

# CCE MODEL TEST PAPER

SECOND TERM (SA-II)

MATHEMATICS

(With Answers)

CLASS X

Time Allowed : 3 Hours

[Maximum Marks : 80]

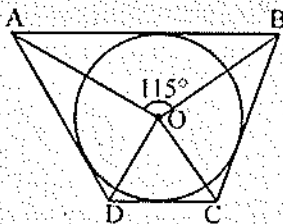
## General Instructions :

- 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.

1.



In figure, the quadrilateral  $ABCD$  is circumscribed to a circle with centre  $O$ . If  $\angle AOB = 115^\circ$ , then  $\angle COD$  is :

(a)  $75^\circ$

(b)  $65^\circ$

(c)  $45^\circ$

(d)  $90^\circ$

2. The distance between the points  $(l + m, n - p)$  and  $(l - m, n + p)$  is

(a)  $\sqrt{m^2 + p^2}$

(b)  $\sqrt{l^2 + p^2}$

(c)  $\sqrt{l^2 + q^2}$

(d)  $\sqrt{m^2 + q^2}$

3. If  $\alpha, \beta$  are the roots of the equation  $x^2 + x\sqrt{\alpha} + \beta = 0$ , then

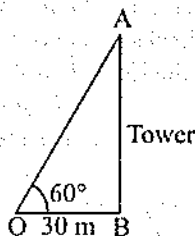
(a)  $\alpha = 1, \beta = -1$

(b)  $\alpha = 2, \beta = 1$

(c)  $\alpha = 1, \beta = -2$

(d)  $\alpha = 2, \beta = -2$

4. If from a point 30 m away from the foot of a tower, the angle of elevation of the top of the tower is  $60^\circ$ , then the height of the tower is



(a)  $30\sqrt{3}$  m

(b)  $10\sqrt{3}$  m

(c)  $15\sqrt{3}$  m

(d)  $20\sqrt{3}$  m

5. A shuttle cock used for playing badminton has the shape of the combination of :

(a) a cylinder and a sphere

(b) a sphere and a cone

(c) a cylinder and a hemisphere

(d) a hemisphere and frustum of cone

6. If the root of  $x^2 + px + 12 = 0$  are in the ratio 1 : 3, then the value of  $p$  is

(a)  $\pm 6$

(b)  $\pm 7$

(c)  $\pm 8$

(d)  $\pm 9$

7. Which term of the sequence 114, 109, 104, ..... is the first negative term ?

(a) 21st

(b) 22nd

(c) 24th

(d) 23rd

8. A card is drawn from a pack of cards numbered 1 to 52. The probability that the number on the card is a perfect square is

(a)  $\frac{1}{13}$

(b)  $\frac{3}{13}$

(c)  $\frac{5}{52}$

(d)  $\frac{7}{52}$

9. The difference between the circumference and diameter of a circle is 30 cm. The area of the circle is

(a)  $154 \text{ cm}^2$

(b)  $217 \text{ cm}^2$

(c)  $135 \text{ cm}^2$

(d)  $115 \text{ cm}^2$

10. If three numbers  $a, b, c$  in order are in A.P., then

(a)  $2b = a + c$

(b)  $2c = a + b$

(c)  $2a = b + c$

(d)  $2 = a + b + c$

### Section 'B'

Question numbers 11 to 18 carry 2 marks each.

11. In what ratio does the  $x$ -axis divide the line segment joining the points  $(2, -3)$  and  $(5, 6)$ ? Also, find the coordinates of the point of intersection.

Or

If  $P(x, y)$  is any point on the line joining the points  $A(a, 0)$  and  $B(0, b)$ , then show that  $\frac{x}{a} + \frac{y}{b} = 1$ .

12. If 2 is a root of the equation  $x^2 + kx + 12 = 0$  and the equation  $x^2 + kx + q = 0$  has equal roots, find the value of  $q$ .

13. 500 persons took dip in a rectangular tank which is 80 m long and 50 m broad. What is the rise in level of water in the tank, if the average displacement of water by a person is  $0.04 \text{ m}^3$ ?

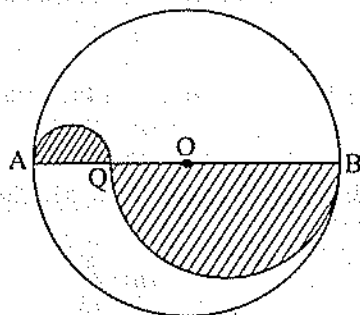
14. A letter is chosen at random from the English alphabet. Find the probability that it is  
(i) a vowel (ii) a consonant

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

16. A race track is in the form of a ring whose inner circumference is 352 m, and the outer circumference is 396 m. Find the width of the track.

