**Series MC-X-STD**

**Roll No.** | | | | | | | |

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

**Q.P. Code**
**MC/X/S/05**

# MATHEMATICS (STANDARD)

**Class X • Sample Paper 05 • Session 2026–27**

*(As per the CBSE Sample Question Paper 2026–27 design)*

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

**NOTE**

(i) Please check that this question paper contains 5 printed pages.
(ii) 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.
(iii) Please check that this question paper contains 38 questions.
(iv) Please write down the serial number of the question in the answer-book before attempting it.
(v) 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.

## General Instructions :

*Read the following instructions carefully and follow them :*

(i) This question paper contains **38** questions. All questions are compulsory.
(ii) This question paper is divided into **five** Sections – **A, B, C, D** and **E**.
(iii) 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.
(iv) In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.
(v) In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.
(vi) In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions, carrying **5** marks each.
(vii) In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.
(viii) There is no overall choice. However, an internal choice has been provided in **2** questions in **Section B**, **2** questions in **Section C**, **2** questions in **Section D**, and in all the sub-parts of **2** marks in **Section E**.
(ix) Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.
(x) Use of calculators is **NOT** allowed.

## SECTION A

**This section comprises 20 Multiple Choice Questions (MCQs) carrying 1 mark each.**

**1.** If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and $\text{LCM}(a, b, c) = 2^3 \times 3^2 \times 5$, then the value of $n$ is:

(A) 1 (B) 2 (C) 3 (D) 4

**2.** The graph of a quadratic polynomial $p(x)$ passes through the points $(-6, 0)$, $(0, -30)$, $(4, -20)$ and $(6, 0)$. The zeroes of $p(x)$ are:

(A) $-6, 0$ (B) $4, 6$ (C) $-30, -20$ (D) $-6, 6$

**3.** The value of $k$ for which the equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ represent coincident lines is:

(A) $-2$ (B) $2$ (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$

**4.** Which of the following equations has no real roots?

(A) $x^2-4x+3\sqrt{2}=0$ (B) $x^2+4x-3\sqrt{2}=0$ (C) $x^2-4x-3\sqrt{2}=0$ (D) $3x^2+4\sqrt{3}x+4=0$

**5.** If $a$, $b$, $c$ form an A.P. with common difference $d$, then the value of $a-2b-c$ is:

(A) $2a+4d$ (B) $0$ (C) $-2a-4d$ (D) $-2a-3d$

**6.** If $\triangle ABC \sim \triangle EDF$ and $\triangle ABC$ is not similar to $\triangle DEF$, then which of the following is **not** true?

(A) $BC \cdot EF = AC \cdot FD$ (B) $AB \cdot EF = AC \cdot DE$ (C) $BC \cdot DE = AB \cdot EF$ (D) $BC \cdot DE = AB \cdot FD$

**7.** The end-points of a diameter of a circle are $(2, 4)$ and $(-3, -1)$. The radius of the circle is:

(A) $\frac{5\sqrt{2}}{2}$ (B) $5\sqrt{2}$ (C) $5$ (D) $\sqrt{5}$

**8.** If $\sqrt{3}\tan 2\theta = 3$, where $0^\circ < 2\theta < 90^\circ$, then the value of $\sin\theta + \sqrt{3}\cos\theta$ is:

(A) $2$ (B) $\sqrt{3}$ (C) $\frac{1}{2}$ (D) $1$

**9.** A number is selected at random from the numbers 1 to 100. The probability that it is a perfect cube is:

(A) $\frac{1}{25}$ (B) $\frac{1}{20}$ (C) $\frac{3}{100}$ (D) $\frac{1}{10}$

**10.** A pendulum swings through an angle of $30^\circ$ and describes an arc 8.8 cm long. The length of the pendulum is:

(A) 16.8 cm (B) 8.4 cm (C) 33.6 cm (D) 21 cm

**11.** Two solid hemispheres of the same base radius $r$ are joined together along their bases. The curved surface area of the new solid is:

