

# PRACTICE TEST (2024-25)

## CLASS-X

### SUBJECT-MATHEMATICS

Time : 3 Hrs.

M.M. : 80

#### General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Qs of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

#### SECTION A

Section A consists of 20 questions of 1 mark each.

1. The ratio of LCM and HCF of the least composite number and the least prime number is

- (a) 1:2      (b) 2:1      (c) 1:3      (d) 3:1

2. If  $bx + ay = a^2 + b^2$  and  $ax - by = 0$ , then the value of  $(x - y)$  is:

- (a)  $a - b$       (b)  $a^2 + b^2$       (c)  $a^2 - b^2$       (d)  $b - a$

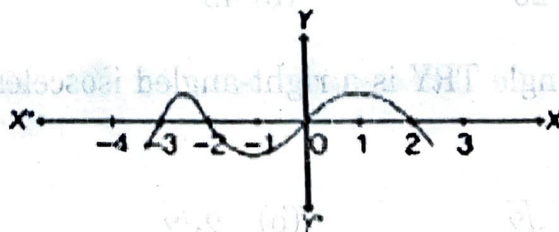
3. The graph of the polynomial  $p(x)$  is given as below, the zeroes of  $p(x)$  are

(a)  $-3, -2, 0$  and  $0$

(b)  $-2, 0, 2$  and  $3$

(c)  $-3, -2, 0$  and  $2$

(d)  $-3, 0, 2$  and  $3$



4. Find the value of  $k$  for which the quadratic equation  $3x^2 + 6x + k = 0$  has real and equal roots.

- (a) 4                      • (b) 3                      (c) -1                      (d) 7

5. If one root of the equation  $3x^2 + 10x + (\lambda - 5) = 0$  be the reciprocal of the other, then find the value of  $\lambda$ .

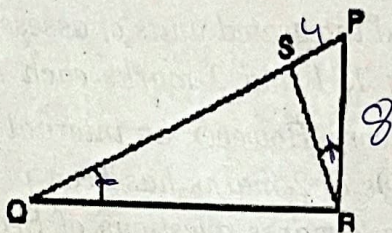
- (a) 5                      (b) 8                      • (c) 3                      (d) -8

6. If the  $n$ th term of an A.P. is  $7n + 12$ , then its common difference is

- (a) 12                      (b) 5                      • (c) 7                      (d) 19

7. In the adjoining figure,  $\angle PQR = \angle PRS$ . If  $PR = 8$  cm,  $PS = 4$  cm, then  $PQ$  is equal to

- (a) 12 cm  
• (b) 16 cm  
(c) 32 cm  
(d) 24 cm



8. The volume and the surface area of a sphere are numerically equal, then the radius of sphere is

- (a) 0 units                      (b) 1 unit                      (c) 2 units                      • (d) 3 units

9. The coordinates of the point where line  $\frac{x}{a} + \frac{y}{b} = 7$  intersects  $y$ -axis are

- (a)  $(a, 0)$                       (b)  $(0, b)$                       • (c)  $(0, 7b)$                       (d)  $(2a, 0)$

10. The centre of circle having end points of its diameter as  $(-4, 2)$  and  $(4, -3)$  is

- (a)  $(2, -1)$                       (b)  $(0, -1)$                       • (c)  $(0, -\frac{1}{2})$                       (d)  $(4, -\frac{5}{2})$

11. If  $x = 3 \sin A + 4 \cos A$  and  $y = 3 \cos A - 4 \sin A$  then  $x^2 + y^2$  is

- (a) 25                      (b) 45                      (c) 7                      (d) 49

12. Triangle TRY is a right-angled isosceles triangle then,  $\cos T + \cos R + \cos Y$  is:

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



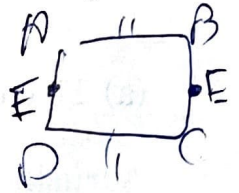
**Statement A (Assertion):** ABCD is a trapezium with  $DC \parallel AB$ . E and F are points on AD and BC respectively such that  $EF \parallel AB$ . Then  $AE/ED = BF/FC$ .

**Statement R (Reason):** Any line parallel to parallel sides of a trapezium divides the non parallel sides proportionally.

20. **Assertion (A):** The 6th term from the end of the AP  $5, 2, -1, -4, \dots, -31$  is  $-16$ .

**Reason (R):** general term ( $n$ th term) from the beginning is given by

$$a_n = a + (n-1)d.$$



### SECTION-B

Section B consists of 5 questions of 2 marks each.

