10 | PRACTICE PAPER

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

General Instructions: As given in Practice Paper 1.

Part – A

SECTION – I

1. The sum of exponents of prime factors in the prime factorisation of 43200 is

(*a*) 23 (*b*) 41 (*c*) 17 (*d*) 11

OR

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

(*a*) 32 (*b*) 64

(*c*) 128 (*d*) 256

2. The coordinates of the point which divides the line joining the points A(1, 2) and B(–1, 1) internally in the ratio 1 : 2 are

(*a*) $\left(\frac{1}{2}, \frac{5}{4}\right)$ (*b*) $\left(\frac{1}{2}, \frac{1}{2}\right)$

(*c*) $\left(\frac{1}{3}, \frac{5}{3}\right)$ (*d*) $\left(\frac{1}{5}, \frac{3}{5}\right)$

3. If one zero of the polynomial $f(x) = (k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other, then k =

(*a*) –1 (*b*) 3 (*c*) 2 (*d*) 0

4. The terms k, $k + 4$, $3k$ are in AP then k =

(*a*) 6 (*b*) 4 (*c*) –4 (*d*) 8

OR

How many terms of AP : 18, 16, 14,.... should be taken, so that their sum is zero?

(*a*) 19 (*b*) 17 (*c*) 13 (*d*) 21

5. The roots of the quadratic equation $x^2 - 3x - 10 = 0$ by factorisation are

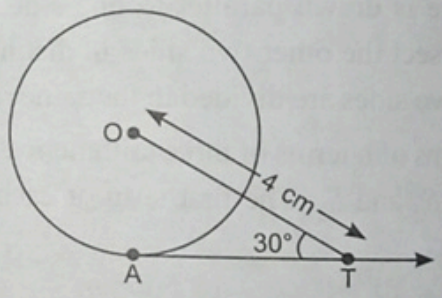
(*a*) –2, 5 (*b*) 5, 3 (*c*) –3, 5 (*d*) 0, 1

6. Two cubes each with 6cm edge are joined end to end. Then surface area of the resulting cuboid is

(*a*) 260 cm^2 (*b*) 100 cm^2

(*c*) 360 cm^2 (*d*) 440 cm^2

7. In figure AT is a tangent to the circle with centre O such that OT = 4 cm and $\angle OTA = 30°$. Then AT =



(*a*) $\sqrt{3}$ cm (*b*) $2\sqrt{3}$ cm

(*c*) $\frac{\sqrt{3}}{2}$ cm (*d*) $\frac{1}{2}$ cm

8. The perimeter of triangle with vertices (4, 0), (0, 0), (0, 3) is

(*a*) 15 (*b*) 12

(*c*) 7 (*d*) 14

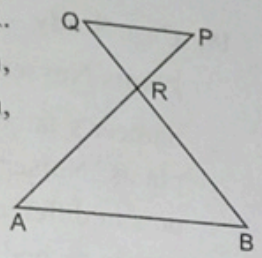
OR

The coordinates of centroid of triangle whose vertices are (0, 4), (8, 16), (6, 0) is

(*a*) (7, 1) (*b*) (1, –7)

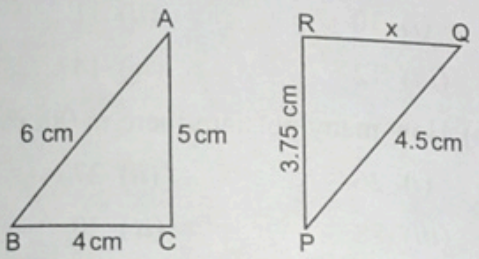
(*c*) (7, 10) (*d*) (10, 7)

9. In given figure, $\Delta ABR \sim \Delta PQR$. If PQ = 40 cm, AR = 60 cm, AP = 82 cm and QR = 55 cm, find PR and BR.



OR

In the given figure, if $\Delta ABC \sim \Delta PQR$



Find x.

10. If X and Y are two positive integer such that least prime factor of X is 7 and least prime factor of Y is 11 then find the least prime factor of X + Y.

11. A bag contains 3 red, 5 black and 7 white balls. A ball is drawn from the bag at random. Find the probability that the ball drawn is white.

