SAMPLE PAPER

CBSE - Class 10

MATHEMATICS

(STANDARD)

Time Allowed: 3 Hours   *Maximum Marks: 80*

General Instructions:

(i) All questions are compulsory.

(ii) The question paper consists of 40 questions divided into four sections A, B, C & D.

(iii) Section A contains **20** questions of **1** mark each, Section B comprises of **6** questions of **2** marks each. Section C comprises of **8** questions of **3** marks each. Section D comprises **6** questions of **4** marks each.

(iv) There is no overall choice. However internal choices have been provided in **two** questions of **1** marks each, **two** questions of **2** marks each, **three** questions of **3** marks each and **three** questions of **4** marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of calculators is **not** permitted.

SECTION - A

Q 1 – 10 are multiple choice questions. Select the most appropriate answer from the given options.

1. Which of the following is a prime number?   **1**

    (A) 11   (B) 22   (C) 33   (D) 44

2. Which of the following is a zero of the polynomial $x^3 - 8$?   **1**

    (A) –2   (B) 2   (C) 0   (D) $\sqrt{8}$

3. The roots of the equation $\sqrt{2}\,x^2 - 2x - \sqrt{3} = 0$ are: **1**

    (A) $-\sqrt{3}, \dfrac{1}{\sqrt{3}}$ (B) 2, 3   (C) $\dfrac{\sqrt{3}}{2}, -\dfrac{2}{\sqrt{3}}$ (D) $\sqrt{3}, -\dfrac{1}{\sqrt{3}}$

4. 15th term of the AP: $x - 7$, $x - 2$, $x + 3$, ... is: **1**

    (A) $x + 63$ (B) $x + 73$ (C) $x + 83$ (D) $x + 53$

5. If the points $(a, 0)$, $(0, b)$ and $(1, 1)$ are collinear, then $\dfrac{1}{a}+\dfrac{1}{b}$ is: **1**

(A) −1   (B) 1   (C) 0   (D) 2

6. How many parallel tangents can a circle have?   **1**

(A) 1   (B) 2   (C) infinite   (D) 0

7. If $3 \cos \theta = 1$, then $\operatorname{cosec} \theta$ is equal to: **1**

(A) $2\sqrt{2}$ (B) $\dfrac{3}{2\sqrt{2}}$ (C) $\dfrac{2\sqrt{3}}{3}$ (D) $\dfrac{4}{3\sqrt{2}}$

8. The perimeter of a quadrant of a circle of radius 'r' is: **1**

(A) $\dfrac{\pi r}{2}$ (B) $2\pi r$ (C) $\dfrac{r}{2}[\pi + 4]$ (D) $2\pi r + -$

9. The probability of drawing a green coloured ball from a bag containing 6 red and 5 black balls is: **1**

(A) $\dfrac{6}{11}$ (B) $\dfrac{5}{11}$ (C) 1   (D) 0

10. A data has 25 observations (arranged in descending order). Which observation represents the median?   **1**

(A) 12th (B) 13th (C) 14th (D) 15th

(Q 11 – 15) Fill in the blanks:

11. Equation $ax^2 + bx + C = 0$ represents a quadratic equation if and only if **1**

12. Next term of AP: $3,\ 3+\sqrt{2},\ 3+2\sqrt{2},\ 3+3\sqrt{2}$, ... is **1**

13. Maximum value of $\dfrac{1}{\operatorname{cosec}\theta}$ is **1**

14. Median of first 50 even natural numbers is **1**

15. Cumulative frequency curve is also known as **1**

OR

The value in a distribution having maximum frequency is called the .... of the distribution.   **1**

(Q 16 – 20) Answer the following:

16. Find $\operatorname{cosec} A$, if $\tan A = \dfrac{1}{\sqrt{3}}$ **1**

17. A data has 25 observations (arranged in descending order). Which observation represents the median?   **1**

18. A card is drawn at random from a pack of 52 playing cards. Determine the probability of it being a red face card.   **1**

19. Determine the number of zeros of the polynomial $x^4 - 1$ **1**

OR

Find the value of k so that the following pair of linear equation has an infinite number of solutions:

$$2x - 3y + 6 = 0;\ 3x + ky + 9 = 0$$ **1**

20. If $\dfrac{1}{2}$ is a root of the equation $x^2 + kx - \dfrac{5}{4} = 0$, then find the value of k.   **1**

SECTION - B

Read the following question carefully and answer the questions that follow.