21. Explain why  $7 \times 11 \times 13 + 13$  and  $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$  are composite numbers.

22. Solve the following pair of linear equations:

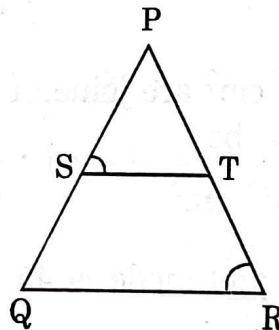
$$\frac{x}{2} + \frac{2y}{3} = -1 \quad \text{and} \quad x - \frac{y}{3} = 3$$

OR

$$0.2x + 0.3y = 1.3 \quad \text{and} \quad 0.4x + 0.5y = 2.3$$

23. Is it possible to design a rectangular mango grove whose length is twice its breadth, and the area is  $800 \text{ m}^2$ ? If so, find its length and breadth.

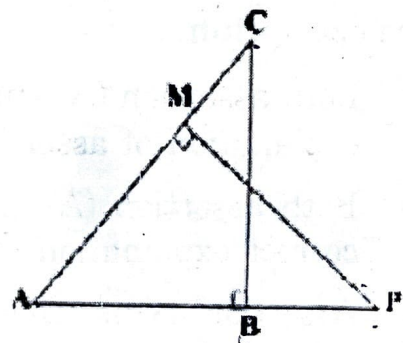
24. In the given figure,  $PS/SQ = PT/TR$  and  $\angle PST = \angle PRQ$ . Prove that PQR is an isosceles triangle.



OR

In the given figure, ABC and AMP are two right triangles, right angled at B and M respectively. Prove that:

$$\frac{CA}{BC} = \frac{PA}{MP}$$



25. In a right triangle ABC, right-angled at B, if  $\tan A = 1$ , then verify that  $2 \sin A \cos A = 1$ .

### SECTION C

Section C consists of 6 questions of 3 marks each.

26. Prove that  $\sqrt{11}$  is irrational.

27. The ratio of incomes of two persons is 9 : 7 and the ratio of their expenditures is 4 : 3. If each of them manages to save Rs. 2000 per month, find their monthly incomes.

28. If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $3x^2 - 13x - 10$ , then find a quadratic polynomial with zeroes  $(3\alpha + 1)$  and  $(3\beta + 1)$ .

29. Prove the following identity : 
$$\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$$

OR

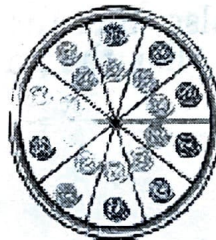
Prove that: 
$$\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$$

30. A chord of a circle of radius 15 cm subtends an angle of  $60^\circ$  at the centre. Find the area of the corresponding minor segment of the circle. (Use  $\pi = 3.14$  and  $\sqrt{3} = 1.73$ )

OR

A 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. Find :

- (i) the total length of the silver wire required.  
(ii) the area of each sector of the brooch.



31. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 8 ? (ii) 13 ? (iii) less than or equal to 12 ?

### SECTION D

Section D consists of 4 questions of 5 marks each.

32. Sides  $AB$  and  $AC$  and median  $AD$  of a triangle  $ABC$  are respectively proportional to sides  $PQ$  and  $PR$  and median  $PM$  of another triangle  $PQR$ . Show that  $\Delta ABC \sim \Delta PQR$ .

33. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs 18. Find the missing frequency  $f$ .

| Daily pocket allowance (in ₹) | 11-13 | 13-15 | 15-17 | 17-19 | 19-21 | 21-23 | 23-25 |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Number of children            | 7     | 6     | 9     | 13    | $f$   | 5     | 4     |

34. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of  $30^\circ$ , which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be  $60^\circ$ . Find the time taken by the car to reach the foot of the tower from this point.

OR

Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are  $60^\circ$  and  $30^\circ$ , respectively. Find the height of the poles and the distances of the point from the poles. [use  $\sqrt{3} = 1.73$ ]

35. A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

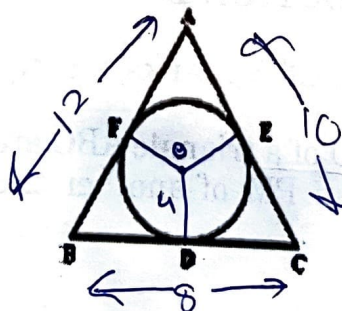
OR

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 ₹500 per  $m^2$ . (Note that the base of the tent will not be covered with canvas.)

