

CCE MODEL TEST PAPER

SECOND TERM (SA-II)

MATHEMATICS

(With Answers)

CLASS X

Time Allowed : 3 Hours]

[Maximum Marks : 80

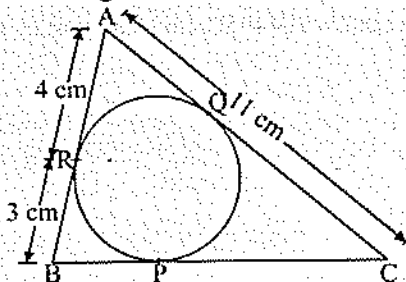
General Instructions :

- All questions are compulsory.
- The question paper consists of 34 questions divided into four sections A, B, C and D. Section A comprises of 10 questions of 1 mark each. Section B comprises of 8 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each and Section D comprises of 6 questions of 4 marks each.
- Question numbers 1 to 10 in Section A are multiple choice questions where you are to select one correct option out of the given four.
- There is no overall choice. However, internal choice has been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators is not permitted.

Section 'A'

Question numbers 1 to 10 are of one mark each.

- The 8th term of the sequence 117, 104, 91, 78, is
(a) 0 (b) 13
(c) 26 (d) 39
- If two cones have their volumes in the ratio 3 : 2 and their heights are in the ratio 2 : 3, then the ratio of their radius is
(a) 9 : 4 (b) 4 : 9
(c) 2 : 3 (d) 3 : 2
- The condition that one root of the quadratic equation $px^2 + qx + r = 0$ is four times the other is
(a) $4r^2 = 25pq$ (b) $4p^2 = 25qr$
(c) $4q^2 = 25pr$ (d) $5q^2 = 24pr$
- In figure, $\triangle ABC$ is circumscribing a circle, then the length of BC is



- (a) 10 cm (b) 9 cm
 (c) 7 cm (d) 6 cm
5. Two coins are tossed simultaneously the probability of getting at least one head is

- (a) $\frac{1}{4}$ (b) $\frac{1}{2}$
 (c) $\frac{3}{4}$ (d) $\frac{2}{3}$

6. If an A.P. consists of 31 terms, if its 16th term is p , then sum of all the terms of this A.P. is

- (a) $52p$ (b) $16p$
 (c) $31p$ (d) $47p$

7. If α, β are the roots of the equation $x^2 - m(x + 1) - p = 0$ then $(\alpha + 1)(\beta + 1)$ is equal to

- (a) p (b) $1 - p$
 (c) $p + 1$ (d) $p - 1$

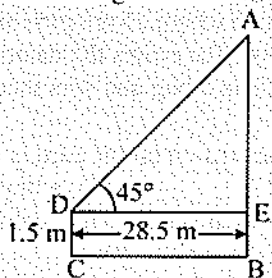
8. If the surface areas of two spheres are in the ratio 9 : 25, the ratio of their radii is

- (a) 3 : 5 (b) 5 : 3
 (c) 2 : 5 (d) 5 : 2

9. The distance between the points $\left(\frac{6}{7}, 8\right)$ and $\left(-\frac{8}{7}, -3\right)$ is

- (a) $5\sqrt{5}$ units (b) $4\sqrt{5}$ units
 (c) $3\sqrt{5}$ units (d) $2\sqrt{5}$ units

10. An observer 1.5 m tall is 28.5 m away from a tower. The angle of elevation of the tower from his eyes is 45° . The height of the tower from the ground is



- (a) 30 m (b) 28.5 m
 (c) 27 m (d) 31.5 m

Section 'B'

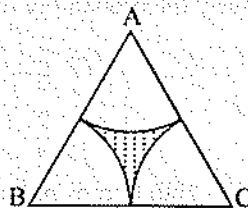
Question numbers 11 to 18 carry 2 marks each.

11. A right circular cone is 3.6 cm high and radius of its base is 1.6 cm. It is melted and recast into a right circular cone with radius of its base as 1.2 cm. Find its height.

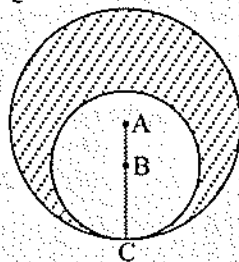
12. Three cubes each of side 5 cm are joined end to end. Find the surface area of the resulting cuboid.

