6 | PRACTICE PAPER

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

General Instructions: As given in Practice Paper 1.

Part – A

SECTION – I

1. If one factor of $x^3 + 7kx^2 - 4kx + 12$ is $(x + 3)$, then $k =$

(a) $-\frac{1}{5}$ (b) $\frac{1}{5}$ (c) $\frac{2}{5}$ (d) $\frac{5}{11}$

OR

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

(a) 2 (b) –2 (c) 1 (d) –4

2. The abscissa of a point A on the x-axis is 11 and another point is B(7, 3), then AB =

(a) –2 (b) 15 (c) 5 (d) 10

3. If α, β are roots of the equation $x^2 + 5x + 5 = 0$, then the quadratic equation whose roots are $\alpha + 1$ and $\beta + 1$ is

(a) $x^2 - 3x = 0$ (b) $x^2 - 3x - 1 = 0$

(c) $x^2 - 3x + 1 = 0$ (d) $x^2 + 3x + 1 = 0$

4. If the points A (4, 3) and B (x, 3) are end point of the diameter of the circle with centre O(2, 3), then x

(a) 2 (b) 1 (c) 0 (d) –1

OR

The points on the x-axis which are at a distance of $2\sqrt{5}$ units from the point (7, –4) is

How many such points are there?

(a) (5, 0), (9, 0), 4 points (b) (5, 0), (9, 0), 2 points

(c) (0, 5), (0, 9), 1 point (d) No point

5. The value of k for which the lines $3x + 4y = 5$, $5x + 4y = 4$ and $kx + 4y = 6$ meet at a point is

(a) 1 (b) 2 (c) 0 (d) –3

6. The ratio in which the line joining points $(a + b, b + a)$ and $(a - b, b - a)$ is divided by the point (a, b) is

(a) 3 : 2 (b) 1 : 2

(c) 2 : 1 (d) 1 : 1

9. Two cylindrical cans have equal base areas. If one of the can is 15 cm high and other is 20 cm high, find the ratio of their volumes.

(a) 2 : 3 (b) 3 : 4

(c) 4 : 3 (d) 3 : 2

8. On simplification : $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} + \frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} =$

(a) $\frac{2}{\text{cosec}^2\theta + 2}$ (b) $\frac{2}{\sin^2\theta - \cos^2\theta}$

(c) $\frac{2}{2\sin^2\theta + \cos^2\theta}$ (d) 1

OR

The value of $\sin^2 30° + \cos^2 45° + \cos^2 30°$.

(a) $\frac{1}{2}$ (b) $-\frac{2}{3}$

(c) $\frac{3}{2}$ (d) –1

9. If cosec $\theta = ?$ and cot $\theta = \sqrt{3}p$ where θ is an acute angle then what is the value of p?

10. A single letter is selected at random from the word 'PROBABILITY'. Find the probability that it is a vowel.

11. Find the common difference of the AP, $\frac{1}{2r}, \frac{1-3r}{2r}, \frac{1-6r}{2r}, \ldots\ldots$

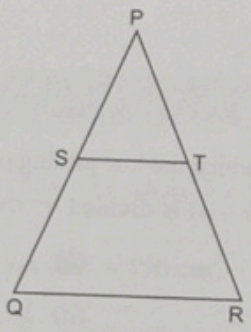
12. Is $(\sqrt{2}x+3)^2 + x^2 = 3x^2 - 5x$ a quadratic equation? Justify your answer.

OR

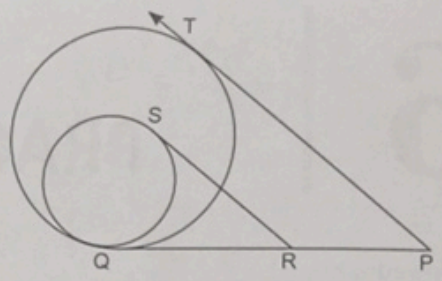
Show that $3x^2 + 5x + 11 = 0$ is not true for any real value of x.

