

KA

COMMON SECOND MID-TERM TEST - 2019

Standard X

Reg.No. : 

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Time: 1.30 hours.

MATHEMATICS

Marks: 50

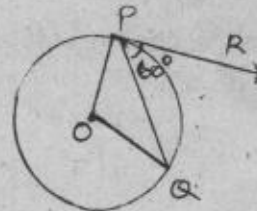
Part - I

I. Choose the correct answer:

7 x 1 = 7

1. If the roots of  $(a - b)x^2 + (b - c)x + (c - a) = 0$  are real and equal, then a, b, c are in  
a) A.P                      b) G.P                      c) Both A.P and G.P                      d) none of these
2. Transpose of a column matrix is  
a) unit matrix                      b) diagonal matrix                      c) column matrix                      d) row matrix

3. In figure if PR is tangent to the circle at P and O is the centre of the circle, then



- POQ is
- a)  $120^\circ$
  - b)  $100^\circ$
  - c)  $110^\circ$
  - d)  $90^\circ$

4. If the ratio of the height of a tower and the length of its shadow is  $\sqrt{3} : 1$ , then the angle of elevation of the sun has measure  
a)  $45^\circ$                       b)  $30^\circ$                       c)  $90^\circ$                       d)  $60^\circ$
5. The minimum number of measurements required to determine the height or distance or angle of elevation is  
a) 1                      b) 2                      c) 3                      d) 4
6. The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is  
a)  $60\pi \text{ cm}^2$                       b)  $68\pi \text{ cm}^2$                       c)  $120\pi \text{ cm}^2$                       d)  $136\pi \text{ cm}^2$
7. The total surface area of a hemisphere is how much times the square of its radius?  
a)  $\pi$                       b)  $4\pi$                       c)  $3\pi$                       d)  $4\pi$

Part - II

II. Answer any 5 questions: (Ques.No.15 is compulsory)

5 x 2 = 10

8. If the difference between a number and its reciprocal is  $\frac{24}{5}$ , find the number.
9. Construct a  $3 \times 3$  matrix whose elements are given by  $a_{ij} = |i - 2j|$
10. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point.
11. Show that in a triangle, the medians are concurrent.
12. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height  $10\sqrt{3}$  m.
13. From the top of a rock  $50\sqrt{3}$  m high, the angle of depression of a car on the ground is observed to be  $30^\circ$ . Find the distance of the car from the rock.
14. The slant height of a frustum of a cone is 5 cm and the radii of its ends are 4 cm and 1 cm. Find its curved surface area.

(2)

X Maths

15. A metallic sphere of radius 16 cm is melted and recast into small spheres each of radius 2 cm. How many small spheres can be obtained?

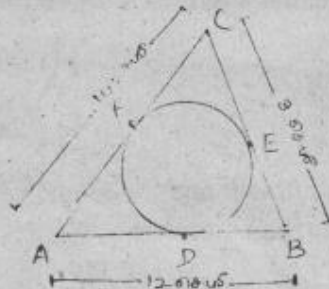
**Part - III**

**III. Answer any 5 questions: (Ques.No.23 is compulsory)** 5 x 5 = 25

16. A flock of swans contained  $x^2$  members. As the clouds gathered  $10x$  went to a lake and one-eighth of the members flew away to a garden. The remaining three pairs played about in the water. How many swans were there in total?

17. If  $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ , show that  $A^2 - 5A + 7I_2 = 0$

18. A circle is inscribed in  $\triangle ABC$  having sides 8 cm, 10 cm and 12 cm as shown in figure, find AD, BE and CF.



19. In  $\triangle ABC$ , with  $\angle B = 90^\circ$ ,  $BC = 6$  cm and  $AB = 8$  cm, D is a point on AC such that  $AD = 2$  cm and E is the mid point of AB. Join D to E and extend it to meet at F. Find BF.

20. From the top of a 12 m high building, the angle of elevation of the top of a cable tower is  $60^\circ$  and the angle of depression of its foot is  $30^\circ$ . Determine the height of the tower.

21. A toy is in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25 cm. Find the total surface area of the toy if its common diameter is 12 cm.

22. A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm, having a hemispherical cap. Find the number of cones needed to empty the container.

23. State and prove Pythagoras theorem.

**Part - IV**

**IV. Answer any one of the following:** 1 x 8 = 8

24. a) Draw the graph of  $y = x^2 - 4x + 3$  and use it to solve  $x^2 - 6x + 9 = 0$

(or)

- b) Draw two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also measure the lengths of the tangents.

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