ಕರ್ನಾಟಕ ಪ್ರೌಢಶಿಕ್ಷಣ ಪರೀಕ್ಷಾ ಮಂಡಳಿ

ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು–560003.

KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD

Malleshwaram, Bengaluru – 560003.

2020-21 MODEL PAPER - 1

Subject : MATHEMATICS **Subject Code : 81E**

Time : 3 hrs. 15 minutes **Max. Marks : 80**

English Medium

Regular Fresh

General Instructions to the Candidate :

1. This question Paper consists of objective and subjective types 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. Check whether all the pages of the question paper are intact.
3. Follow the instructions given against both the objective and subjective types of 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.

I. Four choices are given for each of incomplete / statement / questions. Choose the correct answer and write the complete answer along with its letter of alphabet. 8 x 1 = 8

1. If the pair of Linear equations $x + 2y = 3$ and $2x + 4y = k$ are coincide then the value of 'k' is :

   A. 3 B. 6

   C. -3 D. -6

2. The n^{th} term of an arithmetic progression is $a_n = 4n + 5$ then the 3rd term is :

   A. 5 B. 9

   C. 13 D. 17

3. If the roots of the quadratic equation $x^2 + 6x + k = 0$ are equal, then the value of 'k' is :

   A. 9 B. -9

   C. 8 D. 5

4. The value of $\sin 60^0 \times \cos 30^0$ is :

   A. $\frac{1}{4}$

   B. $\frac{\sqrt{3}}{4}$

   C. $\frac{3}{4}$

   D. $\frac{1}{2}$

5. The distance of the co-ordinate p(4, 3) from the x- axis is :

   A. 2 units B. 3 units

   C. 4 units D. 5 units

6. A straight line intersecting a circle at two points is called :

   A. a secant B. a tangent

   C. radius D. a normal

7. The volume of a cylinder is 300 m^3 then the volume of a cone having the same radius and height as that of the cylinder is :

   A. 900 m^3

   B. 600 m^3

   C. 150 m^3

   D. 100 m^3

8. The surface area of a sphere of radius 7cm is :

   A. 154 cm^2

   B. 308 cm^2

   C. 616 cm^2

   D. 770 cm^2

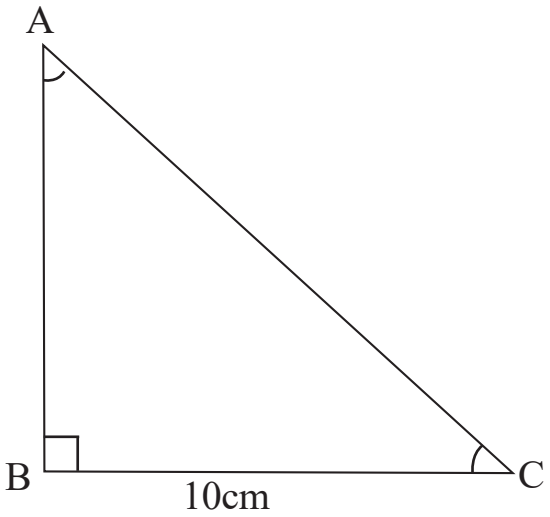
II. Answer the following questions in a sentence each. 8 x 1 = 8

9. How many solutions have the pair of linear equations $2x+3y-9=0$ and $4x + 6y - 18 = 0$?

10. Write the standard form of a quadratic equation.

11. Find the value of $\tan\theta - \cot(90^0 - \theta)$.

12. In the figure $\angle B=90^0$, $\angle A = \angle C$ and BC=10cm, then find the value of $\tan 45^0$.

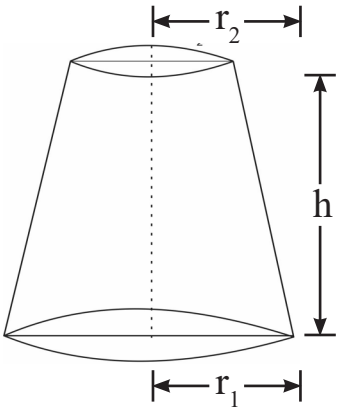


13. Write the co-ordinates of the midpoint of the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$.

14. Find the median of the scores 5, 8, 14, 16, 19 and 20 ?

15. State 'Thale's theorem ?

16. Write the formula to find the curved surface area of the frustum of a cone as shown in the figure?



III. Answer the following questions. 8 x 2 = 16

17. Find the 25th term of an arithmetic progression 2, 6, 10, 14, ...

18. Find the sum of first 20 terms of the arithmetic progression 3, 8, 13, ... using the formula.

OR

Find the sum of the first 30 positive integers divisible by 6.

19. Solve : $3x + y = 15$
$2x - y = 5$

20. Solve by using quadratic formula : $x^2-3x+1=0$.

21. Find the discriminant of the quadratic equation $2x^2-6x+3=0$ and hence write the nature of roots.

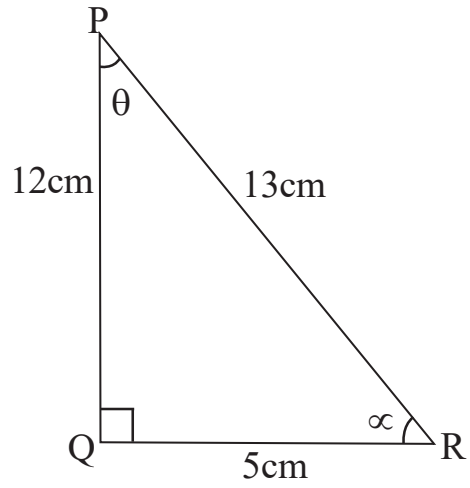
OR

Prove that the quadratic equation $x^2+ax-4=0$ has distinct, real roots.

