CLASS X
SAMPLE PAPER
MATHS

Time: 3Hours   Marks: 80

General Instructions:
I.   The question paper comprises four sections A, B, C and D.
II. All questions are compulsory. But there may be internal choices provided in some questions. Attempt only one of the alternatives.
III. Section A has 6 questions of 1 mark each. Section B has 6 questions of 2 marks each. Section C has 10 questions of 3 marks each. Section D has 8 questions of 4 marks each.
IV. Use of calculations is not permitted.

SECTION A {Each question carries 1 mark}

01.   Find the value of x if the mode of the following data is 40:

      26, 58, 40, 69, 26, 51, 40, 51, 51, 32, x, 55, 26, 19, 40, 69, 36, 29, 32

02.   An experiment has two outcomes. The probability of outcome A is 0.37. Find the probability of the outcome B.

03.   Find a quadratic polynomial whose zeros are $3 + \sqrt{2}$ and $3 - \sqrt{2}$.

04.   If the midpoint of the line segment joining the points P $(6, b – 2)$ and Q $(-2, 4)$ is $(2, -3)$ find the value of b.

05.   Find the 12th term of the AP: 25, 19, 13, 7……

06.   The angle of elevation of the top of a pole standing on a level ground is 60° from a point on the ground, 25 m away from the foot of the pole. Find the height of the pole, taking $\sqrt{3}$ = 1.732.

SECTION B {Each question carries 2 marks}

07. If the sum of first n terms of an AP is $5n^2 - 3n$, find the AP and its 23rd term.

08. The sum of two numbers is 137 and their difference is 43. Find the numbers.

09. A field is in the form of a circle. The cost of ploughing the field at Rs. 15 per m^2 is Rs. 57750. Find the cost of fencing the field at Rs 34 per meter.

10. Prove that $\sqrt{[\sec^2 A + \csc^2 A]} = \tan A + \cot A$

11. In a ΔABC, D and E are two points on AB and AC respectively such that DE // BC and AD/DB = 5:4. If AC = 9 cm then determine the length of AE.

12. What real number should be subtracted from the polynomial $(3x^3 + 10x^2 - 14x + 9)$ so that $(3x – 2)$ divides it completely?

SECTION C {Each question carries 3 marks}

13. Two dice are thrown simultaneously. What is the probability that:
    a) 5 will not come up on either of them,
    b) 5 will come up at least once,
    c) 5 will come up on both the dice.

14. Two circles touch internally so that the distance between their centres is 6 cm. The sum of their areas is (116π) cm^2. Find the radii of the two circles.

OR

Prove that if two tangents are drawn from an external point then they are equally inclined to the line segment joining the centre to that point.

15. A card is drawn at random from a deck of cards. Find the probability that the card drawn is:

a) a king or a jack   b) a non-ace   c) a red card or a 7

16.   Prove that the tangents drawn from an external point to a circle are equal in length.

17.   Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that $\angle$APB = 2 $\angle$OAB

18.   Solve for x and y: 6x + 3y = 7xy;   3x + 9y = 11xy   (x ≠0, y≠ 0)

19.   For what values of k, are the roots of the equation (k + 4) x^2 + (k + 1) x + 1 = 0 are real And equal?

20.   Which term of the AP: 18, 15, 12, ….is -84? Also is there any term 0?

21.   ABCD is a quadrilateral and AC is a diagonal. M, L and N are points on AB, AC and AD respectively such that ML // BC and NL // DC. Prove that AM / MB = AN / AD.

22.   Construct a ∆ABC in which BC = 6.5 cm, AB = 4.5 cm and $\angle$ABC = 60°. Construct a triangle similar to this triangle whose sides are three-fourth of the corresponding sides of ∆ ABC [steps of construction not needed].

SECTION D {Each question carries 4 marks}

23.   Draw a circle of radius 4.2 cm. Draw a pair of tangents to this circle that are inclined to each other at an angle of 45°.

24.   Solve: (-4) + (-1) + 2 + . . . + x = 437.

25.   A circle is given such that its radius is 14 cm and there is a 21 cm chord AB. Calculate the

area of the minor segment so formed and also that of the major sector, when the central angle is 60°. Also calculate the length of the minor arc.

OR

Prove that: cosec (67° + A) - sec (23° - A) = 0

26. The internal and external diameters of a hollow hemispherical vessel are 14 cm and 21 cm respectively. The cost of silver plating of 1 cm^2 surface is Rs. 0.40. Find the total cost of silver plating the vessel all over.

27. Show that one and only one out of n, n + 2 and n + 4 is divisible by 3, where n is any positive integer.

OR

Obtain all the zeros of $(3x^4 - 15x^3 + 13x^2 + 25x - 30)$ if two of its zeros are

$$\sqrt{\frac{5}{3}} \quad and \quad \sqrt{-\frac{5}{3}}$$

28. If the angle of elevation of a cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake is β prove that the distance of the cloud from the point of observation is $\frac{2h \sec \alpha}{\tan \beta - \tan \alpha}$ metres.

OR

From a window (h metres high above the ground) of a house in a street, the angles of elevation and depression of the top and foot of another house on the opposite side of the street are α and β respectively.

Show that if the height of the opposite house is H, then H = h(1 + tan α.cot β) metres.

29. Study the following frequency distribution table:

Marks	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
No. of students	5	9	16	22	36	18	11	6	4	3

Calculate the mean of the given data. Also draw the less than ogive and hence determine the median.

30.   A hollow copper ball has an external diameter of 12 cm and a thickness of 0.1 cm. Find:

a) the outer surface area of the ball.

b) the weight of the ball if 1 cm^3 of copper weighs 8.8 g. [Take π = 3.14]

OR

A circular disc of radius 6 cm is divided into three sectors with central angles 90°, 120° and 150°. What part of the whole circle is the sector with the central angle 150°? Also calculate the ratio of the areas of the three sectors.

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