CLASS 10 MATHEMATICS

Comprehensive Practice Paper & Mock Test

Based on the Latest Examination Pattern

Time Allowed: 3 Hours **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections **A, B, C, D,** and **E**.
2. **Section A** has 10 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. **Section B** has 4 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. **Section C** has 4 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. **Section D** has 3 Long Answer (LA) type questions carrying 5 marks each.
6. **Section E** has 2 Case-Based integrated units of assessment carrying 4 marks each.
7. All questions are compulsory. Internal choices have been provided in some questions.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION A

(Questions 1 to 10 carry 1 mark each)

1. The HCF of 120 and 225 is:

(a) 15
(b) 5
(c) 25
(d) 45

2. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is:

(a) 10
(b) -10
(c) 5

(d) -5

3. The distance of the point $P(2, 3)$ from the x-axis is:

(a) 2 units
(b) 3 units
(c) 1 unit
(d) 5 units

4. The 11^{th} term of the A.P. $-3, -\frac{1}{2}, 2, \ldots$ is:

(a) 28
(b) 22
(c) -38
(d) -48

5. If $\sin A = \frac{1}{2}$, then the value of $\cot A$ is:

(a) $\sqrt{3}$
(b) $\frac{1}{\sqrt{3}}$
(c) $\frac{\sqrt{3}}{2}$
(d) 1

6. The empirical relationship between the three measures of central tendency is:

(a) 3 Median = Mode + 2 Mean
(b) 2 Median = 3 Mode + Mean
(c) Mode = 3 Mean − 2 Median
(d) Mean = 3 Median − Mode

7. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that $OQ = 12$ cm. Length PQ is:

(a) 12 cm
(b) 13 cm
(c) 8.5 cm
(d) $\sqrt{119}$ cm

8. A die is thrown once. The probability of getting a prime number is:

(a) 1/2
(b) 1/3
(c) 1/6
(d) 2/3

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

(a) 36π cm^2
(b) 18π cm^2
(c) 12π cm^2
(d) 9π cm^2

10. The pair of linear equations $x + 2y + 5 = 0$ and $-3x - 6y + 1 = 0$ has:

(a) A unique solution
(b) Exactly two solutions
(c) Infinitely many solutions
(d) No solution

SECTION B

(Questions 11 to 14 carry 2 marks each)

11. Prove that $\sqrt{2}$ is an irrational number.

12. Find a quadratic polynomial, the sum and product of whose zeroes are -3 and 2, respectively.

13. Evaluate the following:

$$2\tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$$

14. A box contains 3 blue, 2 white, and 4 red marbles. If a marble is drawn at random from the box, what is the probability that it will be:

(i) a white marble?
(ii) a blue marble?

SECTION C

(Questions 15 to 18 carry 3 marks each)

15. Solve the following pair of linear equations by the substitution method:

$$2x + 3y = 11$$
$$2x - 4y = -24$$

Hence, find the value of 'm' for which $y = mx + 3$.

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

17. Find the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$ using the quadratic formula.

18. A metallic sphere of radius 4.2 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder.

SECTION D

(Questions 19 to 21 carry 5 marks each)

19. State and Prove the Basic Proportionality Theorem (Thales Theorem).
Statement: If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

20. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storied building are $30°$ and $45°$, respectively. Find the height of the multi-storied building and the distance between the two buildings. (Use $\sqrt{3} = 1.732$)

21. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs 500 per m^2. (Note that the base of the tent will not be covered with canvas).

SECTION E

(Case Study Based Questions: Questions 22 to 23 carry 4 marks each)

22. Case Study 1: Coordinate Geometry in City Planning
A city planner is designing a new park on a coordinate grid. Three main attractions are placed at points $A(-2, 3)$, $B(4, 5)$, and $C(1, -4)$. The planner wants to build a straight walking path connecting point A to point B.

(i) Find the distance between attraction A and attraction B. (1 Mark)

(ii) Find the coordinates of the midpoint of the path connecting A and B. (1 Mark)

(iii) The planner wants to place a water fountain exactly halfway between B and C. What will be the coordinates of the water fountain? (2 Marks)

23. Case Study 2: Arithmetic Progression in School Assembly

In a school ground, students are standing in rows to perform a mass drill. The number of students in the first row is 30, in the second row is 27, in the third row is 24, and so on, forming an Arithmetic Progression (A.P.).

(i) Find the common difference of the A.P. formed by the number of students in each row. (1 Mark)

(ii) Calculate the number of students in the 8^{th} row. (1 Mark)

(iii) If there are a total of 10 rows in the drill, find the total number of students participating in the mass drill. (2 Marks)

End of Practice Paper. Best of luck with your preparations!