7 | PRACTICE PAPER

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

General Instructions: As given in Practice Paper 1.

Part – A

SECTION – I

1. If HCF (253, 440) = 11 and LCM(253, 440) = 253 k then k =

(*a*) 40 (*b*) 42 (*c*) 14 (*d*) 21

OR

If d = HCF (48, 72), then d =

(*a*) 14 (*b*) 24 (*c*) 26 (*d*) 40

2. Find the greatest number of 5 digits, that will give us remainder of 5, when divided by 8 and 9 respectively.

(*a*) 99921 (*b*) 99931 (*c*) 99941 (*d*) 99951

3. If the system of equations $2x - 3y = 3$ and $-4x + qy = \frac{p}{2}$ is inconsistent then

(*a*) $p \neq -6$ (*b*) $p \neq 6$

(*c*) $p \neq 12$ (*d*) $p \neq -12$

4. If the median of the data, $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8$ is a, then the median of the data x_3, x_4, x_5, x_6 is (where $x_1 < x_2 < x_3 < x_4 < x_5 < x_6 < x_7 < x_8$)

(*a*) $\frac{a}{2}$ (*b*) $2a$ (*c*) a (*d*) $-a$

5. If $\cos A = \frac{\sqrt{3}}{2}$, then $\sin 2A$ =

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

OR

ABC is a triangle right-angled at C and $AC = \sqrt{3}$ BC. then $\angle ABC$ =

(*a*) 45° (*b*) 60° (*c*) 30° (*d*) 90°

6. If A(–2, 3) and B(2, 3) are two vertices of ΔABC and G(0, 0) is its centroid, then coordinates of C =

(*a*) (0, –6) (*b*) (0, 6) (*c*) (6, 6) (*d*) (0, 0)

7. If the sum of 16 terms of an AP is 1624 and the first term is 500 times the common difference, then the common difference is

(*a*) $-\frac{1}{5}$ (*b*) 1 (*c*) 5 (*d*) $\frac{1}{5}$

OR

Find the sum of all even natural numbers less than 100.

(*a*) 2450 (*b*) 2540 (*c*) 2505 (*d*) 2500

8. If $\sec\theta + \tan\theta = 7$, then $\sec\theta - \tan\theta$ =

(*a*) $\frac{-1}{7}$ (*b*) $\frac{2}{7}$ (*c*) $\frac{3}{7}$ (*d*) $\frac{1}{7}$

9. What is the largest number that divides each one of 1152 and 1664 exactly?

10. A sequence $\{a_n\}$ is given by the formula $a_n = 10 - 3n$. Prove that it is an AP.

11. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram, taken in order, find x and y.

12. D and E are respectively the points on the sides AB and AC of a triangle ABC such that AD = 2 cm, BD = 3 cm, BC = 7.5 cm and DE || BC. Then, length of DE (in cm) is

13. A card is drawn from a pack of cards numbered 1 to 52. Find the probability that the number on the card is a perfect square.

OR

A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting a red face card.

14. Solve for x and y:

$2x = 5y + 4$

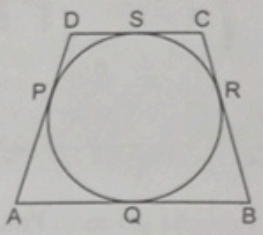
$3x - 2y + 16 = 0$

15. Find the area of a quadrant of a circle, whose circumference is 44 cm.

16. Two concentric circles of radii 13 cm and 12 cm, are given. Find the length of chord of the larger circle which touches smaller circle.

OR

In the given figure, quadrilateral ABCD is circumscribed, touching the circle at P, Q, R and S. If AP = 5 cm, BC = 7cm and CS = 3cm, then find the length of AB.



SECTION – II

17. **Case Study – 1**

Travel to Shimla

Two friends Raj and Anuj have to travel to Shimla via Chandigarh from Gurgaon. When they reached the bus stand of Gurgaon, Raj got a call from his friend Ankit who was also on his way to bus stand. Ankit requested Raj to buy two tickets to Chandigarh and 3 tickets to Shimla also Anuj's friend Kamal asked Anuj to buy 3 tickets to Chandigarh and 4 tickets to Shimla. Raj purchased 2 tickets to Chandigarh and 3 tickets to Shimla for ₹ 3700, Anuj spent ₹ 5100 to buy 3 tickets to Chandigarh and 4 tickets to Shimla.

