8

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. If ΔABC is right-angled at C, then the value of cos (A + B) is: **1**

(A) 1 (B) 0 (C) $\frac{1}{2}$ (D) $\frac{\sqrt{3}}{2}$

2. If cosec θ – cot $\theta = \frac{1}{3}$, then the value of cosec θ + cot θ is: **1**

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

3. A wire is in the shape of a circle of radius 21 cm. It is bent to form a square. The side of the square is: $\left(\pi = \frac{22}{7}\right)$ **1**

(A) 22 cm (B) 33 cm (C) 44 cm (D) 66 cm

4. The area of a circle that can be inscribed in a square of side 6 cm is: **1**

(A) 36 π sq cm (B) 18 π sq cm (C) 12 π sq cm (D) 9 π sq cm

5. Two coins tossed together. The probability of getting head on both is: **1**

(A) 0 (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) $\frac{3}{4}$

6. Which of the following is a non-terminating repeating decimal? **1**

(a) $\frac{35}{14}$ (b) $\frac{14}{35}$ (c) $\frac{1}{7}$ (d) $\frac{7}{8}$

7. If $x = 2^2 \times 3^3 \times 7^2$, $y = 2^3 \times 3^2 \times 5 \times 7$, then HCF (x, y) is: **1**

(A) 252 (B) 1260 (C) 8820 (D) 52920

8. If α, β are the zeros of the polynomial $5x^2 - 7x + 2$, then the sum of their reciprocal is: **1**

(A) $\frac{7}{2}$ (B) $\frac{7}{5}$ (C) $\frac{2}{5}$ (D) $\frac{14}{25}$

9. If the lines by $3x + 2py = 2$ and $2x + 5y + 1 = 0$ are parallel, then the value of p is: **1**

(A) $-\frac{5}{4}$ (B) $\frac{2}{5}$ (C) $\frac{15}{4}$ (D) –

10. The distance between the points (0, 5) and (–5, 0) is: **1**

(A) 5 (B) $5\sqrt{2}$ (C) $2\sqrt{5}$ (D) 10

(Q 11 – 15) Fill in the blanks:

11. 10^{th} term from end of AP: 4, 9, 14, ····· 254 is **1**

12. Secant intersects a circle at ..... distinct points. **1**

13. If D and E are points of trisection of sides AB and AC of ΔABC, then DE = ... **1**

14. Volume of a frustum of a cone is given by **1**

OR

If height of a right circular cylinder is doubled and radius is tripled, then its curved surface area will become ..... times. **1**

15. The probability of getting a number which is neither prime nor composite in single throw of a dice is: **1**

(Q 16 – 20) Answer the following:

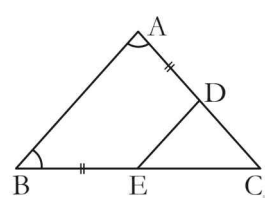
16. If α and β be the roots of the equation $x^2 - 1 = 0$, then **1**

show that: $\alpha + \beta = \frac{1}{\alpha} + \frac{1}{\beta}$

17. Find the solution of $x + y = 3$ and $7x + 6y = 2$. **1**

18. In the figure, if ∠A = ∠B and AD = BE. **1**

Show that DE || AB in ΔABC.

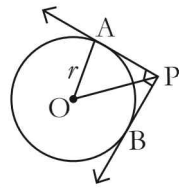


OR

Determine the distance between two parallel tangents to a circle of radius r. **1**

19. In the figure, $\angle APB = 90°$ **1**

Find the length of OP.



20. Find the mean of first eleven natural numbers. **1**

SECTION - B

21. Given that $\sqrt{p}$ is an irrational number, where p is a prime number, prove that $(\sqrt{3}+\sqrt{5})$ is irrational. **2**

22. Form a quadratic polynomial, whose zeros are –3 and 5. **2**

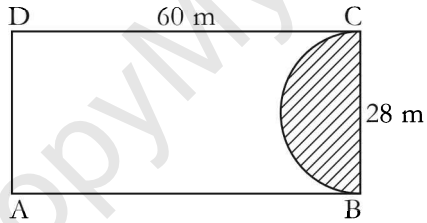
OR

Find the roots of $6x^2 - \sqrt{2}\,x - 2 = 0$ **2**

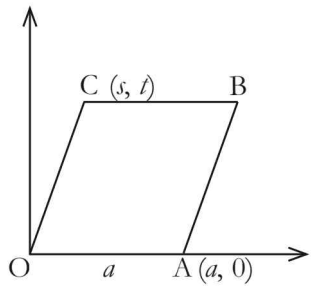
23. The diagonals of a rhombus are 15 cm and 36 cm long. Find the side length of the rhombus. **2**

OR

A plot is in the form of a rectangle ABCD having a semi-circle on BC as shown in the figure. The semi-circular portion is grassy while the remaining plot is without grass. Find the area of the plot without grass. **2**



24. In the diagram, OABC is a rhombus, where O is the origin. The coordinates of A and C are $(a, 0)$ and (s, t) respectively. **2**

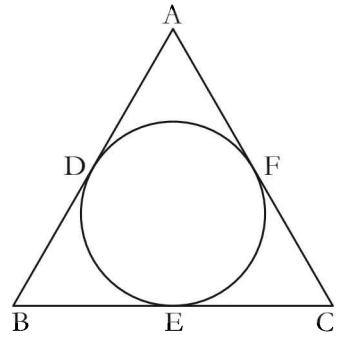


(i) Write down the coordinates of B in terms of a, s and t.

