2023-24ರ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ

S.S.L.C. MODEL QUESTION PAPER – 2023-24

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಆಂಗ್ಲ ಮಾಧ್ಯಮ / English Medium)

ಸಮಯ : 3 ಗಂಟೆ 15 ನಿಮಿಷಗಳು]   ವಿಷಯ ಸಂಕೇತ : **81-E**

ಗರಿಷ್ಠ ಅಂಕಗಳು : **80**]   **Subject Code : 81-E**

CCE-RF : ಶಾಲಾ ವಿದ್ಯಾರ್ಥಿಗಳು / Regular Fresh

General Instructions to the Candidate :

1. This question paper consists of 38 questions.

2. 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. 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.

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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.   Every positive odd integer is of the form (where q is a positive

     integer)

     (A) $2q + 1$

     (B) $2q + 2$

     (C) $2q + 4$

     (D) $2q$

2.   The lines represented by the pair of linear equations $x + 2y = 8$

     and $2x + 4y = 10$ are

     (A)   intersecting each other

     (B)   perpendicular to each other

     (C)   coincident

     (D)   parallel to each other

3. The nth term (a_n) of the Arithmetic progression whose first term is 'a' and common difference 'd' is

    (A) $a_n = a + (n + 1) d$

    (B) $a_n = \dfrac{n}{2} [a + (n - 1) d]$

    (C) $a_n = a + (n - 1) d$

    (D) $a_n = a (n - 1) d$

4. Sum of the zeroes of the polynomial $p (x) = x^2 - 2x - 8$ is

    (A) $- 8$ (B) 2

    (C) $- 2$ (D) 8

5. If $\tan \theta = 1$, then the value of $\sec \theta$ is
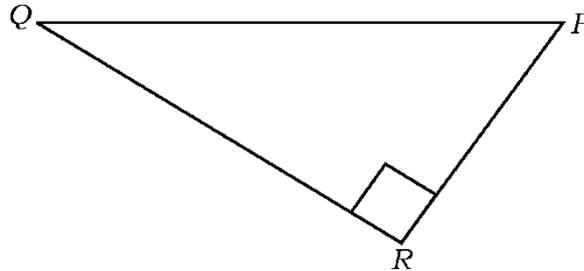
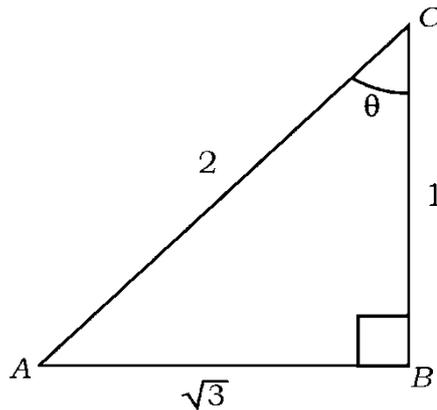   (A) $\dfrac{1}{\sqrt{3}}$ (B) $\sqrt{3}$

    (C) $\sqrt{2}$ (D) $\dfrac{1}{\sqrt{2}}$

6. The correct relation related to the Δ *PQR* given in the figure is

(A) $PQ^2 = PR^2 + QR^2$ (B) $PR^2 = PQ^2 + QR^2$

(C) $QR^2 = PR^2 + PQ^2$ (D) $PQ^2 = PR^2 - QR^2$

7. The volume of a cone having radius '*r*' and height '*h*' is

(A) $\pi r^2 h$ (B) $2\pi rh$

(C) $\dfrac{2}{3} \pi r^2 h$ (D) $\dfrac{1}{3} \pi r^2 h$

8. In Δ *ABC*, if $AB = \sqrt{3}$ units, $BC = 1$ unit, $AC = 2$ units and $\angle ACB = \theta$, then the value of 'θ' is

(A) 0°   (B) 60°

(C) 45°   (D) 90°

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

9. The HCF and LCM of two numbers are 4 and 60 respectively. If one of the numbers is 12, then find the other number.
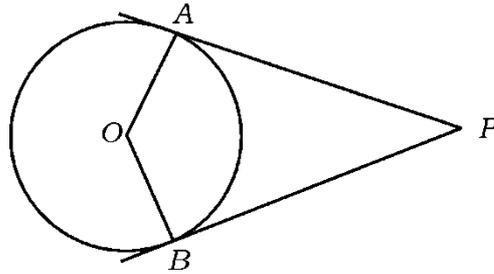
10. Write the degree of the polynomial

$$g(p) = 7p^4 - 2p^3 + 3p^2 + p - 3$$

11. Find the 5th term of the Arithmetic progression 3, 1, – 1, ...

12. Express the quadratic equation $2x = 3x^2 - 5$ in the standard form.

13. If $\sin A = \dfrac{1}{2}$, $\cos A = \dfrac{\sqrt{3}}{2}$, then find the value of tan A.

14. A fair coin is tossed once. Find the probability of getting Head.

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15. In the given figure, if $\angle AOB = 2\angle APB$, then find the value of $\angle APB$.

