ಕರ್ನಾಟಕ ಶಾಲಾ ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯನಿರ್ಣಯ ಮಂಡಲಿ
ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು – 560 003

KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD
Malleshwaram, Bengaluru – 560 003

ರಾಜ್ಯ ಮಟ್ಟದ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪೂರ್ವಸಿದ್ಧತಾ ಪರೀಕ್ಷೆ, ಫೆಬ್ರವರಿ/ಮಾರ್ಚ್ — 2024

STATE LEVEL SSLC PREPARATORY EXAMINATION, FEBRUARY/MARCH — 2024

ವಿಷಯ ಸಂಕೇತ : **81-E**   Subject Code : **81-E**

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ / English Medium)

ದಿನಾಂಕ : 29. 02. 2024]   [Date : 29. 02. 2024

ಸಮಯ : ಬೆಳಗ್ಗೆ 10-15 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-30 ರವರೆಗೆ] [Time : 10-15 A.M. to 1-30 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80]   [Max. Marks : 80

General Instructions to the Candidate :

1. This question paper consists of 38 questions.

2. Follow the instructions given against the questions.

3. Figures in the right hand margin indicate maximum marks for the questions.

4. 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.

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.** $8 \times 1 = 8$

1. The maximum number of zeroes of a quadratic polynomial is

   (A)   4

   (B)   1

   (C)   2

   (D)   3

2. 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) $\frac{3}{2} \pi r^3$ cubic units

   (D) $\frac{3}{4} \pi r^3$ cubic units

3. If the nature of the roots of the quadratic equation

   $ax^2 + bx + c = 0$ is 'real and distinct' then

   (A) $a^2 - 4bc > 0$

   (B) $b^2 - 4ac = 0$

   (C) $a^2 - 4bc = 0$

   (D) $b^2 - 4ac > 0$

4. If $\sec A = \frac{2}{\sqrt{3}}$, then the value of $\cos A$ is

   (A) $\frac{\sqrt{2}}{3}$

   (B) $\frac{3}{2}$

   (C) $\frac{\sqrt{3}}{2}$

   (D) $\frac{1}{\sqrt{3}}$

5. In the Arithmetic progression x, 21, 18, ... the value of 'x' is

(A) 24   (B) 23

(C) 18   (D) – 3

6. $x + 2y = c_1$ and $2x + 4y = c_2$ are pair of linear equations. If $2c_1 \neq c_2$ then the equations have

(A) one solution   (B) two solutions

(C) infinite solutions   (D) no solution

7. The prime factors of 91 are

(A) 2, 13, 7   (B) 13, 7

(C) 91, 1   (D) 13, 7, 1

8. In the given figure, $OP \perp AB$. The length of AB is
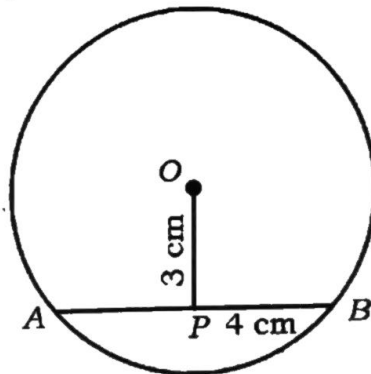
(A) 8 cm   (B) 6 cm

(C) 7 cm   (D) 5 cm

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

9. L.C.M. of 24 and 36 is 72, then find their H.C.F.

10. Find the roots of the equation : $(x - 1)(x + 3) = 0$

11. Write the formula to find the volume of the frustum of a cone having its circular base radii r_1 and r_2 and height 'h'.

12. Find the sum of zeroes of the quadratic polynomial

    $P(x) = x^2 + 7x + 10$.

13. In the figure, $\lfloor PQR = 90°$, then find the value of $\dfrac{\sin R}{\cos R}$.
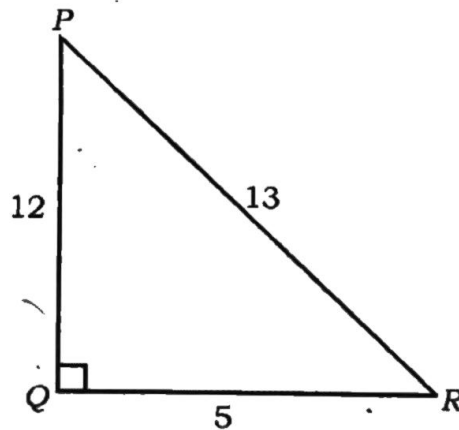
14. A square based prism die whose each rectangular faces are numbered 1, 3, 4 and 6 is rolled once. Find the probability of getting number 2 on its top face.

15. $\Delta ABC \sim \Delta PQR$. If the area of ΔABC is 49 cm^2, $AB = 7$ cm and $PQ = 9$ cm then find the area of ΔPQR.

