2 | PRACTICE PAPER

[Time Allowed: 3 Hours] [Maximum Marks: 80]

General Instructions: As given in Practice Paper 1.

Part – A

SECTION – I

1. The HCF of two co-primes a and b is

(a) 1 (b) 2 (c) 3 (d) 0

OR

HCF (306, 657) = 9, then LCM (306, 657) =

(a) 22328 (b) 23238 (c) 22338 (d) 22138

2. The graph of the polynomial $p(x)$ cuts the x-axis at 2 places and touches it at 4 places. The number of zeroes of $p(x)$ is

(a) 2 (b) 6 (c) 4 (d) 8

3. The system of equations $4x + py = 21$ and $px - 2y = 15$ has unique solution then

(a) $p \neq 8$ (b) $p \neq -8$

(c) $p \neq 0$ (d) None of these

4. If the cost of 2 T-shirts and one pant is ₹ 625 and 3 T-shirts and 2 pants together cost ₹ 1125. Then linear equations representing the situation is (where x = cost of 1 T-shirt and y = cost of 1 pant)

(a) $2x + y = 625$, $3x + 2y = 1125$ (b) $2x - y = 6125$, $3x + 2y = 1125$

(c) $2x + y = 625$, $3x + 2y = 125$ (d) $2x + y = 3x + 2y$

5. The 11th term from the last term (towards the first term) of the AP: 10, 7, 4, ..., –62 is

(a) 32 (b) 64 (c) –64 (d) –32

OR

Which term of the AP: 3, 8, 13, 18, ..., is 78?

(a) 6 (b) 16 (c) 10 (d) 12

6. Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. The quadratic equation representing the situation is

(a) $x^2 - 32x + 270 = 0$ (b) $x^2 - 32x + 273 = 0$

(c) $x^2 + 32x - 273 = 0$ (d) $x^2 + 32x - 270 = 0$

7. For what value of p, the equation $px^2 - 18x + 1 = 0$ is a perfect square?

(a) 81 (b) 0 (c) 18 (d) 22

OR

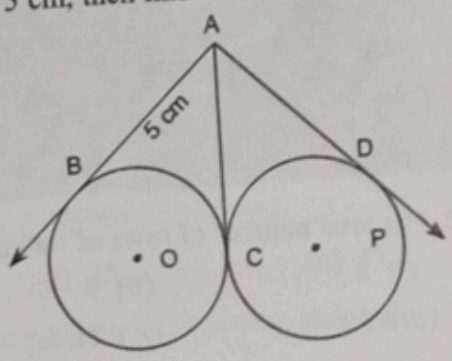
If the discriminant of $3x^2 + 2x + a = 0$ is double the discriminant of $x^2 - 4x + 2 = 0$, then a =

(a) –1 (b) 1 (c) 0 (d) 2

8. A line intersecting a circle in two points is called _____ to a circle.

(a) tangent (b) radius (c) secant (d) chord

9. In the given figure AB, AC and AD are tangents i AB = 5 cm, then find AD.



OR

From a point Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm., find the radius of the circle.

10. X is a point on the side BC of ΔABC. XM and XN are drawn parallel to AB and AC respectively meeting AB in N and AC in M. MN produced meets CB produced at T. Prove that $TX^2 = TB \times TC$

11. State Thales Theorem.

12. If $a = \sec\theta - \tan\theta$ and $b = \sec\theta + \tan\theta$, then find ab.

13. Find the value of $\dfrac{\cos^4 x + \cos^2 x \sin^2 x + \sin^2 x}{\cos^2 x + \sin^2 x \cos^2 x + \sin^4 x}$.

14. A cube of side 4 cm is cut into cubes of side 1 cm, then find total surface area of all the small cubes.

15. A fair dice is rolled. Find the probability of getting a number x such that $1 \le x \le 6$.

OR

One card is drawn from a well shuffled deck of 52 cards. Calculate the probability that the card will be an ace.

16. The length of minute hand of a clock is 14 cm. Find the area swept by the minute hand in ten minutes. (Use $\pi = \dfrac{22}{7}$)

SECTION – II

17. **Case Study – 1**

BIRTHDAY CELEBRATION

Sonakshi is celebrating her 14th birthday. She invited her friends. Her friends bought a cake, pastries, candles and a pack of toffees. Pack of toffees contains 230 toffees. They arrange the toffees in rows such that in the first row there are 14 toffees, in the second row there are 16 toffees in the third row, there are 18 toffees and so on.