13. In what ratio does the point $C\left(\frac{3}{5}, \frac{11}{5}\right)$ divides the line segment joining the points $A(3, 5)$ and $B(-3, -2)$?

14. In figure, ABC is an equilateral triangle of side 8 cm. A , B and C are the centres of circular arcs of radius 4 cm. Find the area of the shaded region. [Take $\pi = 3.142$ and $\sqrt{3} = 1.732$]



15. In figure, two circles with centres A and B touch each other at the point C . If $AC = 8$ cm and $AB = 3$ cm, find the area of the shaded region.



16. Solve for x : $\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{4}$, $x \neq 0$, $x \neq 2$.

Or

Divide 16 into two parts such that twice the square of the larger part exceeds the square of the smaller part by 164.

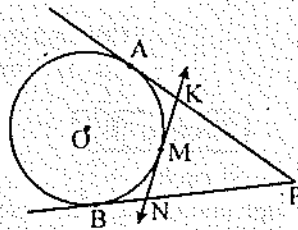
17. There are 40 students in class X of whom 25 are girls and 15 are boys. The class teacher has to select one student as a class representative. She writes the name of each student on a separate card, the cards being identical. Then she puts cards in a bag and stirs them thoroughly. She then draws one card from the bag.

What is the probability that the name written on the card is the name of

(i) a girl?

(ii) a boy?

18. PA and PB are tangents from P to the circle with centre O . At the point M , a tangent is drawn cutting PA at K and PB at N . Prove that $KN = AK + BN$.



Section 'C'

Question numbers 19 to 28 carry 3 marks each.

19. A bag contains 5 red, 8 green and 7 white balls. One ball is drawn at random from the bag. Find the probability of getting

(i) a white ball or a green ball

(ii) neither a green ball nor a red ball.

20. Find a point on the y-axis which is equidistant from the points $A(6, 5)$ and $B(-4, 3)$.

21. A wheel has diameter 84 cm. Find how many complete revolutions must it take to cover 792 metres.

22. Determine the A.P. whose 3rd term is 16 and when 5th term is subtracted from 7th term, we get 12.

23. A solid iron rectangular block of dimensions 4.4 m, 2.6 m and 1 m is cast into a hollow cylindrical pipe of internal radius 30 cm and thickness 5 cm. Find the length of the pipe.

Or

An iron solid sphere of radius 3 cm is melted and recasted into small spherical balls of radius 1 cm each. Assuming that there is no wastage in the process, find the number of small spherical balls made from the given sphere.

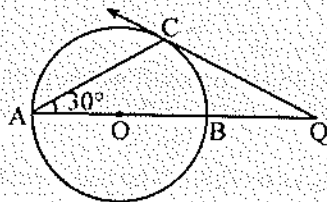
24. The sum of a number and its positive square root is $\frac{6}{25}$. Find the number.

Or

If the equations $5x^2 + (9 + 4p)x + 2p^2 = 0$ and $5x + 9 = 0$ are satisfied by the same value of x , find the value of p .

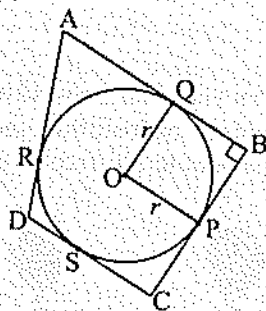
25. In the figure, AB is diameter of a circle with centre O and QC is a tangent to the circle at C . If $\angle CAB = 30^\circ$, find

(i) $\angle CQA$ (ii) $\angle CBA$.

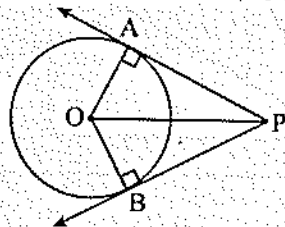


Or

In figure, a circle is inscribed in a quadrilateral $ABCD$ in which $\angle B = 90^\circ$. If $AD = 23$ cm, $AB = 29$ cm and $DS = 5$ cm, find the radius (r) of the circle.



26. In figure, OP is equal to diameter of the circle. Prove that ABP is an equilateral triangle.



27. A tower stands vertically on the ground. From a point on the ground which is 20 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60° . Find the height of the tower.