22. Find the distance between the co-ordinate of the points A(2, 3) and B(10, -3).

23. Draw a line segment of AB=8cm and divide it in the ratio 3:2 by geomtrical construction.

24. In the figure given below find the value of sinθ and cos∝ ?



IV. Answer the following questions. 9 x 3 = 27

25. The sum of two natural numbers is 9 and the sum of their reciprocals is $\frac{9}{20}$. Find the numbers.

OR

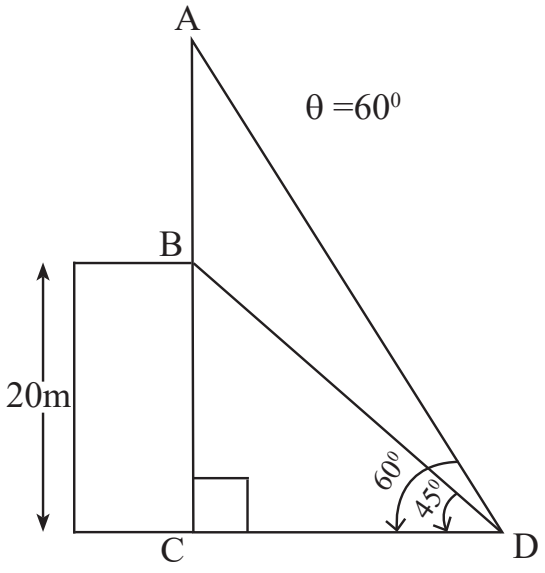
The perimeter and area of a rectangular play ground are 80m and 384m^2 respectively. Find the length and breadth of the play ground.

26. Prove that $\frac{Sin\theta}{1-\cot\theta}+\frac{\cos\theta}{1-\tan\theta}=Sin\theta+\cos\theta$.

OR

Prove that $\frac{\cos\theta-2\cos^3\theta}{2\sin^3\theta-\sin\theta}=\cot\theta$

27. From a point on the ground, the angles of elevation of the top and bottom of a transmission tower fixed at the top of a 20m high building are 60^0 and 45^0 respectively. Find the height of the transmission tower.



28. Find the value of 'k'. If the co-ordinates of the points A(2, -2), B(-4, 2) and C(-7, k) are collinear.

29. Calculate the 'mean' for the frequency distribution table given below, by direct method.

Class internal	Frequency
5 - 15	4
15 - 25	3
25 - 35	6
35 - 45	5
45 - 55	2

OR

Find the 'mode' of the frequency distribution table given below.

Class internal	Frequency
0 - 10	7
10 - 20	9
20 - 30	15
30 - 40	11
40 - 50	8

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

Production yield in kg/hectare	Cumulative Frequency
More than or equal to 50	100
More than or equal to 55	98
More than or equal to 60	90
More than or equal to 65	78
More than or equal to 70	54
More than or equal to 75	16

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

32. Draw a pair of tangents to a circle of radius 4cm which are inclined to each other at an angle of 70^0 and write the measure of its length.

33. A right circular metalic cone of height 20cm and base radius 5cm is melted and recast into a solid sphere. Find the radius of the sphere.

OR

A solid sphere of radius 3cm is melted and reformed by stretching it into a cylindrical shaped wire of length 9m. Find the radius of the wire.

V. Answer the following. 4 x 4 = 16

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

$2x + y = 10$

$x + y = 6$

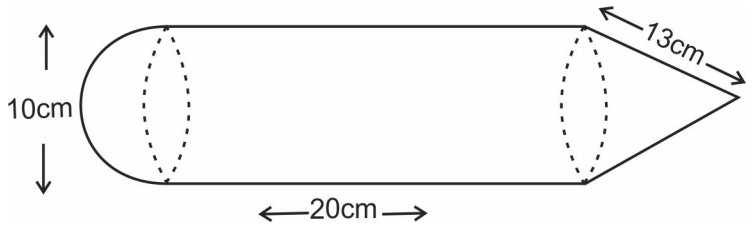
35. An arithmetic progression consists of 37 terms. The sum of the first 3 terms of it is 12 and the sum of its last 3 terms is 318, then find the first and last terms of the progression.

OR

The sum of the first 7 terms of an arithmetic progression is 140 and the sum of the next 7 terms of the same progression is 385 then find the arithmetic progression.

36. Construct a triangle with sides 4cm, 5cm, and 6cm and then another triangle whose sides are $\frac{5}{3}$ of the corresponding sides of the first triangle.

37. A toy is made in the shape of a cylinder with one hemisphere stuck to one end and a cone to the other end, as shown in the figure, the length of the cylindrical part of the toy is 20cm and its diameter is 10cm. If the slant height of the cone is 13cm. Find the surface area of the toy.



VI. Answer the following question : 1 x 5 = 5

38. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.