(*a*) If cost of one ticket to Chandigarh is ₹ x and cost of one ticket to Shimla is ₹ y then represent the situation algebraically.

(*i*) $3x + 4y = 3700$; $2x + 3y = 5100$

(*ii*) $3x + 2y = 3700$; $3x + 4y = 5100$

(*iii*) $2x + 3y = 3700$; $3x + 4y = 5100$

(*iv*) $2x + 3y = 3700$; $4x + 3y = 5100$

(*b*) The cost of one ticket from Gurgaon to Chandigarh is

(*i*) ₹ 400 (*ii*) ₹ 500

(*iii*) ₹ 800 (*iv*) ₹ 900

(*c*) The cost of one ticket from Gurgaon to Shimla is

(*i*) ₹ 400 (*ii*) ₹ 500

(*iii*) ₹ 800 (*iv*) ₹ 900

(*d*) If Raj purchases 3 tickets to Chandigarh and 5 tickets to Shimla, how much amount he will pay?

(*i*) ₹ 5000 (*ii*) ₹ 5500

(*iii*) ₹ 6000 (*iv*) ₹ 6500

(*e*) If Anuj spends ₹ 5600 to buy tickets how many total number of tickets he purchased?

(*i*) 6 (*ii*) 7

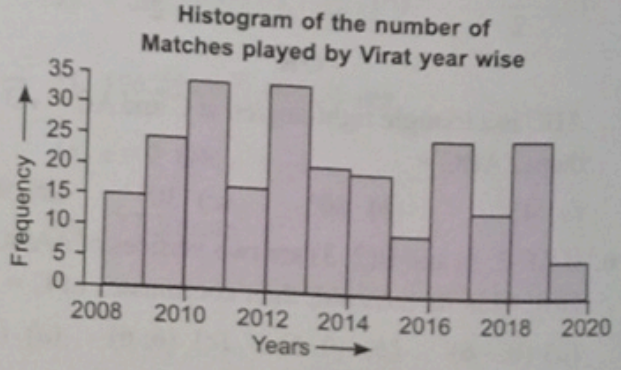
(*iii*) 8 (*iv*) 9

18. **Case Study – 2**

Record of Matches

Born on November 5, 1988. Virat Kohli is the current captan of the Indian national cricket team. A right handed top order batsman. Kohli is regarded as one of the best contemporary batsman in the world. Since October 2017, he has been the top-ranked ODI batsman to the world. Among indian batsmen, Kohli has the best ever Test rating (937 points), ODI rating (911 points) and T20I rating (897 points). His batting average in ODI is 59.34 runs per inning in which he batted.

Given below is the histogram showing the number of matches played by Virat Kohli from 2008 to 2020.



Number of Matches played in the year	Number of years
5 – 10	1
10 – 15	1
15 – 20	4
20 – 25	1
25 – 30	3
30 – 35	0
35 – 40	2

(*a*) Due to the pandemic, most of the matches scheduled for the year were cancelled or postponed. Had it been a normal year for finding the number of matches expected to be played in 2020, which measure of central tendency will be used?

(*i*) Mean (*ii*) Median

(*iii*) Mode (*iv*) None of the above

(*b*) How many matches would have been played in 2020?

(*i*) 30 (*ii*) 25

(*iii*) 20 (*iv*) 5

(*c*) If the mean of the above data is A, Mode B, the median C is

(*i*) $\frac{3A+B}{2}$ (*ii*) $\frac{B+2A}{3}$

(*iii*) $\frac{A+2B}{3}$ (*iv*) $\frac{A+3B}{2}$

(*d*) What is the difference between the upper limits of median and modal class?