13. Find the probability of getting a number less than 7 in a single throw of a die.

14. In ΔPQR, $ST \parallel QR$. If $PT = y$, $TR = y - 2$, $PS = y + 2$, $SQ = y - 1$, then evaluate the value of y.

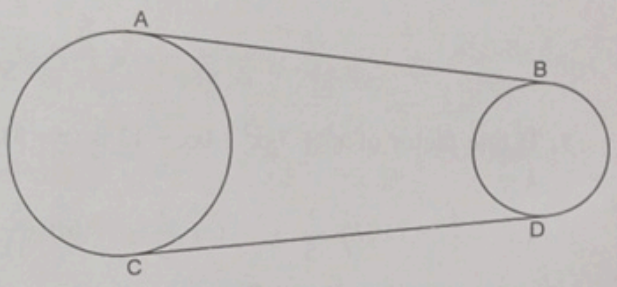


15. In the given figure, PQ is the common tangent to both the circles. SR and PT are tangents. Such that SR = 4 cm and PT = 7cm, then find RP.



OR

In the given figure AB and CD are common tangents to two circles of unequal radii. Prove that AB = CD.



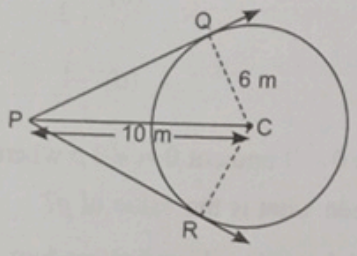
16. If $\Sigma f_i = 12$, $\Sigma f_i x_i = 2p + 52$ and $\bar{x} = 6$, then find the value of p.

SECTION – II

17. **Case Study – 1**

THROWING A BALL

Aman, Sanju, Rakesh and Gaurav are in the throw ball team of their school. They assembled in the ground for practice. Aman draw a circle of radius 6 m with centre C. He marked point P, 10 m away from C. From point P he drew two tangential lines PQ and PR. C was the position of Sanju, P was the position of Aman, Q was position of Rakesh and R was position of Gaurav. Aman throws the ball to Sanju, Sanju throws it to Rakesh, Rakesh throws it to Gaurav, Gaurav throws it to Aman and so on.



(*a*) Distance between Aman and Rakesh is

(*i*) 10 m (*ii*) 7 m

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

(*b*) $\angle PQC$ =

(*i*) 45° (*ii*) 130°

(*iii*) 90° (*iv*) 160°

(*c*) Which of the following is true?

(*i*) $\angle CPQ = \angle CRP$ (*ii*) $\angle PQC = \angle QCP$

(*iii*) $\angle PQC = \angle CRP$ (*iv*) $\angle PCR = \angle RPC$

(*d*) $\frac{1}{2}(\angle QPR + \angle QCR)$ =

(*i*) $\angle QCP$ (*ii*) $\angle CRP$

(*iii*) 60° (*iv*) $\angle QCR$

(*e*) Which of the following is not true?

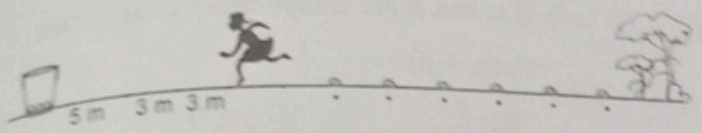
(*i*) PQ = PR (*ii*) QC = CR

(*iii*) $\Delta PQC \cong \Delta PRC$ (*iv*) PC = CR

18. **Case Study – 2**

POTATO RACE

In a potato race, a bucket is placed at the starting point which is 5 m from the first potato and the other potatoes are placed 3m apart in a straight line. There are ten potatoes in the line.



A competition starts from the bucket, picks up the nearest Potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, runs to the bucket to drop it in and he continues in the same way till all the potatoes are in the bucket.