21. Are the points (0, 5) (0, –9) and (3, 6) collinear? Justify your answer.   **2**

22. Find the zeros of the polynomial $x^2 - 3$.   **2**

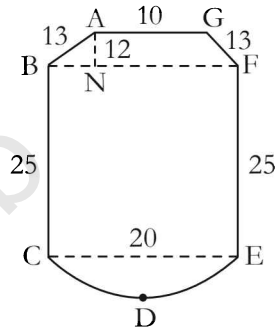**23.** If sin (A – 18°) = cos 2 A, find the value of A.   **2**

OR

If $\sin \theta = \dfrac{2mn}{m^2 + n^2}$, find the value of $\dfrac{\sin\theta \cot\theta}{\cos\theta}$.   **2**

24. The figure shows the cross-section of the interior part of a thermos flask.

The top part is a trapezium, the middle part is a rectangle and the bottom part is a semi- circle.

If CE = 20 cm, BC = 25 cm, AB = GF = 13 cm, AG = 10 cm and AN = 12 cm, the find: **2**

(i) The perimeter of the cross-section

(ii) The area of the cross-section

25. The area of a sector of a circle of radius 36 cm is 54π sq cm. Find the length of the corresponding arc of the sector.   **2**

26. Write the prime factorisation of 8190.   **2**

OR

Find the HCF of $(2^3 \times 3^2 \times 5^1)$, $(2^2 \times 3^3 \times 5^2)$ and $(2^4 \times 3^1 \times 5^2 \times 7)$.   **2**

SECTION - C

Read the following question carefully and answer the questions that follow.

27. If Q (0, 1) is equidistant from P (5, –3) and R (x, 6); find the values of x. Also, find the distances QR and PR.   **3**

28. The sum of two numbers, as well as, the difference between their squares is 9. Find the numbers.   **3**

29. Prove that: $2\sqrt{3} - 4$ is an irrational number, using the fact that $\sqrt{3}$ is an irrational number.   **3**

OR

Find the HCF and LCM of 15, 18 and 45, by the prime factorisation method.   **3**

30. The length of minute hand of a clock is 14 cm. Find the area swept by the minute hand in 15 minutes.   **3**

OR

The radii of two circles are 4 cm and 3 cm. Find the radius of the circle whose area is equal to the sum of the areas of the two circles. Also, find the circumference of this circle. **3**

31. Two concentric circle arc of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle. **3**
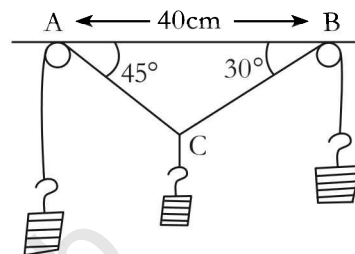
OR

Draw a circle of radius 2.2 cm. Take a point P on the circle. From the point P, construct a tangent to the circle. **3**

32. In an experiment, some masses are hung in equilibrium as shown in the diagram. AB = 40 cm, $\angle CAB = 45°$, and $\angle CBA = 30°$. **3**

Find:

(i) the perpendicular distance of AB from C

(ii) the length of AC

(iii) the length of BC

33. Prove that the line segment joining the mid-points of the sides of a triangle form four triangles, each of which is similar to the original triangle. **3**

34. Find the mean of the following frequency distribution: **3**

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80	Below 90	Below 100
Number of students	12	22	35	50	70	86	97	104	109	115

SECTION - D

35. Find two consecutive odd positive integers, sum of whose squares is 290. **4**

36. The angle of elevation of the top of a building from the foot of a tower is 30°; and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, find the height of the building. **4**

OR

If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, show that: $m^2 - n^2 = 4\sqrt{mn}$. **4**

37. The 6th term of an AP is five times the 1st term and the 11th term exceeds twice the 5th term by 3. Find the 8th term of the AP. **4**

OR

Solve for x, using the quadratic formula:

$$x - \frac{1}{x} = 3.$$

4

38. A circle is inscribed in a ΔABC having sides 8 cm, 10 cm and 12 cm as shown in the figure. Find AD, BE and CF.
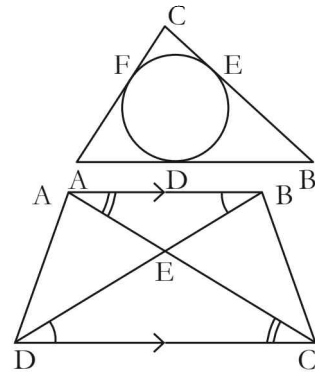
4

39. State and prove the **converse** of Pythagoras Theorem.

4

OR

ABCD is a trapezium with AB || DC. If $\Delta AED \sim \Delta BEC$, then prove that AD = BC.

4

40. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the canonical heap is 24 cm, find the radius and the slant height of the heap.

4