(*i*) 0 (*ii*) 5

(*iii*) 10 (*iv*) 15

(*e*) Using the above data, predict the number of runs scored by Virat Kohli in ODI (considering that he did not get the strike in 45 matches he played).

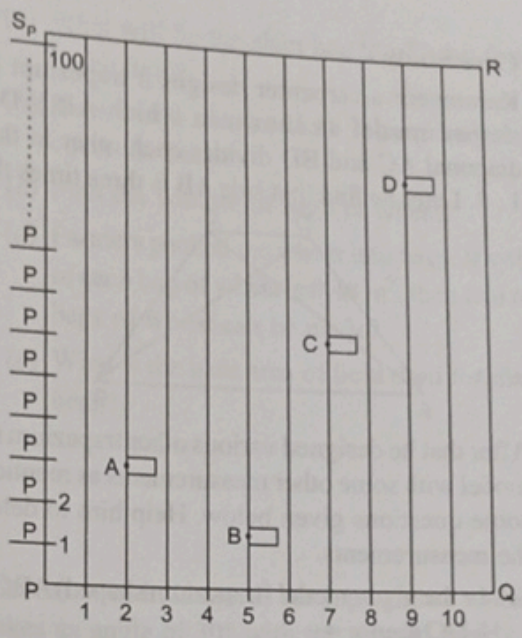
(*i*) Data not sufficient (*ii*) 11,500

(*iii*) 11,868 (*iv*) 14,538

19. Case Study – 3

Sports Day

School of design and architect are celebrates it annual sports day in the month of November every year. This year also their rectangular shaped ground PQRS is marked with lines (with the chalk powder). These lines are at a distance of 1 m each and 100 flags have been placed at distance of 1 m from each other along PS.



To begin with Sarika runs $\frac{1}{4}$th of distance PS and post a white flag at A. Durva runs $\frac{1}{5}$th the distance of PS on the 5th line and post a green flag at B. Ashish runs $\frac{1}{2}$ the distance of PS on the 7 line and place a red flag at C. Pratham runs $\frac{3}{4}$th the distance of PS along 9th line and post blue flag at D.

(*a*) Taking P as origin what are the coordinates of A.

(*i*) (2, 20) (*ii*) (2, 25)

(*iii*) (2, 15) (*iv*) (2, 10)

(*b*) Distance between AB is equal to

(*i*) 6 units (*ii*) $\sqrt{17}$ units

(*iii*) $\sqrt{34}$ units (*iv*) $\sqrt{51}$ units

(*c*) Distance between AC is equal to

(*i*) $\sqrt{650}$ units (*ii*) $\sqrt{700}$ units

(*iii*) $\sqrt{629}$ units (*iv*) $\sqrt{640}$ units

(*d*) Mid point of AD is

(*i*) $\left(\frac{11}{2}, \frac{75}{2}\right)$ (*ii*) $\left(\frac{11}{2}, 50\right)$

(*iii*) (11, 25) (*iv*) (11 30)

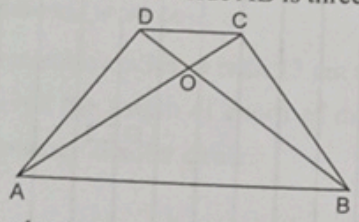
(*e*) If Principal of the school stands at E which is exactly the mid-point of line joining BC, then coordinates of E are

(*i*) (6, 30) (*ii*) (6, 35)

(*iii*) (6, 40) (*iv*) (5, 35)

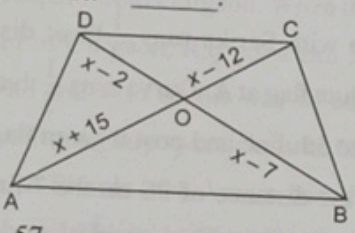
20. Case Study – 4

Karamveer a carpenter designs a trapezium ABCD shaped model as shown in which AB || DC and diagonal AC and BD divides each other in the ratio 1 : 3. Later he find that side AB is three times the CD.



After that he designed various other trapezium shaped model with some other measurements as mentioned in some questions given below. Help him to determine the measurements.