12. If the difference between the mode and median is 2, then find the difference between the median and mean.

13. Find the value of $\dfrac{\left\{\dfrac{4}{\tan^2 60^\circ}+\dfrac{1}{\cos^2 30^\circ}-2\sin^2 45^\circ\right\}}{(\sin^2 60^\circ+\cos^2 45^\circ)}$.

14. If the wheel of an engine of a train is $4\frac{2}{7}$ m in circumference makes seven revolutions in 4 seconds, then find the speed of the train. (Use $\pi = 22/7$)

15. The mean and median of the data a, b and c are 50 and 35, where $a < b < c$. If $c - a = 55$, then find $(b - a)$.

16. Find the distance between the points $(2k + 4, 5k)$ and $(2k, -3 + 5k)$.

OR

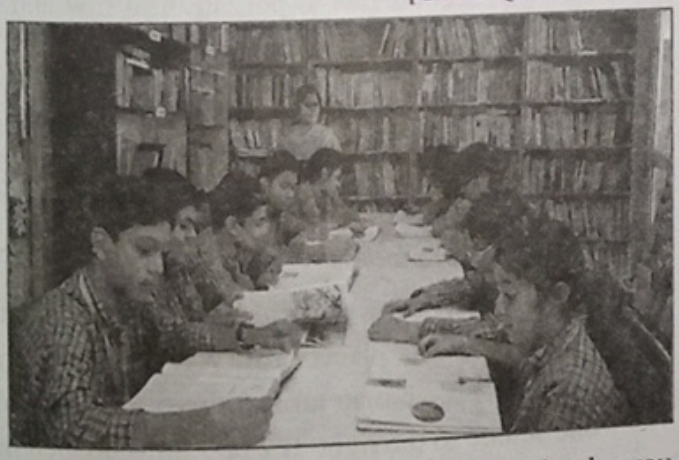
Find the length of the longest side of the triangle formed by the line $3x + 4y = 12$ with the coordinate axes.

SECTION – II

17. **Case Study – 1**

To enhance the reading skills of grade X students, the school nominates you and two of your friends to set up a class library. There are two sections- section A and section B of grade X. There are 32 students in section A and 36 students in section B.

[CBSE Question Bank]



(*a*) What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B?

(*i*) 144 (*ii*) 128

(*iii*) 288 (*iv*) 272

(*b*) If the product of two positive integers is equal to the product of their HCF and LCM is true then, the HCF (32, 36) is

(*i*) 2 (*ii*) 4

(*iii*) 6 (*iv*) 8

(*c*) 36 can be expressed as a product of its primes as

(*i*) $2^2 \times 3^2$ (*ii*) $2^1 \times 3^3$

(*iii*) $2^3 \times 3^1$ (*iv*) $2^0 \times 3^0$

(*d*) $7 \times 11 \times 13 \times 15 + 15$ is a

(*i*) prime number

(*ii*) composite number

(*iii*) neither prime nor composite

(*iv*) none of the above

(*e*) If p and q are positive integers such that $p = ab^2$, and $q = a^2b$, where a, b are prime numbers, then the LCM (p, q) is

(*i*) ab (*ii*) a^2b^2

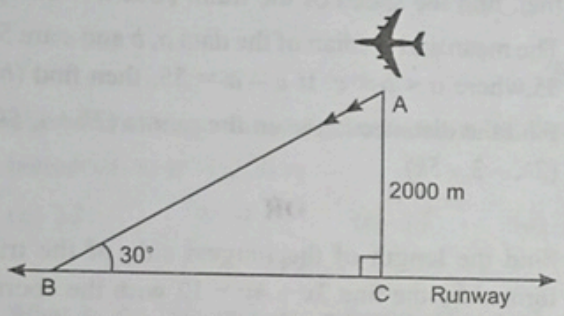
(*iii*) a^3b^2 (*iv*) a^3b^3

18. Case Study – 2

Flight Training

Flight training is a course of study used when learning to pilot an aircraft. The overall purpose primary and intermediate flight training is acquisition and having of basic airmanship skills.

During the training knowledge of triangonometry also plays an important role. Mukul joined the flight training course in Bangalore. During a session all the students were asked to observe an aeroplane which was about to land.