(*a*) The total number of rows of toffees is

(*i*) 8 (*ii*) 9

(*iii*) 10 (*iv*) 11

(*b*) How many toffees will be placed in the last row?

(*i*) 28 (*ii*) 38

(*iii*) 42 (*iv*) 32

(*c*) How many toffees are placed in second last row?

(*i*) 26 (*ii*) 30

(*iii*) 27 (*iv*) 28

(*d*) Total number of toffees placed in first five rows is

(*i*) 90 (*ii*) 92

(*iii*) 94 (*iv*) 96

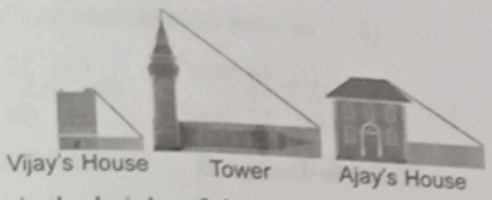
(*e*) One of the friends suggests to make 14 rows, then how many total toffees will be placed by them with the same arrangements?

(*i*) 478 (*ii*) 378

(*iii*) 278 (*iv*) 578

18. **Case Study – 2**

Vijay is trying to find the average height of a tower near his house. He is using the properties of similar triangles. The height of Vijay's house if 20 m when Vijay's house casts a shadow 10 m long on the ground. At the same time, the tower casts a shadow 50 m long on the ground and the house of Ajay casts 20 m shadow on the ground.



(*a*) What is the height of the tower?

(*i*) 20 m (*ii*) 50 m

(*iii*) 100 m (*iv*) 200 m

(*b*) What will be the length of the shadow of the tower when Vijay's house casts a shadow of 12 m?

(*i*) 75 m (*ii*) 50 m

(*iii*) 45 m (*iv*) 60 m

(*c*) What is the height of Ajay's house?

(*i*) 30 m (*ii*) 40m

(*iii*) 50 m (*iv*) 20m

(*d*) When the tower casts a shadow of 40 m, same time what will be the length of the shadow of Ajay's house?

(*i*) 16 m (*ii*) 32 m

(*iii*) 20 m (*iv*) 8 m

(*e*) When the tower casts a shadow of 40 m, same time what will be the length of the shadow of Vijay's house?

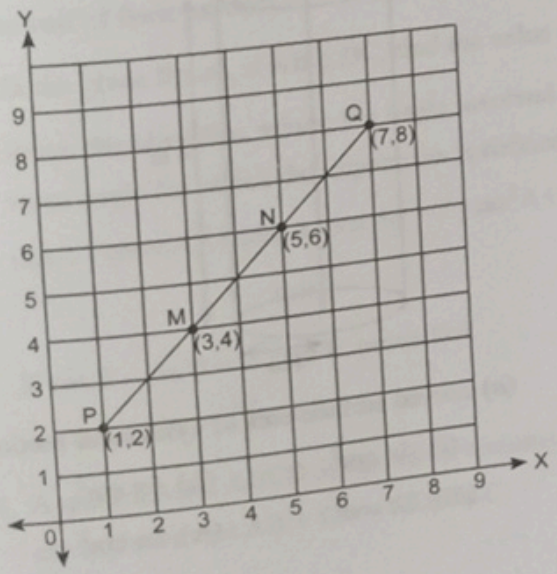
(*i*) 15 m (*ii*) 32 m

(*iii*) 16 m (*iv*) 8 m

19. Case Study – 3

ATHLETE MEET

SOM, a firm organised an athletic meet. They made a rectangular grid on their ground.



Points P(1, 2) and Q(7, 8) were marked for disc throw competition. Disc were made to throw from point P towards point Q.

