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 — 2023

STATE LEVEL SSLC PREPARATORY EXAMINATION, FEBRUARY / MARCH — 2023

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E** **Code No. : 81-E**

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ / English Medium)

ದಿನಾಂಕ : 02. 03. 2023] [Date : 02. 03. 2023

ಸಮಯ : ಬೆಳಗ್ಗೆ 10-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-45 ರವರೆಗೆ] [Time : 10-30 A.M. to 1-45 P.M.

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80] [Max. Marks : 80

General Instructions to the Candidate :

1. This Question Paper consists of objective and subjective types of 38 questions.
2. Follow the instructions given against both the objective and subjective types of 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 × 1 = 8**

1. If 10, x, 18 are in Arithmetic progression, then the value of x is

(A) 12 (B) 13

(C) 14 (D) 16

2. The Highest Common Factor (HCF) of 3 and 5 is

(A) 1 (B) 3

(C) 5 (D) 15

3. The discriminant of the quadratic equation $ax^2 + bx + c = 0$ is

(A) $a^2 - 4bc$ (B) $b^2 - 4ac$

(C) $a^2 + 4bc$ (D) $b^2 + 4ac$

4. The value of $\frac{\sin(90^\circ - \theta)}{\cos\theta}$ is

(A) 0 (B) 1

(C) 2 (D) $\frac{1}{2}$

5. The coordinates of the midpoint of the line segment joining the points $P(4, 7)$ and $Q(10, 3)$ are

(A) (14, 10) (B) (5, 7)

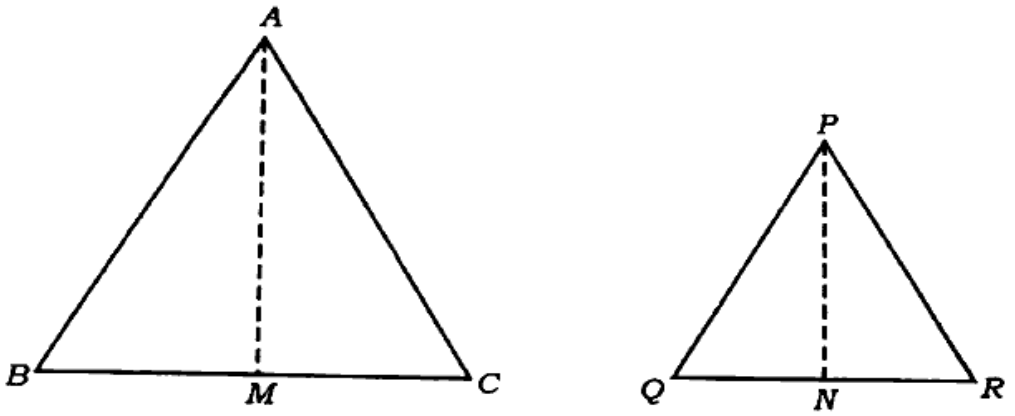
(C) (3, −5) (D) (7, 5)

6. The equation of the line which is parallel to the line represented by the equation $4x - 8y = 11$ is

(A) $4x - 16y = 22$ (B) $2x + 4y = 6$

(C) $8x - 16y = 21$ (D) $8x + 16y = 22$

7. In the figure, $\Delta ABC \sim \Delta PQR$, then the correct relation among the following is



(A) $\frac{\text{area of } (\Delta ABC)}{\text{area of } (\Delta PQR)} = \frac{BC^2}{QR^2}$

(B) $\frac{\text{area of } (\Delta ABC)}{\text{area of } (\Delta PQR)} = \frac{AB^2}{PN^2}$

(C) $\frac{\text{area of } (\Delta ABC)}{\text{area of } (\Delta PQR)} = \frac{BC^2}{QN^2}$

(D) $\frac{\text{area of } (\Delta ABC)}{\text{area of } (\Delta PQR)} = \frac{QR^2}{BC^2}$

8. The curved surface area of a solid hemisphere of radius 'r' units is

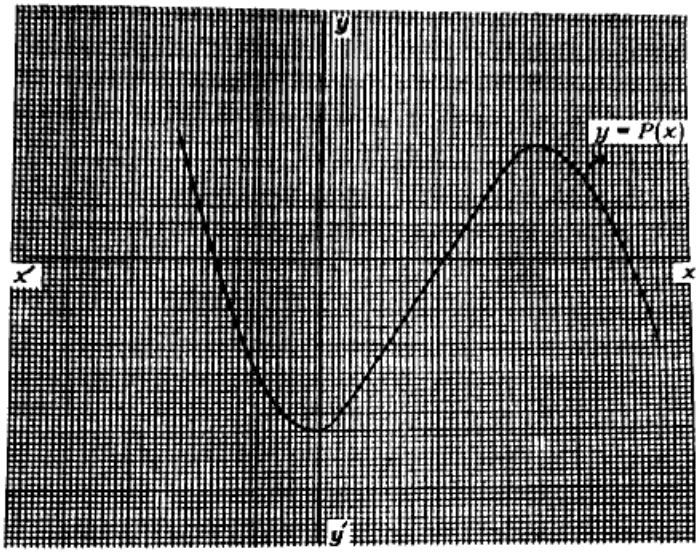
(A) $4\pi r^2$ sq.units (B) $3\pi r^2$ sq.units