(ii) Find the length of OC in terms of s and t.

25. Without actually performing the long division, write the decimal expansion of $\frac{13}{3125}$. **2**

26. In the figure, if AB = AC, prove that: BE = EC **2**



SECTION - C

27. Which term of the AP: –2, –7, –12, ..., will be –77? Find the sum of this AP up to the term –77. **3**

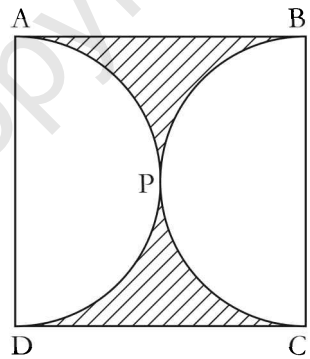
28. If one of the zeros of the cubic polynomial $x^3 + ax^2 + bx + c$ is –1, then find the product of the other two zeros. **3**

OR

Determine the number of real roots of the equation: **3**

$$(x^2 + 1)^2 - x^2 = 0$$

29. Find the area of the shaded region in the figure, if ABCD is a square of side 14 cm and APD and BPC are semi-circles. **3**

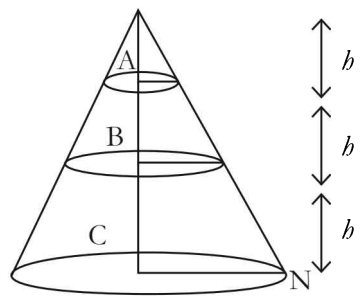


30. A carpenter cuts a wooden cone into three parts A, B and C by two planes parallel to the base as shown in the diagram. The heights of the three parts are equal. **3**

(i) Find the ratio of the volumes of parts A, B and C

(ii) Find the ratio of the base areas of parts A, B and C

(iii) If the volume of the original cone is 540 cu cm, find the volume of part B



31. Show that, points $(a, b + c)$, $(b, c + a)$ and $(c, a + b)$ are collinear. **3**

OR

The two opposite vertices of a square are (–1, 2) and (3, 2). Find the coordinates of the other two vertices. **3**

32. Determine the value of **3**

$\text{cosec}\,(75° + \theta) - \sec(15° - \theta) - \tan(55° + \theta) + \cot(35° - \theta)$

OR

Prove that:

$$\frac{\tan A}{1+\sec A} - \frac{\tan A}{1-\sec A} = 2\,\text{cosec}\,A$$ **3**

33. ABC is an isoscles triangle with AB = AC = 13 cm. The length of altitude from A on BC is 5 cm. Find the length of BC **3**

34. If $\sin\theta = \frac{12}{13}$, find the value of: **3**

$$\frac{\sin^2\theta - \cos^2\theta}{2\sin\theta\cos\theta} - \frac{1}{\tan^2\theta}$$

SECTION - D

35. Two dice are thrown together. Find the probability that the product of the numbers on the top of the dice is: (*i*) 6 (*ii*) 12 (*iii*) 7 **4**

36. How many terms of the AP: 9, 17, 25, ... must be taken to give a sum of 636? **4**

37. From the top of a tower '*h*' metres high, angle of depression of two objects which are in line with foot of the tower are α and β ($\beta > \alpha$). Find the distance between the two objects. **4**

38. 5 books and 7 pens together cost ` 79, whereas 7 books and 5 pens together cost ` 77, find the total cost of 1 book and 2 pens. **4**

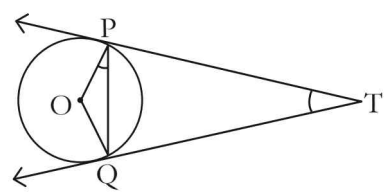
OR

Divide: $p(x) = x^4 - 5x + 6$ by $g(x) = 2 - x^2$; and find the quotient and the remainder. **4**

39. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that: **4**

(i) TP = TQ

(ii) $\angle PTQ = 2\angle OPQ$



OR

State and Prove Pythagoras Theorem. **4**

40. The following table gives production yield per hectare of wheat of 100 farms of a village: **4**

Production yields (in kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	2	8	12	24	38	16

Change the distribution to a "more than type" distribution and draw its ogive.

OR

For the following distribution, find the median. **4**

Class	40-45	45-50	50-55	55-60	60-65	65-70	70-75
Frequency	2	3	8	6	6	3	2