(*a*) Find the PM

(*i*) $\sqrt{5}$ units (*ii*) $\sqrt{7}$ units

(*iii*) $\sqrt{10}$ units (*iv*) $\sqrt{8}$ units

(*b*) Find PN

(*i*) $2\sqrt{5}$ units (*ii*) $4\sqrt{2}$ units

(*iii*) $3\sqrt{2}$ units (*iv*) $2\sqrt{3}$ units

(*c*) Mid-point of PQ are

(*i*) (5, 4) (*ii*) (4, 5)

(*iii*) (4, 3) (*iv*) (4, 4)

(*d*) M divides PQ in the ratio

(*i*) 1 : 3 (*ii*) 1 : 2

(*iii*) 2 : 1 (*iv*) 3 : 1

(*e*) $\frac{PM}{QN}$ =

(*i*) 2 (*ii*) $\frac{1}{3}$

(*iii*) $\frac{1}{4}$ (*iv*) 1

20. Case Study – 4

EVALUATION TEST

A self evaluation test was given to 160 students. Maximum marks were 50. Maximum and Minimum marks scored were 49 and 4 respectively.

36 students scored above 40 marks. 26 students scored between 30 and 40 marks and 42 students scored between 20 and 30 marks. 24 students scored less than 10 marks whereas 32 students scored between 10 and 20 marks class teacher prepared a frequency distribution table for the data of the marks obtained by the students in the test.

(*a*) Find the range of the marks obtained by the students.

(*i*) 35 (*ii*) 45

(*iii*) 25 (*iv*) 29

(b) If A separate section is made for the students scoring less than 20 marks, find the number of students in that section.

(i) 24 (ii) 30

(iii) 46 (iv) 56

(c) Find the median class of the distribution

(i) 10–20 (ii) 20–30

(iii) 30–40 (iv) 40–50

(d) Find the upper limit of the modal class of frequency distribution.

(i) 20 (ii) 30

(iii) 40 (iv) 50

(e) Find the cumulative frequency of the class preceding the median class.

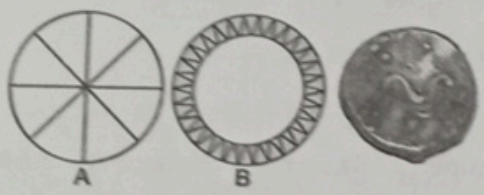
(i) 50 (ii) 60

(iii) 80 (iv) None of these

21. **Case Study – 5**

A brooch is a small piece of jewellery which has a pin at the back so it can be fastened on a dress, blouse or coat.

Designs of some brooch are shown below. Observe them carefully.



Design A: Brooch A is made with silver wire in the form of a circle with diameter 28 mm. The wire used for making 4 diameters which divide the circle into 8 equal parts.

Design B: Brooch b is made two colours_Gold and silver. Outer part is made with Gold. The circumference of silver part is 44 mm and the gold part is 3 mm wide everywhere.

Refer to Design A

(a) The total length of silver wire required is

(i) 180 mm (ii) 200 mm

(iii) 250 mm (iv) 280 mm

(b) The area of each sector of the brooch is

(i) 44 mm^2 (ii) 52 mm^2

(iii) 77 mm^2 (iv) 68 mm^2

Refer to Design B

(c) The circumference of outer part (golden) is

(i) 48.49 mm (ii) 82.2 mm

(iii) 72.50 mm (iv) 62.86 mm

(d) The difference of areas of golden and silver parts is

(i) 18π (ii) 44π

(iii) 51π (iv) 64π

(e) A boy is playing with brooch B. He makes revolution with it along its edge. How many complete revolutions must it take to cover 80π mm ?

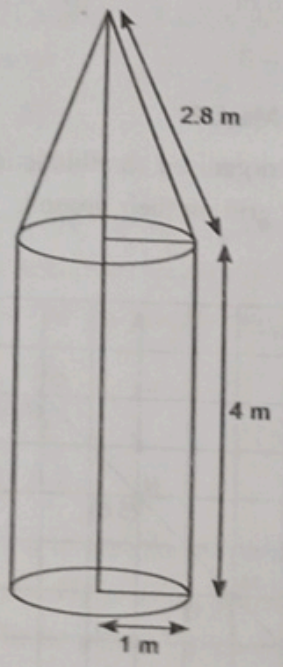
(i) 2 (ii) 3

(iii) 4 (iv) 5

22. **Case Study – 6**

MODEL

Ranveer, an architect design a rough sketch of model as shown in figure: "A cylinder is surmounted by conical top."