(C) πr^2 sq.units (D) $2\pi r^2$ sq.units

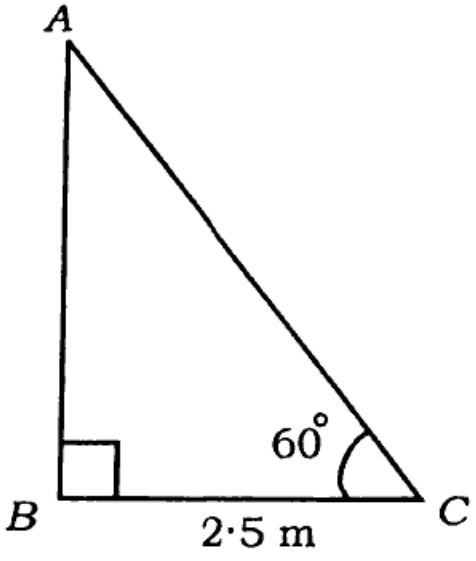
II. Answer the following questions : **8 × 1 = 8**

9. State whether the rational number $\frac{35}{50}$ has a terminating decimal expansion or a non-terminating recurring decimal expansion.

10. The graph of $y = p(x)$ is given below. Write the number of zeroes of $p(x)$.



11. A ladder is placed against a wall such that its foot is at a distance of 2·5 m from the wall and it is inclined at an angle of 60° with the ground. Find the length of the ladder.

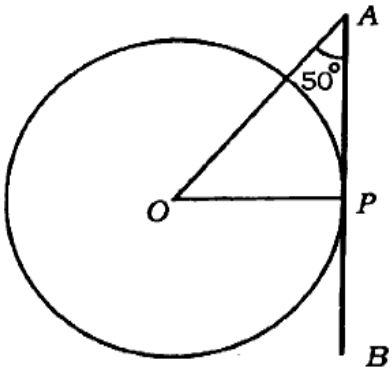


12. Write the formula to find the area of a triangle whose vertices are (x_1 , y_1), (x_2 , y_2) and (x_3 , y_3).

13. For any event E, if $P(E) = 0{\cdot}7$, then find $P(\overline{E})$.

14. If $\tan \theta = 1$, then find the value of $\sec^2 \theta$.

15. In the figure, AB is a tangent to a circle with centre 'O'. 'P' is the point of contact. If $\angle OAP = 50°$, then find $\angle AOP$.



16. Write the formula to find the total surface area of a cylinder of radius 'r' and height 'h'.

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

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

OR

The H.C.F. and L.C.M. of two numbers are 3 and 60 respectively. If one of the numbers is 12, then find the other number.

18. Solve the given pair of linear equations :

$2x - y = 4$

$x + y = 11$

19. If the lines represented by the pair of linear equations,

$2x + 3y - 8 = 0$ and $ax + by - 16 = 0$ are coincident then find the values of 'a' and 'b'.

20. Find the 26th term of the Arithmetic progression 3, 7, 11, ... using formula.

21. Find the roots of the quadratic equation $3x^2 - 5x + 2 = 0$ using quadratic formula.

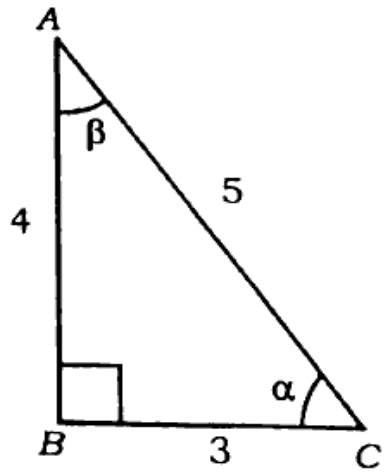
OR

Find the roots of the quadratic equation $x^2 - 5x + 6 = 0$ by the method of completing the square.

22. In the given figure, ΔABC is a right-angled triangle. Find the value of the following :

i) $\sin \alpha$

ii) $\tan \beta$.



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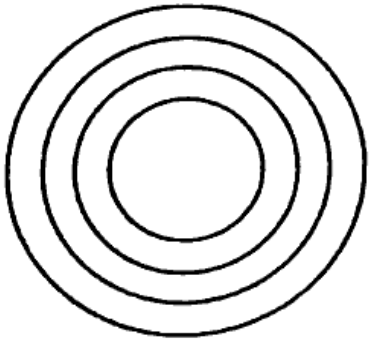
23. A box contains 20 cards, which are numbered from 1 to 20. If one card is drawn at random from the box, then find the probability of getting a perfect cube number.

24. Construct a pair of tangents to a circle of radius 3 cm, which are inclined at an angle of 60°.

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

25. A student prepares a model of atomic structure that consists of four concentric circular rings. The length of circumferences of these rings are in Arithmetic progression. The sum of the circumferences of the first three rings is 66 cm and the circumference of the fourth ring is 44 cm. Find the circumference of the third ring using formula.



