ಮಾರ್ಚ್/ಏಪ್ರಿಲ್ 2025 ರ ಪರೀಕ್ಷೆ-1
MARCH/APRIL 2025 EXAMINATION-1

[ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 16

[Total No. of Printed Pages : 16

[ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 38

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ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Code No. : 81-E

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಆಂಗ್ಲ ಮಾಧ್ಯಮ / English Medium)

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ)

(Regular Fresh / Private Fresh)

ದಿನಾಂಕ : 24. 03. 2025] [Date : 24. 03. 2025

ಸಮಯ : ಬೆಳಗ್ಗೆ 10-00 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-15 ರವರೆಗೆ] [Time : 10-00 A.M. to 1-15 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80] [Max. Marks : 80

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General Instructions to the Candidate :

1. This question paper consists of 38 questions.
2. This question paper has been sealed by reverse jacket. ***You have to cut on the right side to open the paper*** at the time of commencement of the examination ***(Follow the arrow mark)***. **Do not cut the left side to open the paper.** Check whether all the pages of the question paper are intact.
3. Follow the instructions given against the questions.
4. Figures in the right hand margin indicate maximum marks for the questions.
5. The maximum time to answer the paper is given at the top of the question paper. It includes 15 minutes for reading the question paper.
6. Ensure that the Version of the question paper distributed to you and the Version printed on your admission ticket is the same.

TEAR HERE TO OPEN THE QUESTION PAPER
ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ತೆರೆಯಲು ಇಲ್ಲಿ ಕತ್ತರಿಸಿ

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I. ***Four*** **alternatives are given for each of the following questions / incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.** **8 × 1 = 8**

1. LCM of 2 and 3 is

(A) 2 (B) 3

(C) 5 (D) 6

2. If the lines represented by the equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are coincident, then the correct relation is

(A) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (B) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

(C) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (D) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$

3. The quadratic equation in the following is

(A) $x^3 - 6x$ (B) $p(x) = x^2 + 7x$

(C) $3x = 9$ (D) $x^2 + 3x + 4 = 0$

4. In the following, the shapes which are always similar, are

(A) any two equilateral triangles

(B) square and rectangle

(C) square and rhombus

(D) any two trapeziums

5. The volume of a sphere of radius *'r'* units is

(A) $\frac{2}{3}\pi r^3$ cubic units (B) $\frac{4}{3}\pi r^3$ cubic units

(C) $\frac{1}{3}\pi r^3$ cubic units (D) $\frac{3}{2}\pi r^3$ cubic units

6. The distance of a point $P(x, y)$ from the origin is

(A) $\sqrt{x^2 - y^2}$ (B) $\sqrt{x + y}$

(C) $\sqrt{x^2 + y^2}$ (D) $\sqrt{x - y}$

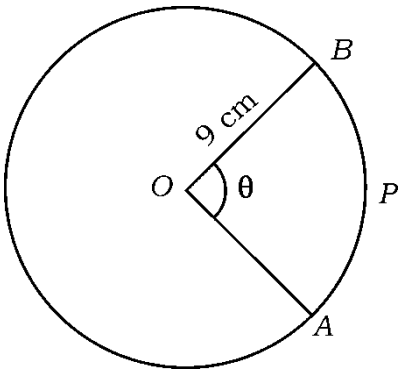
7. The common difference of the arithmetic progression

– 1, – 3, – 5 ... is

(A) – 1 (B) 2

(C) – 2 (D) 3

8. In the given figure *'O'* is the centre of the circle and the length of the arc *APB* is 4 π cm. If *OB* = 9 cm, then the measure of angle θ is