16. Write the formula to find the curved surface area of the frustum of a cone given in the figure.
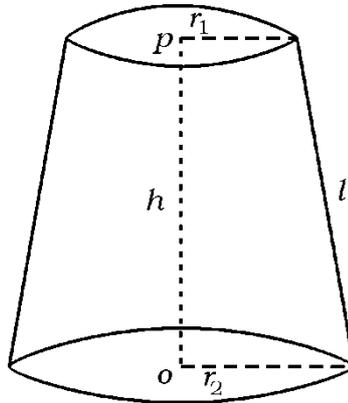
III. Answer the following questions :   **8 × 2 = 16**

17. Prove that $2 + \sqrt{3}$ is irrational.

OR

Find the HCF of 64 and 332 by using Euclid's division algorithm.

18. Solve by elimination method :

   $2x + 3y = 14$

   $2x + y = 10$

19. Find the sum of first 30 terms of the Arithmetic progression

   3, 7, 11, ... using formula.

20. Find the roots of the equation $x^2 - 7x + 12 = 0$ using quadratic

   formula.

21. Prove that $\sin 30° + \cos 60° + \tan 45° = \sec 60°$.

OR

   Prove that $\dfrac{\cos A}{1 + \sin A} + \dfrac{1 + \sin A}{\cos A} = 2 \sec A$.

22. Find the coordinates of the point which divides the line segment

   joining the points (2, 1) and (7, 6) in the ratio 3 : 2.

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23. A box contains tokens which are numbered from 1 to 15. A token is drawn at random from the box. Find the probability that the token does not bear a prime number.

24. Draw a pair of tangents to the circle of radius 4 cm which are inclined to each other at an angle of 60°.

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

25. Divide $p(x) = x^4 - 3x^2 + 4x + 5$ by $g(x) = x^2 - 1$ and find the quotient $[q(x)]$ and remainder $[r(x)]$.

OR

On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$ the quotient and remainder are $(x - 2)$ and $(-2x + 4)$ respectively. Find $g(x)$.

26. The diagonal of a rectangular field is 20 m more than the shorter side of it. If the shorter side is 10 m less than the longer side, then find the sides of the rectangular field.

27. Find the area of a triangle *PQR* whose vertices are *P* (1, 6), *Q* (3, 2) and *R* (10, 8).

OR

ABC is a triangle whose vertices are *A* (1, 4), *B* (− 2, − 2), *C* (4, − 2). If *AD* is median to *BC*, then find the length of *AD*.

28. Find the mean for the distribution given below :

Class-interval	Frequency
0 – 10	4
10 – 20	6
20 – 30	17
30 – 40	13
40 – 50	7
50 – 60	3

OR

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Find the mode for the following data :

Class-interval	Frequency
1 – 5	1
5 – 10	2
10 – 15	13
15 – 20	15
20 – 25	7
25 – 30	2

29. The following table gives production yield per hectare of paddy of 100 farms of a village. Draw a 'more than type ogive' for the given data :

Production yield (In kg/hectare)	Number of farms (cumulative frequency)
50 or more than 50	100
55 or more than 55	98
60 or more than 60	90
65 or more than 65	77
70 or more than 70	49
75 or more than 75	15

30. In the figure $\lfloor BAC = \lfloor ADB$, $BC = 8$ cm and $AB = 6$ cm.

Prove that $\dfrac{\text{Area of } \Delta ABC}{\text{Area of } \Delta ABD} = \dfrac{16}{9}$.
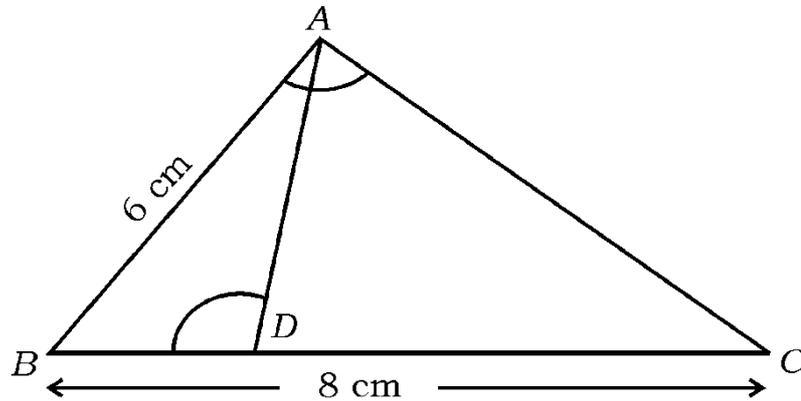
31. Prove that "The lengths of tangents drawn from an external point

    to a circle are equal".

32. Construct a triangle with sides 5 cm, 6 cm and 9 cm and then

    construct another triangle whose sides are $\dfrac{2}{3}$ of the

   corresponding sides of the first triangle.

