CBSE EXAMINATION PAPER-2025

MATHEMATICS

(Solved)

Time allowed : 3 hours | Maximum Marks : 84

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **41 questions.** All questions are **compulsory.**

ii. This question paper is divided into **5 sections.**

iii. **Section A** – questions number **1 to 20** are multiple choice questions Each question carries **1 marks.**

iv. **Section B** – questions number **21 to 25** are very short answer Each question carries **2 marks.**

v. **Section C** – questions number **26 to 33** are short answer Each question carries **3 marks.**

vi. **Section D** – questions number **34 to 35** are case based questions

vii. **Section E** – questions number **36 to 41** are long answer Each question carries **5 marks.**

viii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

ix. Use of calculator is NOT allowed.

Section A

Question 1.

If $\tan 3\theta = \sqrt{3}$, then $\theta/2$ equals:

[1 Marks]

(A) 30°

(B) 20°

(C) 60°

(D) 10°

Question 2.

If x is the LCM of 4, 6, 8 and y is the LCM of 3, 5, 7 and p is the LCM of x and y, then which of the following is true?

[1 Marks]

(A) p = 35x

(B) p = 4y

(C) p = 16y

(D) p = 8x

Question 3.

The value of 'k' for which the system of linear equations 6x + y= 3k and 36x + 6y = 3 have infinitely many solutions is:

[1 Marks]

(A) 1/2

(B) 1/3

(C) 1/6

(D) 6

Question 4.

If α and β are the zeroes of polynomial $p(x) = x^2 - ax - b$, then the value of (α +β +αβ) is equal to:

[1 Marks]

(A) a - b

(B) a + b

(C) -a -b

(D) -a + b

Question 5.

If x/12- 3/x= 0, then the values of x are:

[1 Marks]

(A) ±6

(B) ±12

(C) ±4

(D) ±3

Question 6.

The line represented by x/4 +y/6 =1 intersects x-axis and y-axis respectively at P and Q. The coordinates of the mid-point of line segment PQ are:

[1 Marks]

(A) (0, 3)

(B) (2, 0)

(C) (3, 2)

(D) (2, 3)

Question 7.

Two of the vertices of ΔPQR are P(-1, 5) and Q(5, 2). The coordinates of a point which divides PQ in the ratio 2 : 1 are:

[1 Marks]

(A) (3, -3)

(B) (5, 5)

(C) (3, 3)

(D) (5, 1)

Question 8.

If tangents PA and PB drawn from an external point P to the circle with centre O are inclined to each other at an angle of 80° as shown in the given figure, then the measure of ∠POA is:

[1 Marks]

(A) 80°

(B) 60°

(C) 40°

(D) 50°

Question 9. (cot θ + tan θ) equals:

[1 Marks]

(A) cos θ tan θ

(B) sin θ sec θ

(C) sin θ cos θ

(D) cosec θ sec θ

Question 10.

If in two Δ DEF and Δ PQR, ∠D = ∠Q and ∠R = ∠E, then which of the following is not true?

[1 Marks]

(A) DE/QR =DF/PQ

(B) EF/RP=DE/QR

(C) DE/PQ= EF/RP

(D) EF/PR = DF/PQ

Question 11.

The measurements of Δ LMN and Δ ABC are shown in the figure given below. The length of side AC is:

[1 Marks]

(A) 16 cm

(B) 8 cm

(C) 7 cm

(D) 4 cm

Question 12. If the volumes of two cubes are in the ratio 8 : 125, then the ratio of their surface areas is:

[1 Marks]

(A) 8 : 125

(B) 16 : 25

(C) 4 : 25

(D) 2 : 5

Question 13.

If the area of a sector of a circle of radius 36 cm is 54π cm^2, then the length of the corresponding arc of the sector is:

[1 Marks]

(A) 6π cm

(B) 4π cm

(C) 3π cm

(D) 8π cm

Question 14.

A die is thrown once. The probability of getting a number which is not a factor of 36 is:

[1 Marks]

(A) 1/2

(B) 1/6

(C) 2/3

(D) 5/6

Question 15. If the mean of 2, 9, x+6, 2x+3, 5, 10, 5 is 7, then the value of x is:

[1 Marks]

(A) 9

(B) 6

(C) 5

(D) 3

Question 16. AOBC is a rectangle whose three vertices are A(0, 2), O(0, 0) and B(4, 0). The square of the length of its diagonal is equal to:

[1 Marks]

(A) 20

(B) 36

(C) 16

(D) 4

Question 17.

Zeroes of the polynomial $p(x) = x^2 - 3\sqrt{2}x + 4$ are:

[1 Marks]

(A) $\sqrt{2}$,2

(B) $2\sqrt{2}$,$\sqrt{2}$

(C) 2,$\sqrt{2}$

(D) $4\sqrt{2}$,$-\sqrt{2}$

Question 18.

In the given figure in Δ ABC, AD $\perp$ BC and $\angle$BAC = 90°. If BC = 16 cm and DC = 4 cm, then the value of x is:

[1 Marks]

(A) 4 cm

(B) 8 cm

(C) 3 cm

(D) 5 cm

Question 19.

Assertion (A) : A ladder leaning against a wall, stands at a horizontal distance of 6 m from the wall. If the height of the wall up to which the ladder reaches is 8 m, then the length of the ladder is 10 m.

Reason (R): The ladder makes an angle of 60 with the ground.

[1 Marks]

(A) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true and Reason (R) is 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.

Question 20.

Assertion (A) : If two tangents are drawn to a circle from an external point, then they subtend equal angles at the centre of the circle.

Reason (R): A parallelogram circumscribing a circle is a rhombus.

[1 Marks]

(A) Assertion (A) is false, but Reason (R) is true.

(B) Assertion (A) is true, but Reason (R) is false.

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

(D) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

Section B

Question 21.

If $4k = \tan^2 60° - 2\,\text{cosec}^2 30° - 2\tan^2 30°$, then find the value of k.

[2 Marks]

Question 22.

The probability of guessing the correct answer of a certain test question is x / 12. If the probability of not guessing the correct answer is 5 / 6 then find the value of x.

[2 Marks]

Question 23. Find the smallest number which is divisible by both 644 and 462.

[2 Marks]

Question 24. Two numbers are in the ratio 4 : 5 and their HCF is 11. Find the LCM of these numbers.

[2 Marks]

Question 25.

Find the value (s) of 'K' so that the quadratic equation $4x^2 + kx + 1 = 0$ has real and equal roots.

[2 Marks]

Section C

Question 26. If the mid-point of the line segment joining the points A(3, 4) and B(k, 6) is P(x, y) and $x + y - 10 = 0$, find the value of k.

[3 Marks]

Question 27.

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

[3 Marks]

Question 28.

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

[3 Marks]

Question 29.

Prove that: $\sqrt{\sec A - 1}/\sqrt{\sec A + 1} + \sqrt{\sec A + 1}/\sqrt{\sec A - 1} = 2\operatorname{cosec} A$

[3 Marks]

Question 30.

Prove that: $(1/\cos A - \cos A)(1/\sin A - \sin A) = 1/\tan A + \cot A$

[3 Marks]

Question 31. A chord of a circle of radius 10 cm subtends a right angle at the centre of the circle. Find the area of the corresponding minor segment. [Use $\pi = 3.14$]

[3 Marks]

Question 32.

Three unbiased coins are tossed simultaneously. Find the probability of getting:

(a) exactly two tails

(b) at least one head

(c) at most two heads

[3 Marks]

Question 33.

In the given figure, PC is a tangent to the circle at C. AOB is the diameter which when extended meets the tangent at P. Find $\angle CBA$ and $\angle BCO$, if $\angle PCA = 110°$.

[3 Marks]

Section D

Question 34.

A garden designer is planning a rectangular lawn that is to be surrounded by a uniform walkway. The total area of the lawn and the walkway is 360 square metres. The width of the walkway is the same on all sides. The dimensions of the lawn itself are 12 metres by 10 metres.

Based on the information given above, answer the following questions :

(1) Find the perimeter of the lawn.

[1 Marks]

(2) Formulate the quadratic equation representing the total area of the lawn and the walkway, taking width of walkway = x m.

[1 Marks]

(3)

(a) Solve the quadratic equation to find the width of the walkway 'x'.

[2 Marks]

(4)

If the cost of paving the walkway at the rate of ₹50 per square metre is ₹12,000, calculate the area of the walkway.

[2 Marks]

Question 35.

A lighthouse stands tall on a cliff by the sea, watching over ships that pass by. One day a ship is seen approaching the shore and from the top of the lighthouse, the angles of depression of the ship are observed to be 30° and 45° as it moves from point P to point Q. The height of the lighthouse is 50 metres.

Based on the information given above, answer the following questions :

(1) Find the distance of the ship from the base of the lighthouse when it is at point Q, where the angle of depression is 45°.

[1 Marks]

(2) Find the measures of ∠PBA and ∠QBA.

[1 Marks]

(3)

Find the distance travelled by the ship between points P and Q.

[2 Marks]

(4)

If the ship continues moving towards the shore and takes 10 minutes to travel from Q to A, calculate the speed of the ship in km/h, from Q to A.

[2 Marks]

Section E

Question 36.

The perimeter of an isosceles triangle is 32 cm. If each equal side is 5/ 6 th of the base, find the area of the triangle.

[5 Marks]

Question 37. The sum of the third term and the seventh term of an AP is 6 and their product is 8. Find the sum of the first sixteen terms of the AP.

[5 Marks]

Question 38. The minimum age of children eligible to participate in a painting competition is 8 years. It is observed that the age of the youngest boy was 8 years and the ages of the participants, when seated in order of age, have a common difference of 4 months. If the sum of the ages of all the participants is 168 years, find the age of the eldest participant in the painting competition.

[5 Marks]

Question 39.

In the given figure, PA, QB and RC are perpendicular to AC. If PA = x units, QB = y units and RC = z units, prove that $1/x + 1/z = 1/y$.

[5 Marks]

Question 40.

Sides AB and BC and median AD of triangle ABC are respectively proportional to sides PQ and QR and median PM of triangle PQR. Show that Δ ABC ~ ΔPQR.

[5 Marks]

Question 41. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm, are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.

[5 Marks]