the

circle with centre O. If  $\angle APB = 60^\circ$ , then calculate  $\angle OAB$ .

25) A chord of a circle of radius 14 cm subtends an angle of  $60^\circ$  at the centre. Find the area of the corresponding minor sector of the circle.

**OR**

AB is a chord of a circle, with centre O and radius 10 cm, that subtends a right angle at the centre of the circle. Find the area of the minor segment [Use  $\pi = 3.14$ ]

### SECTION – C

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

26) Prove that  $3 + 2\sqrt{5}$  is an irrational number.

27) Find the zeroes of the quadratic polynomials  $p(x) = 6x^2 - 3 - 7x$  and verify the relationship between the zeroes and the coefficients.

28) If  $\sin \theta + \cos \theta = \sqrt{3}$ , then prove that  $\tan \theta + \cot \theta = 1$

**OR**

If  $\cos \theta + \sin \theta = 1$ , then prove that  $\cos \theta - \sin \theta = \pm 1$

29) Prove that the parallelogram circumscribing a circle is a rhombus

30) The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages.

**OR**

A part of monthly hostel charges in a college hostel are fixed and the remaining depends on the number of days one has taken food in the mess. When a student  $A$  takes food for 25 days, he has to pay ₹ 4,500, whereas a student  $B$  who takes food for 30 days, has to pay ₹ 5,200. Find the fixed charges per month and the cost of food per day.

31) A fair coin is tossed thrice. Find the probability of getting:

(i) at least two heads

(ii) No head

(iii) at most one head

### **SECTION – D**

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

32) The numerator of a fraction is 3 less than its denominator. If 2 is added to both of its numerator and denominator then the sum of the new fraction and original fraction is  $\frac{29}{20}$ . Find the original fraction

**OR**

A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, what is its original average speed?

33) A tent is in the shape of a right circular cylinder up to a height of 3 m and then a right circular cone, with a maximum height of 13.5 m above the ground. Calculate the cost of painting the inner side of the tent at the rate of ₹ 4 per square metre, if the radius of the base is 14 m.

**OR**

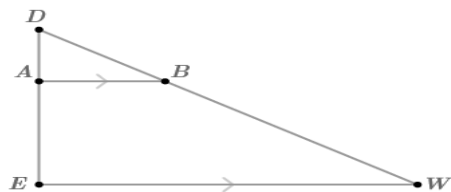
A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere of same radius. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of the wooden toy.

34. Find the values of  $x$  and  $y$  if the median for the following data is 31.

| Class        | Frequency |
|--------------|-----------|
| 0-10         | 5         |
| 10-20        | $x$       |
| 20-30        | 6         |
| 30-40        | $y$       |
| 40-50        | 6         |
| 50-60        | 5         |
| <b>Total</b> | <b>40</b> |

35) (a) State and Prove Basic Proportionality theorem.

(b) In the given figure  $AB \parallel EW$ . If  $AD = 4\text{cm}$ ,  $DE = 12\text{cm}$ , and  $DW = 24\text{cm}$ . Find the length of  $DB$ .



### SECTION – E

#### (Case-study Based Questions)

(This section comprises of 3 case-study based questions of 4 marks each with three sub-parts)

36) A group of class X students goes to picnic during winter holidays. Aman, Kirti and Chahat are three friends. The position of three friends Aman, Kirti and Chahat are represented by the points P, Q and R. The co-ordinates of P (2,5), Q (4,4) and R (8,3) are given.

- Find the distance between P and R.
- Is Q the midpoint of PR? Justify by finding midpoint of PR.
- Find the point on x-axis which is equidistant from P and Q.

**OR**

(iii) Let S be a point which divides the line joining PQ in ratio 2:3. Find the coordinates of S.

37) Mohan is an auto driver. His autorickshaw was too old and he had to spend a lot of money on repair and maintenance every now and then. One day he got to know about the EV scheme of the Government of India where he can not only get a good exchange bonus but also avail heavy discounts on the purchase of an electric vehicle. So, he took a loan of 1,15,000 from a reputed bank and purchased a new autorickshaw.



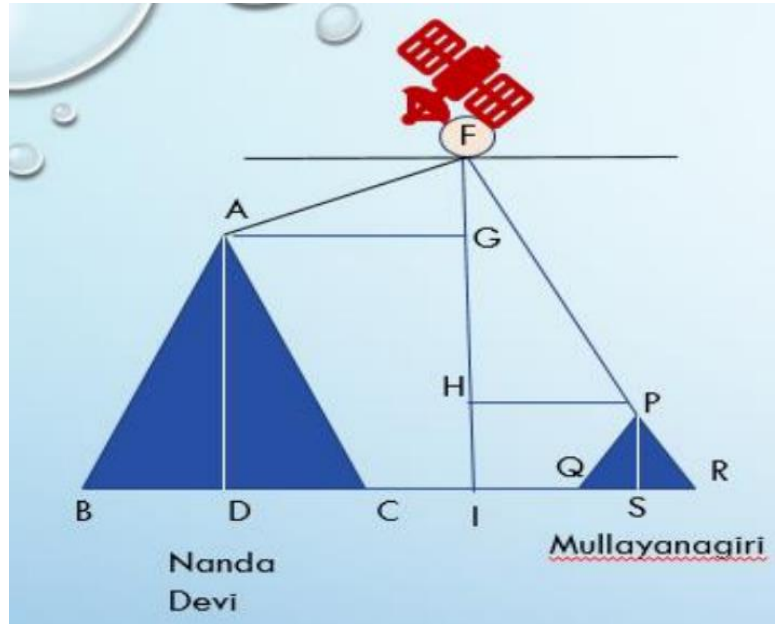
Mohan repays his total loan of Rs. 1,23,000 (including interest) by paying every month starting with the first instalment of 1000 rupees.

- If he increases the instalment by 100 rupees every month, then what amount will be paid by him in the 30th instalment?
- If he increases the instalment by 200 rupees every month, then find the total amount paid by him after 20 instalments?
- If he increases the instalment by 150 rupees every month, then what amount of loan does he still have to pay after 25th instalment?

**OR**

(iii) If he increases the instalment by 100 rupees every month, then In how many months will he pay his total loan?

38) A Satellite flying at height  $h$  is watching the top of the two tallest mountains in Uttarakhand and Karnataka ,them being Nanda Devi(height 7,816m) and Mullayanagiri (height 1,930 m). The angles of depression from the satellite , to the top of Nanda Devi and Mullayanagiri are  $30^\circ$  and  $60^\circ$  respectively. If the distance between the peaks of two mountains is 1937 km, and the satellite is vertically above the midpoint of the distance between the two mountains.



- (i) Find the distance of the satellite from the top of Nanda Devi ?
- (ii) Find the distance of the satellite from the top of Mullayanagiri ?
- (iii) What is the angle of elevation if a man is standing at a distance of 7816 m from Nanda Devi ?

**OR**

- (iii) If a mile stone very far away from, makes  $45^\circ$  to the top of Mullanyangiri mountain. So, find the distance of this mile stone from the mountain.

\*\*\*\*\*END OF THE PAPER \*\*\*\*\*