(A) $4\pi r^2$ (B) $6\pi r^2$ (C) $3\pi r^2$ (D) $8\pi r^2$

**12.** The mean weight of 45 students is 42 kg. If each student gains 1.5 kg after one year, their new mean weight is:

(A) 45 kg (B) 43 kg (C) 40 kg (D) 43.5 kg

**13.** A card is drawn at random from a well-shuffled deck of 52 cards. The probability that it is neither a king nor a red card is:

(A) $\frac{6}{13}$ (B) $\frac{7}{13}$ (C) $\frac{1}{2}$ (D) $\frac{9}{26}$

**14.** If the distance between the points $(4, p)$ and $(1, 0)$ is 5 units, then $p$ is:

(A) 4 only (B) $\pm 4$ (C) $-4$ only (D) $0$

**15.** If the circumference and the area of a circle are numerically equal, then its radius is:

(A) 2 units (B) $\pi$ units (C) 4 units (D) 7 units

**16.** The mean of 15 numbers is 25. If each number is multiplied by 4, the new mean is:

(A) 125 (B) 30 (C) 100 (D) 25

**17.** From a point on the ground, the angle of elevation of the top of a 10 m high building is $30^\circ$. A flagstaff is fixed on the top of the building and the angle of elevation of its top from the same point is $45^\circ$. The length of the flagstaff is:

(A) $10(\sqrt{3}-1)$ m (B) $10\sqrt{3}$ m (C) $10(\sqrt{3}+1)$ m (D) 20 m

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**18.** Two dice are thrown together. The probability that the product of the numbers on them is 6 is:

(A) $\frac{1}{9}$ (B) $\frac{1}{6}$ (C) $\frac{5}{36}$ (D) $\frac{1}{12}$

*Questions number **19** and **20** are Assertion and Reason based questions. Two statements are given, one is labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.*

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of the 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) :* The point $(-1, 6)$ divides the line segment joining $(-3, 10)$ and $(6, -8)$ in the ratio $2:7$.

*Reason (R) :* The section formula gives the coordinates of the point dividing a segment internally in a given ratio.

**20.** *Assertion (A) :* If $\alpha$ and $\beta$ are the zeroes of $x^2 - 5x + 6$, then $\alpha^2 + \beta^2 = 13$.

*Reason (R) :* $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$.

## SECTION B

**This section comprises 5 Very Short Answer (VSA) type questions carrying 2 marks each.**

**21.** (a) Find the least number which is exactly divisible by each of the numbers 1 to 10.

**OR**

(b) Two tankers contain 850 litres and 680 litres of petrol. Find the maximum capacity of a container which can measure the petrol of each tanker an exact number of times.

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

**OR**

(b) A vertical pole 6 m long casts a shadow 4 m long on the ground. At the same time a tower casts a shadow 28 m long. Find the height of the tower.

**23.** If $\sin\theta - \cos\theta = 0$, $0^\circ < \theta < 90^\circ$, find the value of $\sin^4\theta + \cos^4\theta$.

**24.** Four cows are tethered, each by a rope 14 m long, at the four corners of a quadrilateral field $ABCD$. Find the total area of the field that the cows can graze.

**25.** A bag contains 24 balls, of which 4 are blue, 11 are green and the rest are white. One ball is drawn at random. Find the probability that it is (i) white, (ii) not green.

## SECTION C

**This section comprises 6 Short Answer (SA) type questions carrying 3 marks each.**

**26.** Given that $\sqrt{6}$ is irrational, prove that $\sqrt{2} + \sqrt{3}$ is an irrational number.

**27.** Find the value of $k$ such that the polynomial $x^2 - (k+6)x + 2(2k-1)$ has the sum of its zeroes equal to half of their product. Also find the zeroes.

**28.** (a) Find the sum of all three-digit natural numbers which are divisible by 7.

**OR**

(b) In an A.P., $S_5 + S_7 = 167$ and $S_{10} = 235$. Find the A.P.

**29.** A circle is inscribed in a quadrilateral $ABCD$ in which $\angle D = 90^\circ$, $BC = 38$ cm and $CD = 25$ cm. The circle touches $AB$, $BC$, $CD$ and $DA$ at $P$, $Q$, $R$ and $S$ respectively. If $BP = 27$ cm, find the radius of the circle.