(A) 60° (B) 80°

(C) 85° (D) 70°

II. Answer the following questions : 8 × 1 = 8

9. Write the degree of a linear polynomial.

10. Write the formula to find the total surface area of a cube of edge *'a'* units.

11. In the given frequency distribution table, write the modal class :

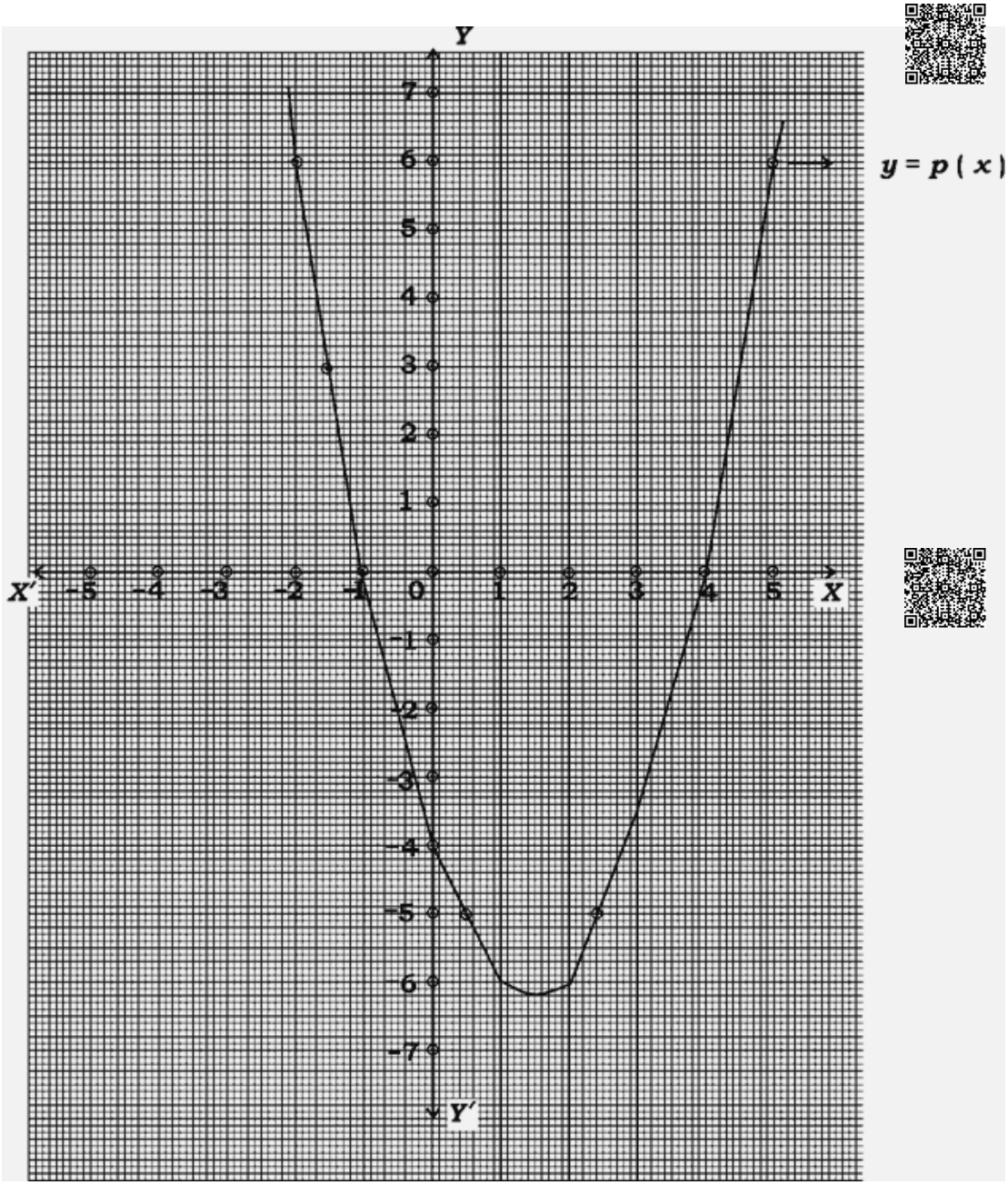
Class-interval	*Frequency*
1 – 3	4
3 – 5	8
5 – 7	2
7 – 9	2