33. In the figure, *'O'* is the centre of the circle of radius 5 cm and *APB* is an equilateral triangle of side 8 cm. *AP* and *BP* are tangents. Find the area of the shaded region.
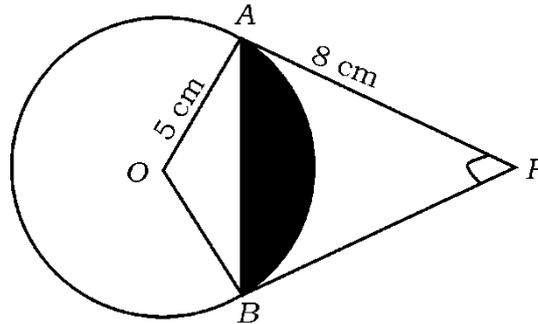
OR

ABCD is a rectangle and *APB* is a semicircle as shown in the figure. The length (*BC*) of the rectangle is 3 times the radius of the semicircle and the total area of the figure *APBCDA* is 371 cm^2, then find the length of the semicircular arc.
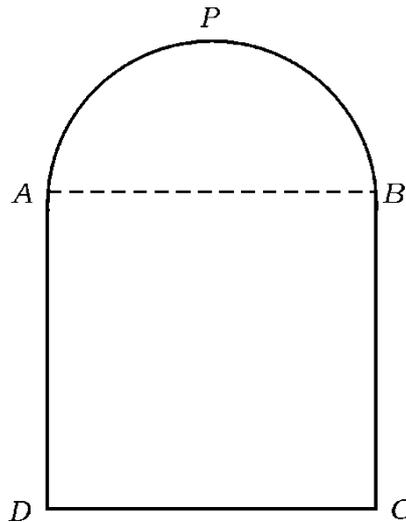
V. **Answer the following questions :** **4 × 4 = 16**

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

    $x + y = 4$

    $2x + y = 7$

35. There are 20 terms in an Arithmetic progression. The sum of the first term and 6th term of the progression is zero. The 4th and 5th terms of the progression are 2 and 6 respectively. Find the Arithmetic progression and also find which term of the progression is 62.

36. A man standing at the point 'A' on the building (AD) observes a car at point 'C' on a straight road from the foot of the building. The car moves 500 m towards the building and reaches the point 'B', now he observes the car from point 'A'. The angles of
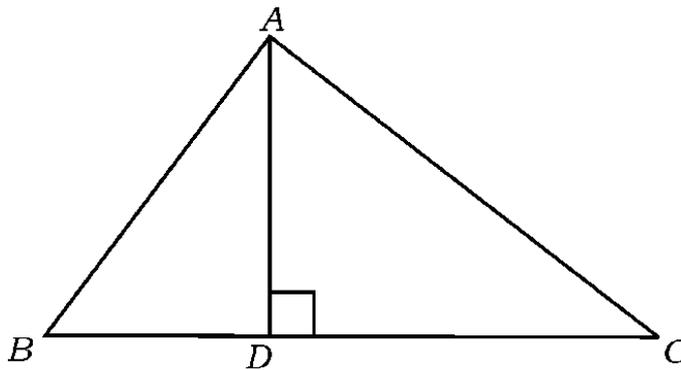
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depression in these cases are complementary to each other. If the

car takes 9 minutes to reach from point *'C'* to point *'D'* at the

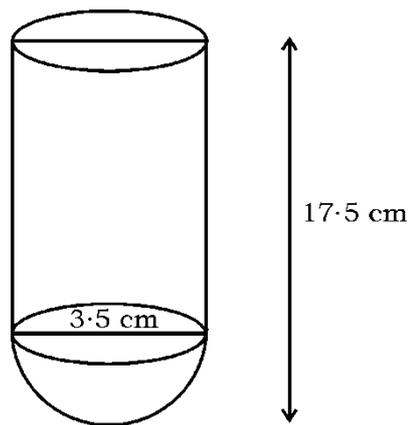speed of 100 m/minute, then find the height of the building.

OR
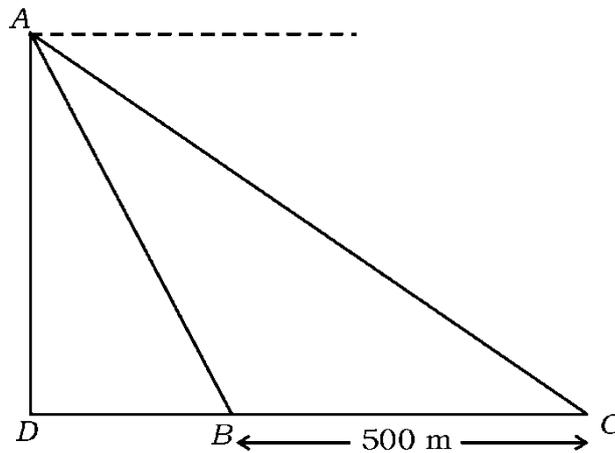
In Δ *ABC*, *AD* ⊥ *BC*. If ∠ *ABC* = 60°, ∠ *ACB* = 30° and

BC = 36 cm, then find measures of *AB, AC* and *AD*.

37. Prove "Basic proportionality theorem." (Thale's theorem).

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

38. A test tube is made up of a cylinder and a hemisphere as shown in the figure. If the diameter of the hemisphere is 3·5 cm and the total height of the test tube is 17·5 cm, then find the curved surface area of the test tube and the quantity of the solution that could be completely filled in the hemispherical part.