(a) curved surface area of cylindrical portion is

(i) 4π cm^2 (ii) 6π cm^2

(iii) 8π cm^2 (iv) 2π cm^2

(b) height of conical part is

(i) 2.42 cm (ii) 2.61 cm

(iii) 2.5 cm (iv) 25.2 cm

(c) curved surface area of conical part is

(i) $\frac{2.8}{\pi}$ cm^2 (ii) 28π cm^2

(iii) 2.8 cm^2 (iv) 2.8π cm^2

(d) Base area of cylinder =

(i) π cm^2 (ii) $\frac{\pi}{2}$ cm^2

(iii) 2π cm^2 (iv) 3π cm^2

(e) Total surface area of combination is

(i) 5.8 cm^2 (ii) $\frac{5.8}{\pi}$ cm^2

(iii) 5.8π cm^2 (iv) 58π cm^2

Part – B

SECTION – III

23. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum numbers of columns in which they can march?

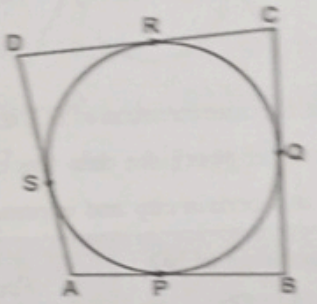
24. Find a relation between x and y such that the points (x, y) is equidistant from the points (7, 1) and (3, 5).

OR

The centre of a circle is C(2, k). If A(2, 1) and B(5, 2) are two points on its circumference, then find the value of k.

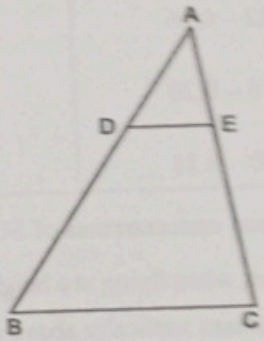
25. Find the value of k such that the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ has sum of its zeros equal to half of their product.

26. In the given figure, if AB ∥ DC, find the value of x.



OR

In the figure, D and E are points on AB and AC respectively such that DE∥BC. If AD = $\frac{1}{3}$BD and AE = 4.5 cm, find AC.



27. Prove the identities, where the angle involved is an acute angle for which the expression is defined.

$(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

OR

If $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$, prove that

$\cos\theta + \sin\theta = \sqrt{2}\cos\theta$.

28. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC.

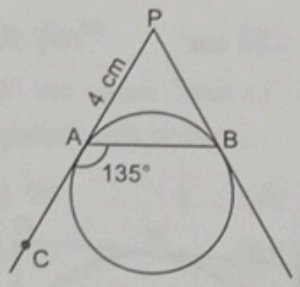
29. Given that $\sqrt{2}$ is irrational, prove that $(5 + 3\sqrt{2})$ is an irrational number.

30. A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, then what is its original average speed?

OR

If (–4) is a root of the equation $x^2 + px - 4 = 0$ and the equation $x^2 + px + q = 0$ has equal roots, then find the values of p and q.

31. In the given figure, PA and PB are tangents to a circle from an external point P such that PA = 4 cm and $\angle BAC = 135°$. Find the length of chord AB.



32. To find out the concentration of SO_2 in the air (in parts per million, i.e. ppm), the data was collected for 30 localities in a certain city and is presented below:

Concentration of SO_2 (in ppm)	Frequency
0.00 – 0.04	4
0.04 – 0.08	9
0.08 – 0.12	9
0.12 – 0.16	2
0.16 – 0.20	4
0.20 – 0.24	2

Find the mean concentration of SO_2 in the air.

33. An aeroplane, when flying at a height of 4000 m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of two planes from the same point on the ground are 60° and 45°, respectively. Find the vertical distance between the aeroplanes at that instant. $(\sqrt{3} = 1.732)$

34. The lengths of 40 leaves of a plant are measured correct to the nearest millimetres, and the data obtained is represented in the following table:

Length (in mm)	Numbers of leaves
118 – 126	3
127 – 135	5
136 – 144	9
145 – 153	12
154 – 162	5
163 – 171	4
172 – 180	2

Find the median length of the leaves.

35. 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°, 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°. Find the time taken by the car to reach the foot of the tower from this point.

OR

As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse ,find the distance the two ships. $(\sqrt{3} = 1.73)$

36. A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 squares metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m. Find its length and breadth.