16. If $\sin(90° - A) = \cos 60°$, where A is an acute angle, find the value of A.

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

17. Prove that $7 + \sqrt{5}$ is an irrational number.

18. Find the roots of the equation $3x^2 - 6x + 2 = 0$ using 'quadratic formula'.

19. Solve the following pair of linear equations by Elimination method :

$$4x + y = 15$$

$$x + y = 6$$

20. Find the sum of first 20 terms of the Arithmetic progression 4, 9, 14, ... using formula.

OR

Find the sum of the first 40 positive integers divisible by 6.

21. Find the coordinates of the point which divides the line segment joining the points (1, 5) and (– 4, 0) in the ratio 2 : 3.

22. If $P(A) = \dfrac{3}{4}$ then, show that $P(\overline{A}) \neq \dfrac{1}{2}$.

23. Draw a pair of tangents to the circle of radius 3·5 cm which are inclined to each other at an angle of 70°.

24. Find the value of : $\dfrac{\cos 45° \cdot \sin 45°}{\sec 30° - \cot 60°}$

OR

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

IV. Answer the following questions :

$9 \times 3 = 27$

25. Divide $p(x) = 3x^3 + 4x^2 - 11x + 35$ by $g(x) = x^2 - 2x + 3$ and find the quotient $[q(x)]$ and remainder $[r(x)]$.

OR

Find a quadratic polynomial, whose sum and product of its zeroes are -3 and 2 respectively and also find the zeroes of this polynomial.

26. Prove that "The lengths of tangents drawn from an external point to a circle are equal".

27. Construct a triangle ABC with sides $AC = 8$ cm, $AB = 5$ cm and $BC = 6\cdot5$ cm. Then construct a triangle whose sides are $\dfrac{2}{3}$ of the corresponding sides of the triangle ABC.

28. Find the mean for the following data by direct method :

Class-interval	Frequency
2 – 6	4
6 – 10	8
10 – 14	2
14 – 18	1
18 – 22	5

OR

Find the mode for the following data :

Class-interval	Frequency
5 – 15	4
15 – 25	8
25 – 35	2
35 – 45	5
45 – 55	1

10+14

20×5
100

29. A production yield per hectare of wheat of 75 farms of a village is given in the following data. Draw a 'More than type' ogive.

Production yield (in kg/ha)	Number of farms (Cumulative frequency)
50 or more than 50	75
55 or more than 55	70
60 or more than 60	65
65 or more than 65	54
70 or more than 70	40
75 or more than 75	25
80 or more than 80	12

30. Find the area of a triangle whose vertices are $A(-5, -1)$, $B(3, -5)$ and $C(5, 2)$.

OR

The vertices of a square are $A(-1, -2)$, $B(1, 0)$, $C(-1, 2)$ and $D(-3, 0)$. AC and BD diagonals intersect at a point 'O' as shown in the figure. Find the length of diagonals and the coordinates of point of intersection of the diagonals.

$\frac{35}{9}$

$\frac{44}{20}$

$\overline{64}$
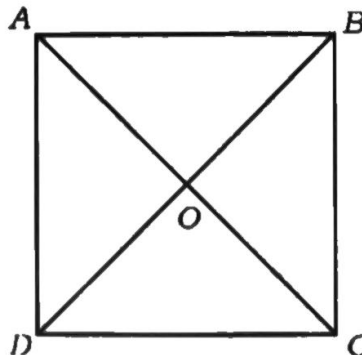
31. In the figure, *ABC* is an equilateral triangle with sides 14 cm and area $49\sqrt{3}$ cm^2. *P, Q* and *R* are the mid-points of the sides of the triangle. If *PQ, QR* and *RP* are the arcs of a circle with centres *B, C* and *A* respectively, then find the area of the shaded region and its perimeter. [Take $\sqrt{3}$ = 1·7]
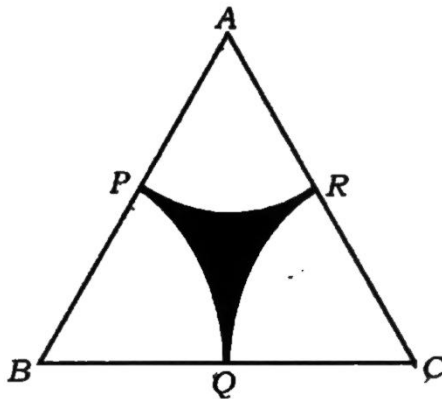

32. A motor boat whose speed is 11 km/hour in still water takes 2 hours 45 minutes to go 12 km upstream then to return downstream to the same spot. Find the speed of the stream.

OR

The sum of the reciprocals of ages of a person (in years) 3 years ago and 5 years from now is $\frac{1}{3}$. Find his present age.