28. Draw a right triangle ABC in which $AC = AB = 4.5$ cm and $\angle A = 90^\circ$. Draw a triangle similar to ΔABC with its sides equal to $\frac{5}{4}$ th of the corresponding sides of ΔABC .

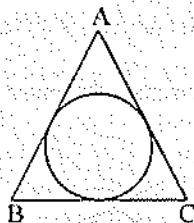
Section 'D'

Question numbers 29 to 34 carry 4 marks each.

29. Prove that the lengths of tangent drawn from an external point to a circle are equal.

Using the above result, prove the following :

ABC is an isosceles triangle in which $AB = AC$, circumscribed about a circle as shown in figure. Prove that the base is bisected by the point of contact.



30. A motor-boat, whose speed is 15 km/h in still water, goes 30 km upstream and comes back in a total time of 4 hours 30 minutes. Find the speed of the stream.

Or

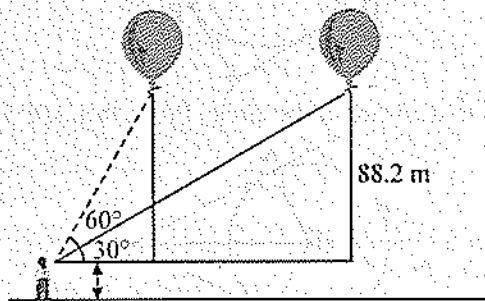
A shopkeeper buys a number of books for ₹ 80. If he had bought 4 more books for the same amount, each book would have cost ₹ 1 less. How many books did he buy ?

31. Find the sum of all integers between 92 and 786, which are multiples of 9.

32. Four points $A(6, 3)$, $B(-3, 5)$, $C(4, -2)$ and $D(x, 3x)$ are given in such a way that

$$\frac{\Delta DBC}{\Delta ABC} = \frac{1}{2}, \text{ find } x.$$

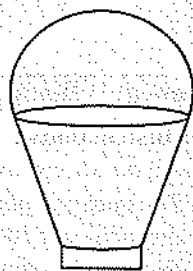
33. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60° . After sometime, the angle of elevation reduces to 30° (see figure). Find the distance travelled by the balloon during the interval.



Or

The horizontal distance between the two towers is 140 m. The angle of elevation of the top of the first tower when seen from the top of the second tower is 30° . If the height of the second tower is 60 m, find the height of the first tower. [Use $\sqrt{3} = 1.73$]

34. An open metal bucket is in the shape of a frustum of a cone, mounted on a hollow cylindrical base made of the same metallic sheet (see figure). The diameters of the two circular ends of the bucket are 45 cm and 25 cm, the total vertical height of the bucket is 40 cm and that of the cylindrical base is 6 cm. Find the area of the metallic sheet used to make the bucket, where we do not take into account the handle of the bucket. Also, find the volume of water that the bucket can hold.



ANSWERS

Section 'A'

- | | | |
|---------|--------|--------|
| 1. (c) | 2. (a) | 3. (c) |
| 4. (a) | 5. (c) | 6. (c) |
| 7. (b) | 8. (a) | 9. (a) |
| 10. (a) | | |

Section 'B'

11. Height of the cone = 6.4 cm
12. Surface area of the cuboid = 350 cm^2
13. 2 : 3 internally 14. Area = 2.576 cm^2 15. Area = 122.57 cm^2
16. $x = 4$ or $x = -\frac{2}{9}$ Or 10 and 6
17. (i) $\frac{5}{8}$, (ii) $\frac{3}{8}$

Section 'C'

19. (i) $\frac{3}{4}$, (ii) $\frac{7}{20}$ 20. (0, 9) 21. Number of revolutions = 300
22. A.P. is 4, 10, 16, 22,
23. Length of the pipe = 112 m Or Number of spherical balls = 27
24. $\frac{1}{25}$ Or $p = 3.6$ 25. (i) $\angle CQA = 30^\circ$, (ii) $\angle CBA = 60^\circ$ Or 15 cm
27. Height of the tower = $20\sqrt{3}$ m

Section 'D'

30. Speed of the stream = 5 km/h Or 16 books
31. Sum of all integers between 92 and 786 = 33957 32. $x = \frac{11}{8}$ or $x = -\frac{3}{8}$
33. $58\sqrt{3}$ m Or 140.73 m 34. 4860.9 cm^2 , 33.62 litres.