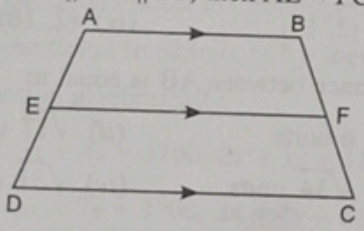
(*a*) In the given model (trapezium shaped) ABCD, AB || DC then $x =$ _____.



(*i*) $\frac{57}{16}$ m (*ii*) $\frac{47}{16}$ m

(*iii*) $\frac{15}{16}$ m (*iv*) $\frac{114}{13}$ m

(*b*) He designed a trapezium ABCD, as shown such that AB || DC || EF, then AE × FC =



(*i*) BF × DE (*ii*) BF × AE

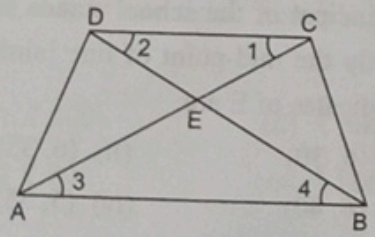
(*iii*) AB × DC (*iv*) EF × BF

(*c*) He designed a trapezium ABCD in which AB || DC. If diagonals AC and BD intersects at P then AP × DP =

(*i*) PC × PD (*ii*) PC × PB

(*iii*) PB × PA (*iv*) CP × AP

(*d*) He designed a quadrilateral ABCD, such that $\angle 1 = \angle 3$ and $\angle 2 = \angle 4$



If $\frac{AE}{EC} = \frac{DE}{BE} = \frac{1}{2}$, and DC = 4 cm then AB =

(*i*) 12 cm (*ii*) 2 cm

(*iii*) 8 cm (*iv*) 4 cm

(*e*) In all the trapezium shaped model which theorem he is using.

(*i*) Pythagoras theorem

(*ii*) BPT

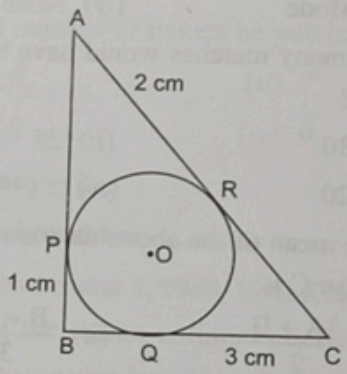
(*iii*) Euclid lemma

(*iv*) None of these

21. Case Study – 5

Triangular plate

In triangle, a circle is inscribed as shown sides AB, BC and AC act as tangents to inscribed circle at P, Q, R and O is centre of circle.



(*a*) length AP =

(*i*) 2 cm (*ii*) 1 cm

(*iii*) 3 cm (*iv*) 5 cm

(*b*) length BQ =

(*i*) 2 cm (*ii*) 1 cm

(*iii*) 3 cm (*iv*) 5 cm

(*c*) ΔABC is a/an

(*i*) right angled triangles

(*ii*) isosceles triangle

(*iii*) equilateral triangles

(*iv*) None of these

(*d*) As O is centre of circle, then radius OP =

(*i*) 5 cm (*ii*) 2 cm

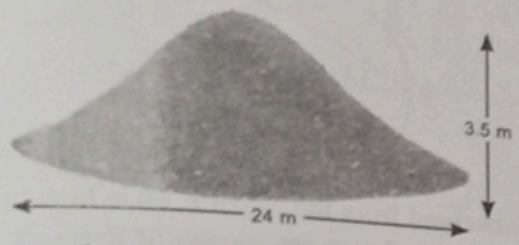
(*iii*) 1 cm (*iv*) 3 cm

(*e*) Area of square OPBQ =

(*i*) 4 cm^2 (*ii*) 2 cm^2

(*iii*) 3 cm^2 (*iv*) 1 cm^2

22. The farmers in the field make a heap of wheat in the field in the form of a cone. The base diameter of heap formed in the field is 24 m and height of heap formed is 3.5 m.



Answer the questions based on above:

(*a*) What will be the slant height of heap formed in the field?

(*b*) How much canvas cloth is required to just cover the heap?

(*c*) Find the volume of heap of wheat?