33. In the given figure, $BC \parallel PQ$, $AB = 5$ cm, $PQ = 2$ cm and

$AP = 2 \cdot 5$ cm. Find the length of BC. Also

Prove that $\dfrac{\text{Area of } \triangle APQ}{\text{Area of } \triangle ABC} = \dfrac{1}{4}$.
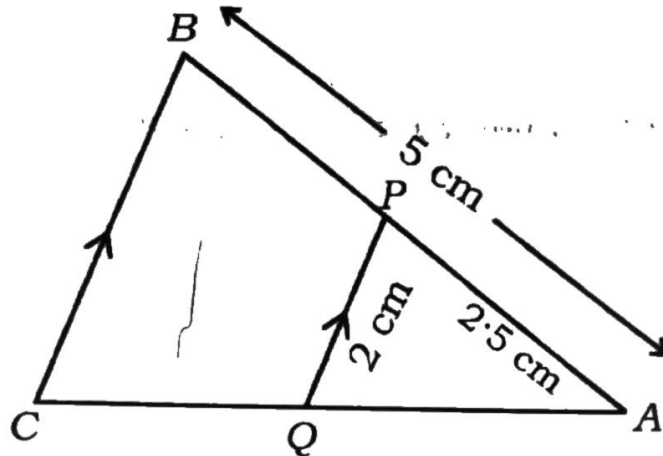
V. **Answer the following questions :** $\qquad$ **4 × 4 = 16**

34. An Arithmetic progression consists of 51 terms. The 20th term from the last term of this progression is 157. If the common difference is 5, then find the Arithmetic progression.

OR

The sum of 2nd and 4th terms of an Arithmetic progression is 22 and the sum of first 11 terms is 253. Find the Arithmetic progression. If the last term of it is 67, then find the number of terms of this progression.

35. Find the solution of the given pair of linear equations by graphical method.
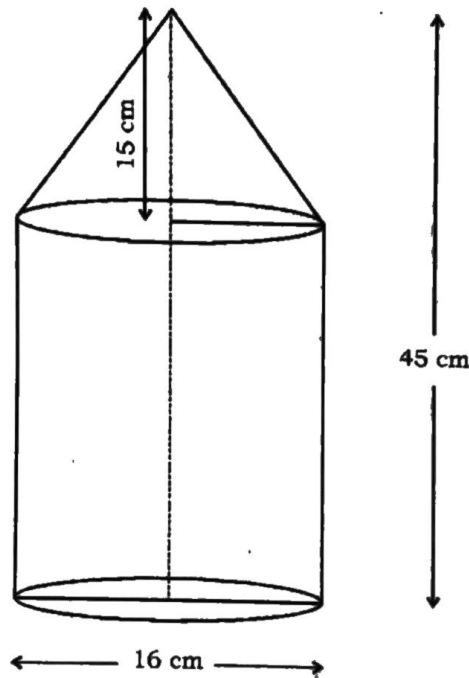
    $2x + y = 8$

    $x + y = 5$

36. Prove that "If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio [or proportion] and hence the two triangles are similar".

37. The lighthouse [AB] of height $10\sqrt{3}$ m stands vertically on a sea shore. A tower [CE] and a ship [F] are standing 30 m and 10 m away from the foot of the lighthouse respectively. The angle of elevation of the top of the tower from the top of the lighthouse is 30°. Find the height of the tower and distance between the top of the lighthouse to the top of the tower [AE]. Also find the angle of depression formed from the top of the lighthouse to the ship.
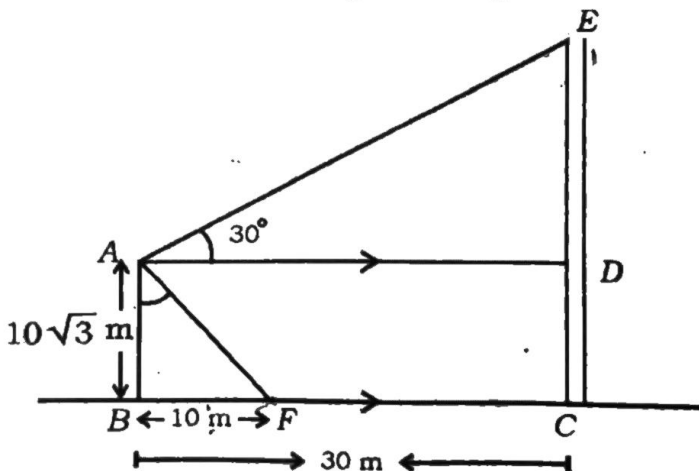
VI. Answer the following question : $1 \times 5 = 5$

38. A wooden solid is made by mounting a right circular cone on a circular base of a cylinder as shown in the figure. If the height of the solid is 45 cm, height of the cone is 15 cm and diameter of the circular base of cylinder is 16 cm, then find the total surface area and volume of the wooden solid.