## SECTION E

### CASE STUDY

36. Varun has been selected by his School to design the logo for Sports Day T-shirts for students and staff. The logo design is as given in the figure and he is working on the fonts and different colours according to the theme. In the given figure, the incircle  $C(O, r)$  of  $\triangle ABC$ , touches the sides BC, CA and AB at D, E and F respectively. The lengths of sides AB, BC and CA are 12 cm, 8 cm and 10 cm respectively. Based on the above information, answer the following.

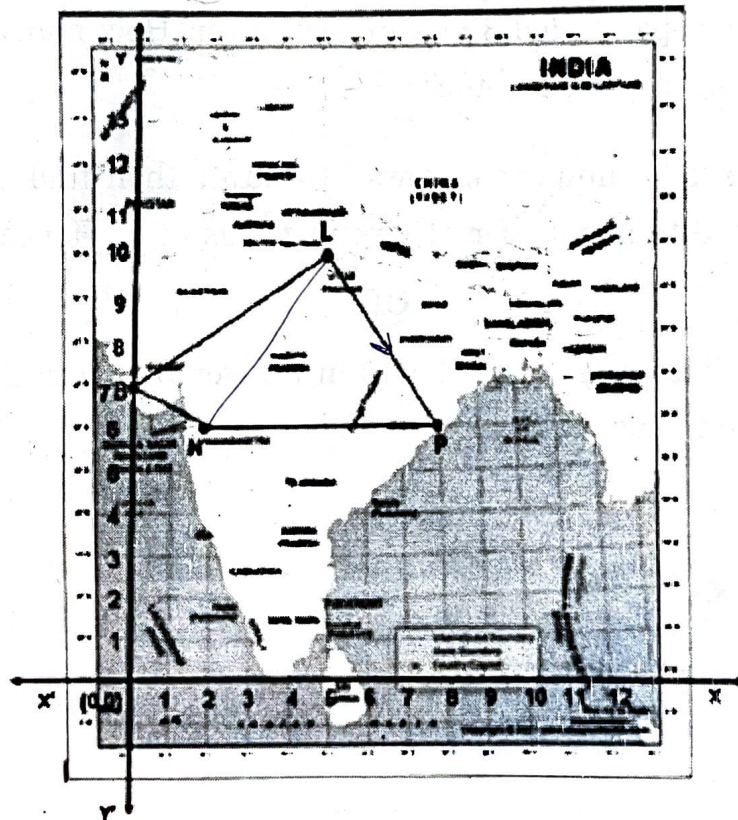


- (i) If the radius of the circle is 4 cm, Find the area of  $\Delta OAB$ . (1)
- (ii) Find the length of BD. (1)
- (iii) Prove that  $AF + BD + CE = AE + BF + CD = \frac{1}{2}$  (Perimeter of  $\Delta ABC$ ).

OR

Find area of  $\Delta ABC$ . (2)

37 **Case Study :** In a GPS, The lines that run east-west are known as lines of latitude, and the lines running north-south are known as lines of longitude. The latitude and the longitude of a place are its coordinates and the distance formula is used to find the distance between two places. The distance between two parallel lines is approximately 150 km. A family from Uttar Pradesh planned a round trip from Lucknow (L) to Puri (P) via Bhuj (B) and Nashik (N) as shown in the given figure below. Based on the above information, answer the following question using the coordinate geometry.



- (a) Find the distance between Lucknow (L) to Bhuj (B). (1)
- (b) If Kota (K), internally divide the line segment joining Lucknow (L) to Bhuj (B) into 3 : 2 then find the coordinate of Kota (K). (1)

(c) Name the type of triangle formed by the places Lucknow (L), Nashik (N) and Puri (P).

OR

Find a place (point) on the longitude (y-axis) which is equidistant from the point Lucknow (L) and Puri (P). (2)

38. CASE STUDY – Ms. Sheela visited a store near her house and found that the glass jars are arranged one above the other in a specific pattern. On the top layer there are 3 jars. In the next layer there are 6 jars. In the 3rd layer from the top there are 9 jars and so on till the 8th layer. On the basis of the above situation answer the following questions. 24.

- (i) Write an A.P whose terms represent the number of jars in different layers starting from top. Also, find the common difference. (1)  
3, 6, 9, 12, 15, 18, 21, 24
- (ii) The shopkeeper added 3 jars in each layer. How many jars are there in the 5th layer from the top? 15 (1)  
3
- (iii) If there are 'n' number of rows in a layer then find the expression for finding the total number of jars in terms of n. Hence find  $S_8$ . (2)

OR

Is it possible to arrange 34 jars in a layer if this pattern is continued? Justify your answer.