12. Write the probability of an impossible event.

13. How many solutions do the pair of linear equations

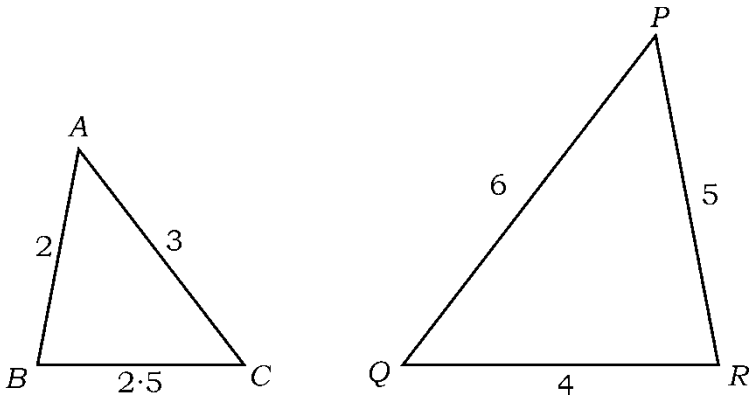
$2x + 3y - 9 = 0$ and $3x + 2y - 6 = 0$ has ?

14. Write the zeroes of the polynomial $y = p(x)$ in the given graph.



15. Write the roots of the quadratic equation $x(x + 2) = 0$.

16. In the given figure, write the similarity criterion used to show that $\Delta ABC \sim \Delta QRP$.

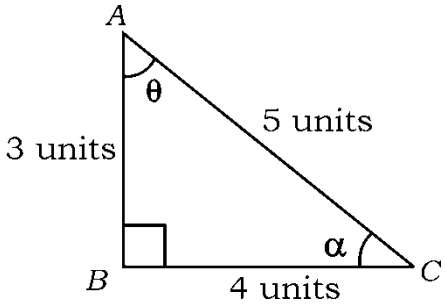


III. Answer the following questions : **8 × 2 = 16**

17. In the given figure, $\angle ABC = 90°$. Write the values of the following :

i) sin α

ii) tan θ



18. Prove that $6 + \sqrt{2}$ is an irrational number.

OR

The HCF and LCM of two positive integers are respectively 4 and 60. If one of the integers is 20, then find the other integer.

19. Solve the given pair of linear equations by elimination method :

$2x + y = 10$

$x - y = 2$

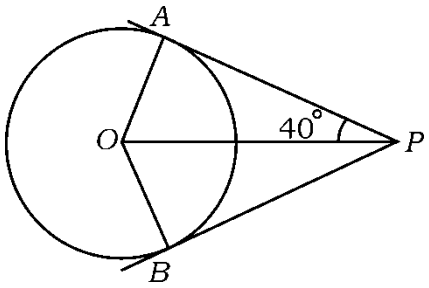
20. Find the roots of the quadratic equation $x^2 + 8x + 12 = 0$.

OR

Find the discriminant of the quadratic equation $x^2 + 4x + 5 = 0$ and hence write the nature of the roots.

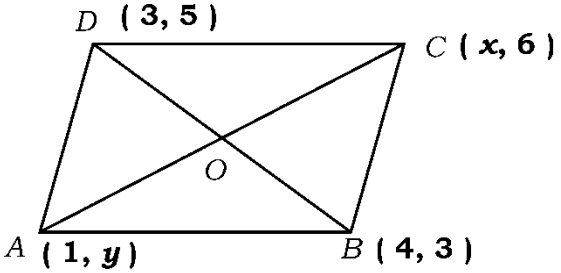
21. Find the sum of first 20 terms of the arithmetic progression 5, 9, 13, ... using formula.

22. In the given figure, *PA* and *PB* are tangents to the circle with centre *'O'*. If *PA* = 4 cm and $\angle APO = 40°$, then find the measure of $\angle AOB$ and length of *PB*.



23. According to Fundamental Theorem of Arithmetic, if $40 = x^y.z$, then find the values of *x, y* and *z*.

24. If *A* (1, *y*), *B* (4, 3), *C* (*x*, 6) and *D* (3, 5) are the vertices of a parallelogram taken in an order, then find the values of *x* and *y*.



IV. Answer the following questions : **9 × 3 = 27**

25. Find the zeroes of the quadratic polynomial $p(x) = x^2 + 7x + 10$ and verify the relationship between the zeroes and the coefficients.