(*a*) What is the angle of elevation of aeroplane from B?

(*i*) 30° (*ii*) 60°

(*iii*) 45° (*iv*) 90°

(*b*) What is the distance of aeroplane from point B?

(*i*) 2000 m (*ii*) $2000\sqrt{3}$ m

(*iii*) 4000 m (*iv*) $\frac{4000}{\sqrt{3}}$ m

(*c*) If point B moves away from the C then angle of elevation of the aeroplane will

(*i*) decrease

(*ii*) increase

(*iii*) will remain same

(*iv*) none of the above

(*d*) What is the distance between B and C?

(*i*) 2000 m (*ii*) $2000\sqrt{3}$ m

(*iii*) $\frac{2000\sqrt{3}}{3}$ m (*iv*) 4000 m

(*e*) If angle of elevation changes from 30° to 45° then distance BC will

(*i*) increase (*ii*) decrease

(*iii*) will not change (*iv*) none of these

19. Case Study – 3

Plants Nursery

Sameer's father took him to a nursery to buy some plants. Nursery owner has arranged to plants with pots in different rows. There are 4 pots in Ist row, 7 pots in second row, 10 pots in third row and so on.

(*a*) If total number of pots is 209 then total number of rows formed is

(*i*) 10 (*ii*) 11

(*iii*) 12 (*iv*) 14

(*b*) How many pots are there in 9th row?

(*i*) 26 (*ii*) 27

(*iii*) 28 (*iv*) 30

(*c*) If Sameer's father purchases 34 plants with pots then how many rows are left?

(*i*) 9 (*ii*) 10

(*iii*) 8 (*iv*) 6

(*d*) If cost of one plant is ₹ 20 and Sameer's father purchase all the plants in 7th row then how much money he spends?

(*i*) ₹ 400 (*ii*) ₹ 420

(*iii*) ₹ 440 (*iv*) ₹ 450

(*e*) If Sameer's father purchases 99 plants and Nursery owner rearranges to remaining pots such that there are 2 pots in first row, 4 pots in second row, 6 pots in third row and so on then how many rows will be there?

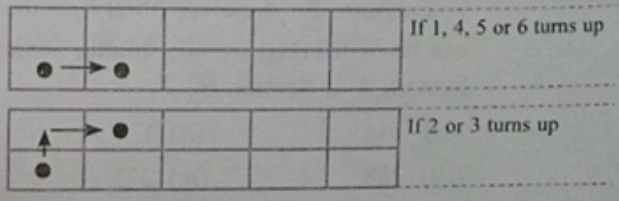
(*i*) 9 (*ii*) 10

(*iii*) 11 (*iv*) 12

20. Case Study – 4

Grid

The diagram shows a grid of numbered squares. A small marble is placed in first square. A fair die is thrown. If 1,4,5 or 6 turns up then marble is moved one square to the right. If 2 or 3 turns up then marble is moved one square up and one square on right



37	38	39	40	41	42	43	44	45
28	29	30	31	32	33	34	35	36
19	20	21	22	23	24	25	26	27
10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9

(*a*) If marble is in 3rd square what is the probability that it will move to the right?

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

(*iii*) $\frac{1}{4}$ (*iv*) $\frac{5}{6}$

(*b*) If marble is in square number 6 then what is the probability that it will not move to square number 7.

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

(*iii*) $\frac{1}{4}$ (*iv*) $\frac{5}{6}$

(*c*) If marble is in a square number 14, what is the probability to will move to a square with even number

(*i*) $\frac{1}{3}$ (*ii*) $\frac{1}{4}$

(*iii*) $\frac{5}{6}$ (*iv*) $\frac{2}{3}$

(*d*) If marble is in square number 35 what is the probability that it will move to a square whose number is a perfect square

(*i*) $\frac{1}{6}$ (*ii*) $\frac{1}{3}$

(*iii*) $\frac{2}{3}$ (*iv*) $\frac{2}{5}$

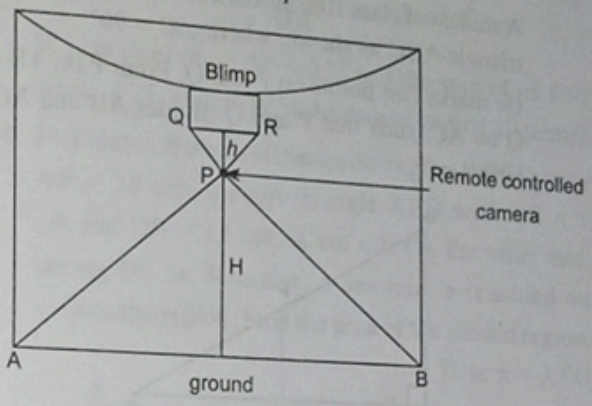
(*e*) If marble is in square number 12, what is the probability that it will move to a square such that sum of the digits of its number is a perfect square.

(*i*) $\frac{5}{7}$ (*ii*) $\frac{2}{5}$

(*iii*) $\frac{1}{3}$ (*iv*) 1

21. Case Study – 5

Similar triangles can be used for many different things in real life. It is used in aerial photography to see the distance from the sky to the ground. Aerial photography is the taking of photographs from an aircraft or other flying objects. Low-level aerial photos can be taken using a remote controlled camera suspended from a blimp.



In a figure, a remote controlled camera 'P' is used to take a photo that covers a distance AB which is proportional to base QR.

Here $\frac{QR}{AB} = \frac{h}{H}$

Using, similarity criterian, answer the questions based on it

(*a*) If h = 3 cm, AB = 50 m, and QR = 8 cm, Find H

(*i*) 18 m (*ii*) 18.75 m

(*iii*) 1875 m (*iv*) 875 m

(*b*) ΔPQR is similar to

(*i*) ΔABP (*ii*) ΔPBA

(*iii*) ΔAPB (*iv*) ΔBAP

(*c*) Write scale factor of ΔPQR and ΔPBA, if $h : H = 1 : 110$

(*i*) 1 (*ii*) 110

(*iii*) 1 : 110 (*iv*) 110 : 1

(*d*) If perimeter ΔPQR is 20 cm, then perimeter of ΔPBA in m is (scale factor = 1: 110)

(*i*) 2200 m (*ii*) 22 m

(*iii*) 2.2 m (*iv*) 0.22 m

(*e*) Which of the following is correct?

(*i*) $\frac{PQ}{PB} = \frac{PA}{PR}$ (*ii*) $\frac{PQ}{PB} = \frac{PR}{PA}$

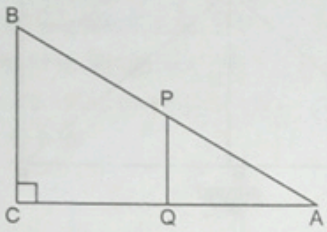
(*iii*) $\frac{PQ}{PR} = \frac{PA}{PB}$ (*iv*) PQ.PR = PA.PB

22. Case Study – 6

Triangle

A student of class 10th makes a red colour right angled triangle ABC as shows, where $\angle C = 90°$

He marks two points on P and Q. Point P on AB and Q on AC, such that P and Q divides AB and AC in ratio 1 : 2



(*a*) AP : AB =

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

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

(*b*) In Δ ABC

(*i*) PQ || BC

(*ii*) PQ = BC

(*iii*) AQ = QC

(*iv*) none of these

(*c*) ∠ C =

(*i*) ∠A (*ii*) ∠B

(*iii*) ∠Q (*iv*) ∠P

(*d*) ΔAPQ is similar to

(*i*) ΔAQP (*ii*) ΔABC

(*iii*) ΔACB (*iv*) none of these

(*e*) PQ : BC

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

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

Part – B

SECTION – III

23. Find the zeroes of the quadratic polynomial $9t^2 - 6t + 1$ and verify the relationship between the zeroes and the coefficients.

OR

If the zeroes of the polynomial $ax^2 + bx + b = 0$ are in the ratio $m : n$, then find the value of $\sqrt{\frac{m}{n}} + \sqrt{\frac{n}{m}}$.

24. A number X is selected at random from the numbers 1,4,9,16 and another number Y is selected at random from the numbers 1,2,3,4. Find the probability that the value of XY is more than 16.

25. If $a \cos\theta - b \sin\theta = c$,

prove that $a \sin\theta + b \cos\theta = \pm \sqrt{a^2 + b^2 - c^2}$.

26. In the following frequency distribution table, find the missing values.

Class interval	Frequency	Cumulative frequency
0 – 8	15	15
8 – 16	f_1	28
16 – 24	f_2	43
24 – 32	18	61
32 – 40	9	f_4
40 – 48	f_3	80

OR

Find the mode of the given data.

Class interval	Frequency
3 – 6	2
6 – 9	5
9 – 12	10
12 – 15	23
15 – 18	21
18 – 21	12
21 – 24	3

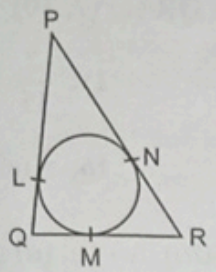
27. Two cubes have their volume in the ratio 1 : 27. Find the ratio of their surface areas.

28. If one diagonal of a trapezium divides the other diagonal in the ratio 1 : 3. Prove that one of the parallel sides is three times the other.

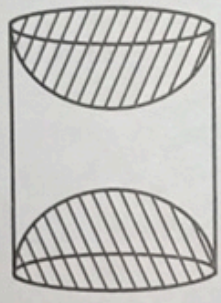
29. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.

OR

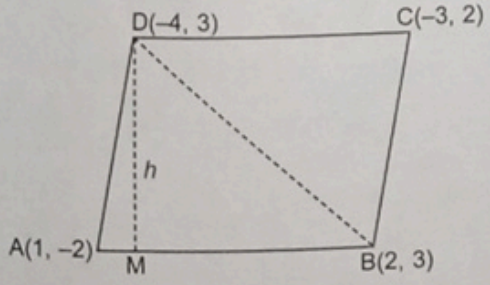
In figure, a circle is inscribed in a triangle PQR with PQ = 10 cm, QR = 8 cm and PR = 12 cm. Find the lengths QM, RN and PL.



30. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in figure. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm. Find the total surface area of the article.



31. If the points A(1, –2), B(2, 3), C(– 3, 2) and D(– 4, 3) are the vertices of parallelogram ABCD, then taking AB as the base , find the height of the parallelogram.



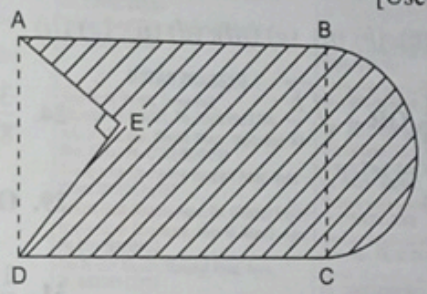
32. A railway half ticket cost half the full fare but the reservation charges are the same on the half ticket as on a full ticket. One reserved first class ticket from the stations A to B costs ₹ 2530. Also, one reserved first class ticket and one reserved first class half ticket stations A to B costs ₹ 3810. Find the full first class fare from stations A to B also the reservation charges for a ticket.

33. If the mth term of an AP is $\frac{1}{n}$ and nth term is $\frac{1}{m}$, then show that the sum of mn terms is $\frac{1}{2}(mn + 1)$.

OR

If 12th term of an AP is 213 and the sum of its four terms is 24, then what is the sum of its first 10 terms?

34. In Figure, from a rectangular region ABCD with AB = 20 cm, a right triangle AED with AE = 9 cm and DE = 12 cm, is cut off. On the other end, taking BC as diameter; a semicircle is added on outside the region. Find the area of the shaded region. [Use $\pi = 3.14$]



OR

A tent is in the form of a right circular cylinder surmounted by a cone. The diameter of the base of the cylinder on the cone is 24 m. The height of the cylinder is 11 m. If the vertex of the cone is 16 m above the ground, find the area of the canvas required for making the tent.

35. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 60 m high, then find the height of the building.

OR

The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60°. At a point R, 40 m vertically above X, the angle of elevation of the top Q of tower is 45°. Find the height of the tower PQ and the distance PX. [Take, $\sqrt{3} = 1.73$]

36. Solve the following system of linear equations graphically.

$3x + y - 12 = 0$; $x - 3y + 6 = 0$

Shade the region bounded by the lines and x-axis. Also, find the area of shaded region.