(*a*) Total distance covered to pick first potato and to drop it in the bucket is

(*i*) 5 m (*ii*) 10 m

(*iii*) 8 m (*iv*) 12 m

(*b*) Total distance covered to pick first three potatoes and to drop in the bucket is

(*i*) 24 m (*ii*) 30 m

(*iii*) 40 m (*iv*) 48 m

(*c*) Total distance covered to pick all the potatoes and to put in the basket is

(*i*) 185 m (*ii*) 270 m

(*iii*) 370 m (*iv*) 410 m

(*d*) Starting from bucket, total distance covered to 10th potato and put it in the basket is

(*i*) 50 m (*ii*) 56 m

(*iii*) 64 m (*iv*) 70 m

(*e*) If potatoes are placed 5 m apart instead of 3 m apart then total distance covered to pick first and second potato and put in the basket is

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

(*iii*) 28 m (*iv*) 35 m

19. Case Study – 3

LIBRARY BOOKS

Kuldeep works as a librarian in SPS Gurgaon. He ordered for 120 books of physics, 48 books of biology, 168 books of mathematics and 336 books of english. These books were delivered next day. He wishes to arrange these books in stacks such that each stack consists of the books on only one subject and the number of books in each stack is the same. He also wishes to keep the number of stacks minimum.

(*a*) The total number of stacks formed is

(*i*) 24 (*ii*) 26

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

(*b*) How many stacks of english books will be formed?

(*i*) 10 (*ii*) 12

(*iii*) 13 (*iv*) 14

(*c*) The number of books in each stack is

(*i*) 24 (*ii*) 28

(*iii*) 30 (*iv*) 32

(*d*) Difference between maximum and minimum number of stacks formed of different subjects is

(*i*) 5 (*ii*) 7

(*iii*) 9 (*iv*) 12

(*e*) If price of one book of biology is ₹ 200 then find the cost of all books in one stack of biology books.

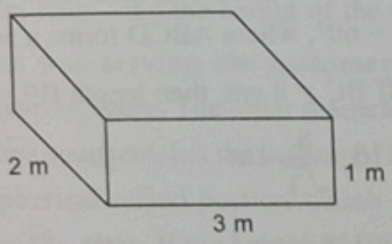
(*i*) ₹ 9600 (*ii*) ₹ 4800

(*iii*) ₹ 4000 (*iv*) ₹ 5400

20. Case Study – 4

WATER TANK

A solar water heater is fixed on the terrace of an apartment consisting of 10 floors each floor consisting of 8 houses. Each house has 2 persons living in it. The tank of solar water heater is cubical in shape having dimensions 3 m by 2m by 1m. Each person requires a bucket full of water per day to take bath. The bucket is cylindrical in shape with radius 14 cm and height 42 cm.



(*a*) What is volume of water required by a person to take bath? $\left(\text{Take } \pi = \frac{22}{7}\right)$.

(*i*) 20 litres (*ii*) 22.6 litres

(*iii*) 24.64 litres (*iv*) 25.872 litres

(*b*) What is volume of water tank?

(*i*) 5000 litres (*ii*) 7000 litres

(*iii*) 6000 litres (*iv*) 4000 litres

(c) How many litres of water required daily by the society if all the people living in it take bath once?

(i) 4000 litres (ii) 3900 litres

(iii) 3942.4 litres (iv) 4139.52 litres

(d) The maximum number of people who can take bath twice if the tank is filled once is

(i) 110 (ii) 150

(iii) 121 (iv) 115

(e) If each house has 4 person living in it then how many people can take bath once if tank is filled once.

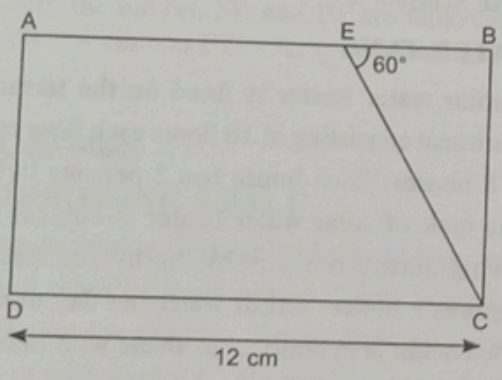
(i) 220 (ii) 57

(iii) 240 (iv) 243

21. Case Study – 5

FLOOR TILE

A floor tile is a combination of trapezium and triangle as shown



ADCE is a trapezium and EBC is a triangle $\angle BEC = 60°$, where ABCD forms a rectangle.

(a) If BC = 8 cm, then length BE =

(i) $\frac{8}{\sqrt{3}}$ cm (ii) $8\sqrt{3}$ cm

(iii) 8 cm (iv) $\sqrt{3}$ cm

(b) If BC = 8 cm, then length CE =

(i) $\sqrt{3}$ cm (ii) $\frac{16}{\sqrt{3}}$ cm

(iii) $16\sqrt{3}$ cm (iv) 16 cm

(c) Length AE = (use $\sqrt{3} = 1.732$)

(i) 14 cm (ii) 7 cm

(iii) 7.2 cm (iv) 7.39 cm

(d) If α and β are complimentary angle, then $\sin(\alpha + \beta) =$

(i) 1 (ii) 0

(iii) –1 (iv) 2

(e) $\tan 90° =$

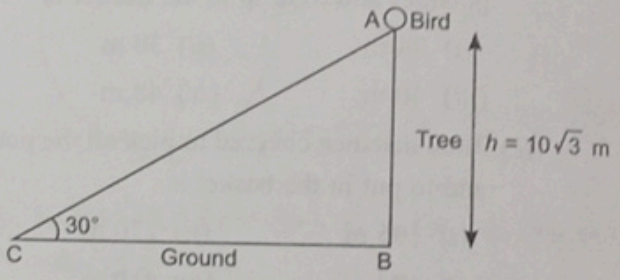
(i) not defined (ii) 1

(iii) 2 (iv) –1

22. Case Study – 6

BIRD

A bird is sitting on the top of tree of height $10\sqrt{3}$ m. The angle of elevation of bird from the ground is 30°.



(a) BC =

(i) 30 m (ii) 10 m

(iii) $\frac{10}{\sqrt{3}}$ m (iv) $\sqrt{3}$ m

(b) AC =

(i) $10\sqrt{3}$ m (ii) $\frac{20}{\sqrt{3}}$ m

(iii) $20\sqrt{3}$ m (iv) 20 m

(c) AB : AC

(i) $\tan 30°$ (ii) $\sin 30°$

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

(d) If we assume that AB and BC are equal, then angle of elevation will be

(i) 45° (ii) 90°

(iii) 0° (iv) 60°

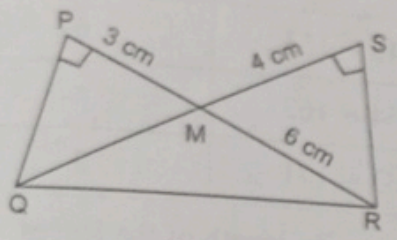
Part – B

SECTION – III

23. Area of a sector of a circle of radius 36 cm is 54π cm^2. Find the length of corresponding arc of the sector.

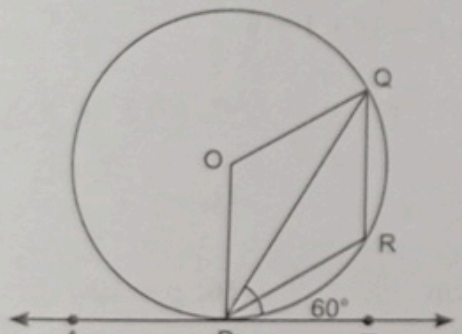
24. R and S are points on the sides DE and EF respectively of a ΔDEF such that ER = 5 cm, RD = 2.5 cm, SE = 1.5 cm and FS = 3.5 cm. Find whether RS $\parallel$ DF or not.

25. In the figure, PQR and SQR are two right triangles with common hypotenuse QR. If PR and SQ intersect at M such that PM = 3 cm, MR = 6 cm and SM = 4 cm, find the length of MQ.



OR

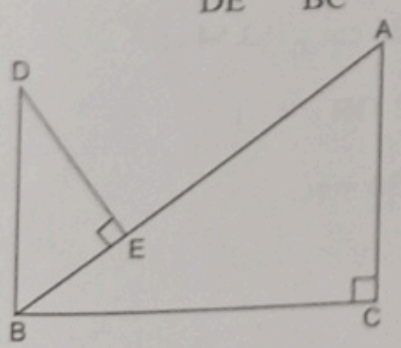
In the given figure, PQ is a chord of a circle with centre O and PT is a tangent at P such that $\angle QPT = 60°$, then find $\angle PRQ$.



26. ΔABC is a triangle, PQ is the line segment intersecting AB in P and AC in Q such that PQ $\parallel$ BC and it divides ΔABC into two parts, of equal in areas, find BP : AB.

OR

In the given figure, DB $\perp$ BC, DE $\perp$ AB and AC $\perp$ BC. Prove that $\frac{BE}{DE} = \frac{AC}{BC}$.

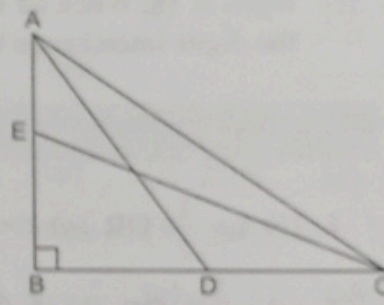


27. Find the largest number that will divide 398, 436 and 542 leaving remainders 7, 11 and 15, respectively

28. If $\sec\alpha = x + \frac{1}{4x}$, prove that $\sec\alpha + \tan\alpha = 2x$ or $\frac{1}{2x}$

29. There are 20 rows of seats on concert hall, 25 seats are in the first row, 27 seats on the second row, 29 seats on the third row and so on. Ms. Uma, a student of XYZ school gave a music concert during the December holiday and collected ₹ 100000 as a fund raiser for flood victims, given the price per ticket is ₹ 2300. How much will be the total sales for one night concert if all seats are taken? How many seats are there in the last row?

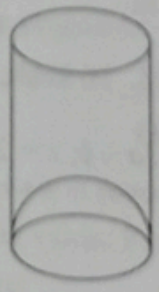
30. In the figure, ABC is a right triangle, right-angled at B. AD and CE are two medians drawn from A and C respectively. If AC = 5 cm and AD = $\frac{3\sqrt{5}}{2}$ cm, Find the length of CE.



OR

A vertical flag staff of length 12 m cast a shadow 8 m on the ground and at the same time a tower cast a shadow 28 m long. Find the height of the tower.

31. A juice seller was serving his customers using glasses as shown in figure. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. (Use $\pi = 3.14$)



32. There are 30 cards of the same size in a bag in which the numbers 1 to 30 are written. One card is taken out of the bag at random. Find the probability that

(*i*) the number on the selected card is not divisible by 3.

(*ii*) The number on the card is prime number.

33. Places P_1 and P_2 are 250 km apart from each other on a highway. A car starts from P_1 and another from P_2 at the same time. If they go in the same direction then they meet in 5 hours and if they go in opposite directions they meet in $\frac{25}{13}$ hours. Find their speeds.

34. If the points A (4, 3) and B (x, 5) are on the circle with centre O(2,3), find the value of x.

OR

The centre of circle is $(2p - 1, 7)$ and circle passes through the point $(-3, -1)$ and radius of circle is 8 units, then find the value of p.

35. A two digit number is such that the product of the digits is 18. When 63 is subtracted from the number the digits interchange their places. Find the number.

OR

Solve for x: $9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$

36. The lengths of 50 leaves of a plant are measured correct to the nearest millimetre and the data obtained is represented in the following table:

Length (in mm)	No. of leaves
109 – 117	4
118 – 126	6
127 – 135	14
136 – 144	13
145 – 153	6
154 – 162	4
163 – 171	3

Find the mean length of the leaves.

ANSWERS