26. Prove that "The tangent at any point of a circle is perpendicular to the radius through the point of contact".

27. Prove that :

$$\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2 \sec A.$$

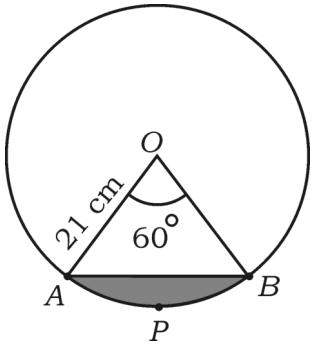
OR

Find the value of :

$$\left(\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ} \right)$$

28. In the given figure *'O'* is the centre of the circle of radius 21 cm. If $\angle AOB = 60°$, then find the area of the segment *APB*.

[Take $\sqrt{3} = 1{\cdot}73$]



29. Find the coordinates of a point which divides the line segment joining the points (– 1, 7) and (4, – 3) internally in the ratio 2 : 3.

OR

Find a relation between x and y such that the point (x, y) is equidistant from the points (3, 6) and (– 3, 4)

30. Find the mean for the following data :

Class-interval	*Frequency*
10 – 20	2
20 – 30	3
30 – 40	6
40 – 50	5
50 – 60	4

OR

Find the median for the following data :

Class-interval	*Frequency*
15 – 20	4
20 – 25	5
25 – 30	10
30 – 35	5
35 – 40	6

31. A box contains 20 cards numbered from 1 to 20. One card is drawn randomly from the box. Find the probability of getting a card bearing —

    i) a perfect square number

    ii) a number which is divisible by both 2 and 3.

32. The difference between the altitude and base of a right angled triangle is 5 cm. If the area of the triangle is 150 cm^2, then find the base and altitude of the triangle.

OR

The sum of the squares of two consecutive even positive integers is 164. Find the integers.

33. Two line segments *AB* and *CD* intersect each other at a point *'O'*. Join *AC* and *BD* such that *AC* || *BD* and prove that $\Delta AOC \sim \Delta BOD$.

V. Answer the following questions : **4 × 4 = 16**

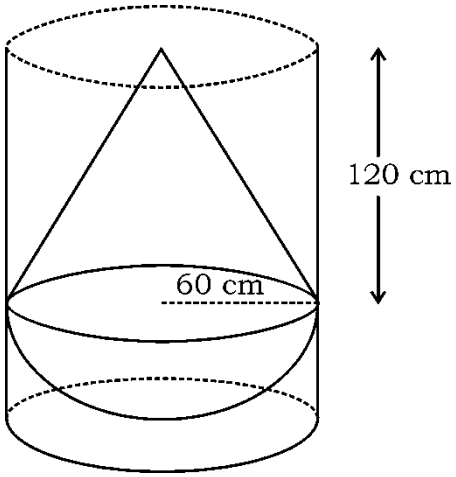
34. Find the solution of the given pair of linear equations by graphical method :

$x + 2y = 8$

$x + y = 5$

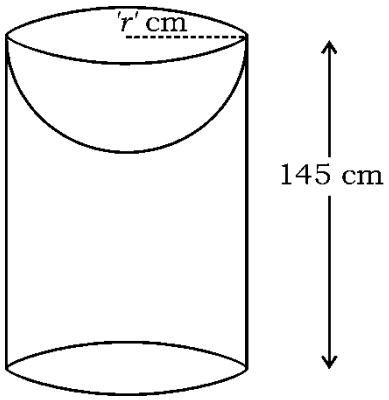
35. Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio".

36. 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 as shown in the figure. If the radius of the cylinder is 60 cm and height is 180 cm, then find the volume of water left in the cylinder in terms of π.



OR

A solid is made of a cylinder with a hemispherical depression having the same radius (*'r'* cm) as that of cylinder at the top end as shown in the figure. The volume of the hemispherical depression is 18000 π cm^3. If the height of the cylinder is 145 cm, then find the total surface area of the solid.



37. An arithmetic progression consists of 16 terms. The sum of all its terms is 768. If the last term of the progression is 93, then find the arithmetic progression. Also show that the sum of all the terms of this progression is equal to 3 times the sum of first 16 odd natural numbers using formula.

VI. Answer the following question : **1 × 5 = 5**

38. A pole and a tower are standing vertically on a level ground. The height of the pole is 6 m and the angle of elevation to the top of the pole from the bottom of the tower is 30°. The angle of elevation to the top of the tower from the top of the pole is 60° as shown in the figure. Find the height of the tower (*CD*). Also find the distance (*AC*) between the top of the pole and the top of the tower.