(*d*) Farmers packed the wheat into bags. If volume of each bag of wheat is 0.48 m^3, then two many bags of wheat can be made?

(*e*) What is the base area of field used for making heap?

Part – B

SECTION – III

23. Find the difference of the roots of equation $x^2 - 7x - 9 = 0$.

OR

If -4 is a root of the quadratic equation $x^2 + px - 4 = 0$ and the equation $2x^2 + px + k = 0$ has equal roots, then find the value of k.

24. An AP consists of 60 terms. If the first and the last terms be 7 and 125 respectively, find 32nd term.

25. A jigsaw puzzle is composed of five rectangular pieces, three circular pieces and five triangular pieces. If one piece of the puzzle is lost, find the probability that the lost piece is a circular one.

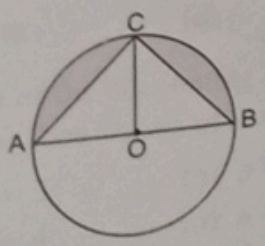
OR

A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is

(*i*) a card of spade or an ace

(*ii*) neither a king nor a queen

26. A round thali has two in build equal triangular sections for serving vegetables and a separate semicircular area for keeping rice or chapati. If the radius of the thali is 21cm. Find the area of the thali that is shaded in the figure.



27. A ladder, 4 m in length is resting against a wall and makes an angle of 30° with the ground. Find:

(*i*) the height of the wall up to which the ladder reaches.

(*ii*) the distance of the foot of ladder from the wall.

28. The sum of numerator and denominator of a fraction is 12. If 1 is added to both the numerator and the denominator, the fraction becomes $\frac{3}{4}$. Find the fraction.

29. The 4th term of an AP is zero. Prove that the 25th term of the AP is three times its 11th term.

OR

Determine k, so that $k^2 + 4k + 8$, $2k^2 + 3k + 6$ and $3k^2 + 4k + 4$ are three consecutive terms of an AP.

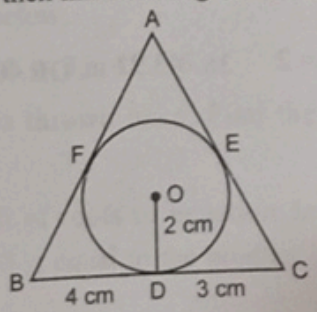
30. If $\cot\theta = \frac{12}{5}$, show that $\tan^2\theta - \sin^2\theta = \sin^4\theta \cdot \sec^2\theta$.

OR

Prove that :

$$\frac{1}{\sec A - \tan A} - \frac{1}{\cos A} = \frac{1}{\cos A} - \frac{1}{\sec A + \tan A}.$$

31. In figure, a triangle ABC is drawn to circumscribe a circle of radius 2 cm such that the segments BD and DC into which BC is divided by the point of contact D are the lengths 4 cm and 3 cm respectively. If area of $\Delta ABC = 21$ cm^2, then find the lengths of sides AB and AC.



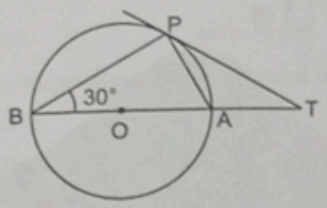
32. Find HCF and LCM of 404 and 96 and verify that HCF × LCM = Product of the two given numbers.

33. Some students planned a picnic. The budget for food was ₹ 4800. But 8 of these failed to go and thus cost of food, for each member , increased by ₹ 100. How many students attended the picnic?

34. If the mode of following data is 45, find x and y given $\Sigma f_i = 50$.

Class interval	Frequency
10 – 20	4
20 – 30	8
30 – 40	x
40 – 50	12
50 – 60	10
60 – 70	4
70 – 80	y

35. In figure, O is the centre of the circle and TP is the tangent to the circle from an external point T. If $\angle PBT = 30°$, prove that BA : AT = 2 : 1.



36. As observed from the top of a 60 m high light house 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 light house, find the distance between the two ships. (Use $\sqrt{3} = 1.732$)

OR

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 the two planes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant.