CBSE EXAMINATION PAPER-2025

MATHEMATICS

(Solved)

Time allowed : 3 hours | Maximum Marks : 81

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **45 questions.** All questions are **compulsory.**

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

iii. **Section A** – questions number **1 to 19** are multiple choice questions Each question carries **1 marks.**

iv. **Section B** – questions number **20 to 26** are very short answer Each question carries **2 marks.**

v. **Section C** – questions number **27 to 32** are short answer Each question carries **3 marks.**

vi. **Section D** – questions number **33 to 34** are case based questions

vii. **Section E** – questions number **35 to 40** 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 α and β are the zeroes of polynomial $3x^2 + 6x + k$ such that $\alpha + \beta + \alpha\beta = -2/3$, then the value of k is:

[1 Marks]

(A) -8

(B) 8

(C) 4

(D) -4

Question 2.

If x = 1 and y = 2 is a solution of the pair of linear equations 2x - 3y + a = 0 and 2x + 3y - b = 0, then:

[1 Marks]

(A) 2a + b = 0

(B) a + 2b = 0

(C) 2a = b

(D) a = 2b

Question 3.

The mid-point of the line segment joining the points P(-4, 5) and Q(4, 6) lies on:

[1 Marks]

(A) x-axis

(B) y-axis

(C) origin

(D) neither x-axis nor y-axis

Question 4.

If θ is an acute angle and 7+ 4 sin θ = 9, then the value of θ is:

[1 Marks]

(A) 45°

(B) 90°

(C) 30°

(D) 60°

Question 5.

The value of $\tan^2\theta - (1/\cos\theta \times \sec\theta)$ is:

[1 Marks]

(A) -1

(B) 1

(C) 0

(D) 2

Question 6.

If HCF(98, 28) = m and LCM(98, 28) = n, then the value of n -7 m is:

[1 Marks]

(A) 198

(B) 28

(C) 0

(D) 98

Question 7.

The tangents drawn at the extremities of the diameter of a circle are always:

[1 Marks]

(A) parallel

(B) perpendicular

(C) equal

(D) intersecting

Question 8.

If $(-1)^n + (-1)^8 = 0$, then n is:

[1 Marks]

(A) any even number

(B) any positive integer

(C) any negative integer

(D) any odd number

Question 9.

Two polynomials are shown in the graph below. The number of distinct zeroes of both the polynomials is:

[1 Marks]

(A) 3

(B) 2

(C) 5

(D) 4

Question 10. If the sum of first m terms of an AP is $2m^2 + 3m$, then its second term is:

[1 Marks]

(A) 10

(B) 9

(C) 12

(D) 4

Question 11.

Mode and Mean of a data are 15x and 18x, respectively. Then the median of the data is:

[1 Marks]

(A) x

(B) 11x

(C) 17x

(D) 34x

Question 12.

A card is selected at random from a deck of 52 playing cards. The probability of it being a red face card is:

[1 Marks]

(A) 3/26

(B) 3/13

(C) 1/2

(D) 2/13

Question 13.

Which of the following is a rational number between $\sqrt{3}$ and $\sqrt{5}$?

[1 Marks]

(A) 1.4142387954012...

(B) π

(C) 1.857142

(D) $2.32\overline{6}$

Question 14.

If a sector of a circle has an area of 40π sq. units and a central angle of 72°, the radius of the circle is:

[1 Marks]

(A) 200 units

(B) $10\sqrt{2}$ units

(C) 100 units

(D) 20 units

Question 15.

In the given figure, PA is a tangent from an external point P to a circle with centre O. If $\angle POB = 115^\circ$, then $\angle APO$ is equal to:

[1 Marks]

(A) 25°

(B) 90°

(C) 35°

(D) 65°

Question 16.

A kite is flying at a height of 150 m from the ground. It is attached to a string inclined at an angle of 30° to the horizontal. The length of the string is:

[1 Marks]

(A) 150√2 m

(B) 150√3 m

(C) 300 m

(D) 100√3 m

Question 17.

A piece of wire 20 cm long is bent into the form of an arc of a circle of radius 60/π cm. The angle subtended by the arc at the centre of the circle is:

[1 Marks]

(A) 50°

(B) 90°

(C) 30°

(D) 60°

Question 18.

Assertion (A) : The probability of selecting a number at random from the numbers 1 to 20 is 1.

Reason (R): For any event E, if P(E) = 1, then E is called a sure event.

[1 Marks]

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

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

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

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

Question 19.

Assertion (A) : If we join two hemispheres of same radius along their bases, then we get a sphere.

Reason(R): Total Surface Area of a sphere of radius r is $3\pi r^2$.

[1 Marks]

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

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

(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 20.

If $x \cos 60° + y \cos 0° + \sin 30° - \cot 45° = 5$, then find the value of $x + 2y$.

[2 Marks]

Question 21.

Evaluate: $\tan^2 60° / \sin^2 60° + \cos^2 30°$

[2 Marks]

Question 22.

Find the zeroes of the polynomial $p(x) = x^2 + 4/3x - 4/3$.

[2 Marks]

Question 23.

The coordinates of the centre of a circle are (2a, a - 7). Find the value(s) of a, if the circle passes through the point (11,-9) and has diameter $10\sqrt{2}$ units.

[2 Marks]

Question 24.

If Δ ABC~ ΔPQR in which AB = 6 cm, BC = 4 cm, AC = 8 cm and PR = 6 cm, then find the length of(PQ + QR).

[2 Marks]

Question 25.

In the given figure, QR/QS= QT/PR and ∠1 = ∠2, show that ΔPQS~ ΔTQR.

[2 Marks]

Question 26.

A person is standing at P outside a circular ground at a distance of 26 m from the centre of the ground. He found that his distances from the points A and B on the ground are 10 m (PA and PB are tangents to the circle). Find the radius of the circular ground.

[2 Marks]

Section C

Question 27. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

[3 Marks]

Question 28.

Prove that: $\sin A + \cos A / \sin A - \cos A + \sin A - \cos A / \sin A + \cos A = 2/2 \sin^2 A - 1$

[3 Marks]

Question 29. Find the ratio in which the y-axis divides the line segment joining the points (5, -6) and (-1, 4). Also find the point of intersection.

[3 Marks]

Question 30.

Prove that $1/\sqrt{5}$ is an irrational number.

[3 Marks]

Question 31.

A room is in the form of a cylinder surmounted by a hemispherical dome. The base radius of the hemisphere is half of the height of the cylindrical part. If the room contains 1408 / $21m^3$ of air, find the height of the cylindrical part. (Use $\pi = 22/7$)

[3 Marks]

Question 32. Two dice are thrown at the same time. Determine the probability that the difference of the numbers on the two dice is 2.

[3 Marks]

Section D

Question 33.

A brooch is a decorative piece often worn on clothing like jackets, blouses or dresses to add elegance. Made from precious metals and decorated with gemstones, brooches come in many shapes and designs. One such brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in the figure.

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

(1) Find the central angle of each sector.

[1 Marks]

(2) Find the length of the arc ACB.

[1 Marks]

(3) Find the area of each sector of the brooch.

[2 Marks]

(4) Find the total length of the silver wire used.

[2 Marks]

Question 34.

Amrita stood near the base of a lighthouse, gazing up at its towering height. She measured the angle of elevation to the top and found it to be 60°. Then, she climbed a nearby observation deck, 40 metres higher than her original position and noticed the angle of elevation to the top of lighthouse to be 45°.

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

(1)

IF CD is h meter, find the distance BD in term of 'h'

[1 Marks]

(2)

Find distance BC in term of ' h'

[1 Marks]

(3) Find the height CE of the lighthouse. (Use $\sqrt{3} = 1.73$)

[2 Marks]

(4) Find distance AE, if AC = 100 m.

[2 Marks]

Section E

Question 35. Vijay invested certain amounts of money in two schemes A and B, which offer interest at the rate of 8% per annum and 9% per annum, respectively. He received ₹1,860 as the total annual interest. However, had he interchanged the amounts of investments in the two schemes, he would have received ₹20 more as annual interest. How much money did he invest in each scheme?

[5 Marks]

Question 36.

The diagonal BD of a parallelogram ABCD intersects the line segment AE at the point F, where E is any point on the side BC. Prove that DF x EF = FB x FA.

[5 Marks]

Question 37.

In Δ ABC, if AD ⊥ BC and AD^2= BD x DC then prove that ∠BAC = 90°.

[5 Marks]

Question 38. The perimeter of a right triangle is 60 cm and its hypotenuse is 25 cm. Find the lengths of other two sides of the triangle.

[5 Marks]

Question 39. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

[5 Marks]

Question 40.

Find the missing frequency 'f' in the following table, if the mean of the given data is 18. Hence find the mode.

[5 Marks]