OR

The sum of the first four terms of an Arithmetic progression is 38 and the sum of the first seven terms is 98. Find the first term and common difference of the Arithmetic progression.

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

OR

Find the zeroes of the quadratic polynomial $p(x) = x^2 - 2x - 8$ and verify the relationship between the zeroes and coefficients.

27. Find the coordinates of the point '*P*' on *x*-axis, which is equidistant from the points *A* (2, – 5) and *B* (– 2, 9).

OR

Find the coordinates of the point '*P*' on *AB* which divides the line joining the points *A* (– 2, – 2) and *B* (5, 12) in the ratio 3 : 4.

28. Find the Arithmetic mean for the following grouped data :

Class-interval	*Frequency*
0 – 2	2
2 – 4	6
4 – 6	8
6 – 8	3
8 – 10	1

OR

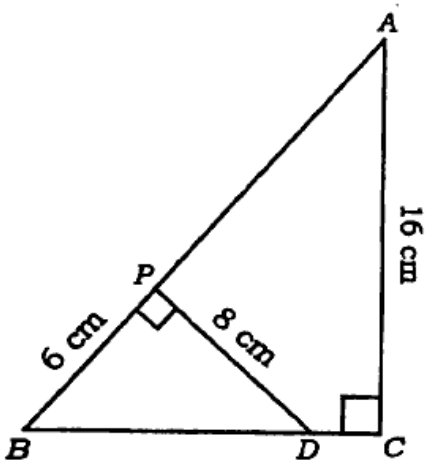
Find the mode for the following grouped data :

Class-interval	*Frequency*
0 – 6	2
6 – 12	9
12 – 18	15
18 – 24	12
24 – 30	5

29. During the medical check-up of 60 students of a class, their weights were recorded as follows. Draw 'less than type' ogive for the given data :

Weight (in kg)	*Number of students (cumulative frequency)*
Less than 45	5
Less than 50	12
Less than 55	30
Less than 60	50
Less than 65	58
Less than 70	60

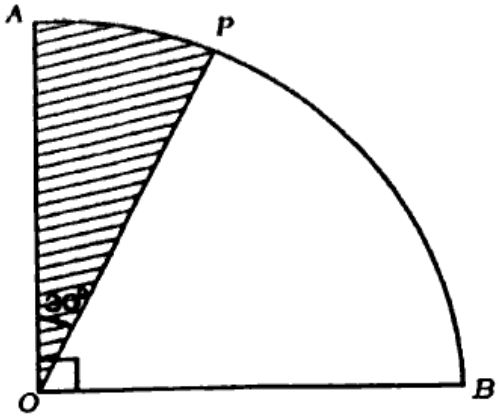
30. In the figure, ABC is a right angled triangle and $DP \perp AB$. If $BP = 6$ cm, $DP = 8$ cm and $AC = 16$ cm then find the length of AB.



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

32. **Construct a triangle ABC, with $AB = 9$ cm, $BC = 5$ cm and $AC = 6$ cm, and then construct another triangle similar to it, whose sides are $\frac{2}{3}$ of the corresponding sides of the ΔABC.**

33. In the figure, $OAPB$ is a quadrant of a circle and OAP is a sector. If $\angle AOP = 30°$ and the area of the shaded region is 462 cm^2, then find the length of the arc PB.



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

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

$x + y = 5$

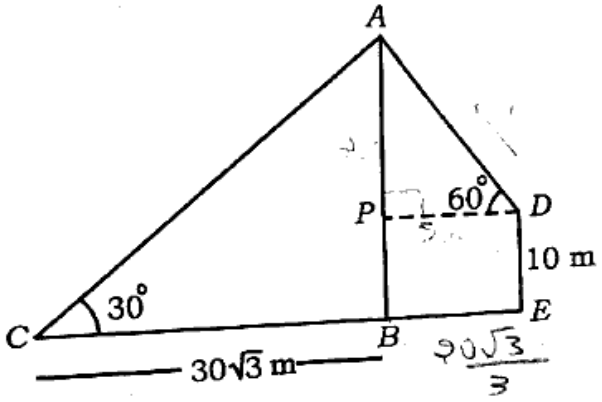
$3x - y = 3$.

35. A motor boat whose speed is 18 km/h in still water takes one hour more to go 24 km upstream than the time taken to return downstream to the same spot. Find the speed of the stream.

OR

Person '*A*' is 26 years older than person '*B*'. The product of their ages (in years), 3 years from now will be 360. Find the present ages of person '*A*' and person '*B*'.

36. A tower and a building are standing vertically on a level ground. The angles of elevation of the top of the tower from a point on the same ground and from the top of the building are found to be 30° and 60° respectively. If the distance of the point from the foot of the tower is $30\sqrt{3}$ m and height of the building is 10 m, then find the distance between the foot of the tower and building and also the distance between their tops.



37. 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". **1 × 5 = 5**

VI. Answer the following question :

38. A solid is in the shape of frustum of a cone of height 12 cm and radii of its circular ends are 5 cm and 10 cm. Find the total surface area and volume of the solid.