**30.** Find the coordinates of the points which divide the line segment joining $A(-2, 2)$ and $B(2, 8)$ into four equal parts.

**31.** (a) Prove that: $\dfrac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$

**OR**

(b) If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, prove that $m^2 - n^2 = 4\sqrt{mn}$.

## SECTION D

**This section comprises 4 Long Answer (LA) type questions carrying 5 marks each.**

**32.** In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed was reduced by 100 km/h and the time of flight increased by 30 minutes. Find the original duration of the flight.

**33.** State and prove the Basic Proportionality Theorem. Using it, solve: In $\triangle ABC$, $DE \parallel BC$ with $D$ on $AB$ and $E$ on $AC$. If $AD = (4x - 3)$, $AE = (8x - 7)$, $BD = (3x - 1)$ and $CE = (5x - 3)$ units, find $x$.

**34.** (a) A vessel is in the form of an inverted cone of height 16 cm and radius of top 5 cm. It is filled with water to the brim. When 75 identical spherical lead shots are dropped into it, three-fourths of the water flows out. Find the radius of a lead shot.

**OR**

(b) A toy is in the form of a cone mounted on a hemisphere of the same radius 7 cm. If the total height of the toy is 31 cm, find its total surface area and volume.

**35.** (a) The angles of depression of the top and the bottom of a 50 m high building, as observed from the top of a tower, are $30^\circ$ and $60^\circ$. Find the height of the tower and the horizontal distance between them. (Use $\sqrt{3} = 1.732$)

**OR**

(b) The angle of elevation of an aeroplane from a point on the ground is $60^\circ$. After a flight of 30 seconds, the angle changes to $30^\circ$. If the plane is flying at a constant height of $3600\sqrt{3}$ m, find its speed in km/h.

## SECTION E

**This section comprises 3 case study based questions carrying 4 marks each.**

**36.** Rishi repays a car loan of ₹ 11,80,000 in monthly instalments. The first instalment is ₹ 10,000 and each instalment is ₹ 1,000 more than the previous one. Based on the above information, answer the following questions:

(i) What is the amount of the $30^{\text{th}}$ instalment? *1*

(ii) Find the difference between the $25^{\text{th}}$ and the $15^{\text{th}}$ instalments. *1*

(iii) (a) In how many instalments will the loan be repaid? *2*

**OR**

(iii) (b) Find the amount paid in the first 30 instalments and the amount still to be paid. *2*

**37.** A cabinet designer uses triangles: the largest triangle is $\triangle ABC$ and the smallest one, with a shelf, is $\triangle DEF$. The shelf $PQ$ is parallel to $EF$, with $P$ on $DE$ and $Q$ on $DF$. Based on the above information, answer the following questions:

(i) Show that $\triangle DPQ \sim \triangle DEF$. *1*

(ii) If $DP = 50$ cm and $PE = 70$ cm, find $\dfrac{PQ}{EF}$. *1*

(iii) (a) If $\triangle ABC \sim \triangle DEF$ and $2AB = 5DE$, show that $\dfrac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF}$ is constant and find it. *2*

**OR**

(iii) (b) If $AM$ and $DN$ are medians of $\triangle ABC$ and $\triangle DEF$ ($\triangle ABC \sim \triangle DEF$), prove that $\triangle ABM \sim \triangle DEN$. *2*

**38.** The monthly expenditure on milk of 200 families of a housing society is given below: Based on the above information, answer the following questions:

| Expenditure (₹) | 1000–1500 | 1500–2000 | 2000–2500 | 2500–3000 | 3000–3500 | 3500–4000 | 4000–4500 | 4500–5000 |
|---|---|---|---|---|---|---|---|---|
| Families | 24 | 40 | 33 | $x$ | 30 | 22 | 16 | 7 |

(i) Find the value of $x$. *1*

(ii) Write the modal class. *1*

(iii) (a) Find the mean monthly expenditure. *2*

**OR**

(iii) (b) Find the modal monthly expenditure. *2*

**• • • End of Question Paper • • •**

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