17. The diameters of the internal and external surfaces of a hollow hemispherical shell are 6 cm and 10 cm respectively. If it is melted and recast into a solid cylinder of diameter 14 cm, find the height of the cylinder.

18. Find the area of the shaded region from figure, if the diameter of the circle with centre  $O$  is 28 cm and  $AQ = \frac{1}{4}AB$ .



**Section 'C'**

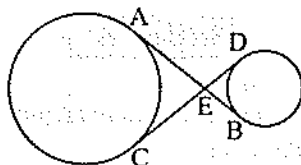
Question numbers 19 to 28 carry 3 marks each.

19. A box contains 20 balls bearing numbers 1, 2, 3, 4, ..... , 20. A ball is drawn at random from the box. What is the probability the number on the ball is

(i) an odd number? (ii) divisible by 2 or 3?

20. The diameter of a roller 120 cm long is 84 cm. If it takes 500 complete revolutions to level a playground, determine the cost of levelling it at the rate of 30 paise per square metre.

21. In figure, common tangents  $AB$  and  $CD$  to two circles intersect at  $E$ . Prove that  $AB = CD$ .



22. Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact.

23. Prove that a diameter  $AB$  of a circle bisects all those chords which are parallel to the tangent at the point  $A$ .

24. How many silver coins, 1.75 cm in diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions 5.5 cm  $\times$  10 cm  $\times$  3.5 cm?

Or

A hemispherical tank full of water is emptied by a pipe at the rate of  $3\frac{4}{7}$  litres per second. How much time will it take to empty half the tank, if it is 3 m in diameter?

25. Find the area of the rhombus if its vertices are (3, 0), (4, 5), (-1, 4) and (-2, -1) taken in order.

26. Two ships are sailing on the sea on either side of the light-house, the angles of depression of two ships are observed from the top of the light-house are  $60^\circ$  and  $45^\circ$  respectively. If the distance between the ships is  $200\left(\frac{\sqrt{3}+1}{\sqrt{3}}\right)$  m, find the height of light-house.

27. Find the number of terms of the A.P. : 54, 51, 48, ..... so that their sum is 513.

Or

For what value of  $n$  are the  $n$ th terms of two A.P.'s 63, 56, 67, ..... and 3, 10, 17, ..... equal?

28. The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

Or

Solve for  $x$  :

$$\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, \quad a \neq 0, b \neq 0, x \neq 0.$$

### Section 'D'

Question numbers 29 to 34 carry 4 marks each.

29. In a flight of 600 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/h and the time of flight increased by 30 minutes. Find the duration of flight.

Or

₹ 9,000 were divided equally among a certain number of persons. Had there been 20 more persons each would have got ₹ 160 less. Find the original number of persons.

30. If  $p$  times the  $p$ th term of an A.P. is equal to  $q$  times the  $q$ th term. Find the  $(p+q)$ th term of the A.P.

31. The angle of elevation of a jet fighter from a point  $A$  on the ground is  $60^\circ$ . After a flight of 10 seconds, the angle of elevation changes to  $30^\circ$ . If the jet is flying at a speed of 648 km/hour, find the constant height at which the jet is flying. [Use  $\sqrt{3} = 1.732$ ]

32. A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 100 cm and the diameter of the hemispherical ends is 28 cm, find the cost of polishing the surface of the solid at the rate of 5 paise per sq. cm.

Or

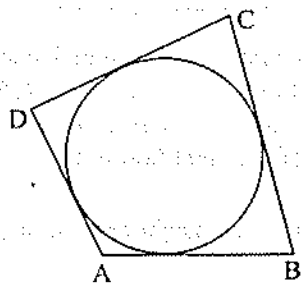
Water is flowing at the rate of 7 metres per second through a circular pipe whose internal diameter is 2 cm into a cylindrical tank the radius of whose base is 40 cm. Determine the increase in the water level in 1/2 hour.

33. You have studied in Class IX, that a median of a triangle divides it into two triangles of equal areas. Verify this result for  $\triangle ABC$  whose vertices are  $A(4, -6)$ ,  $B(3, -2)$  and  $C(5, 2)$ .

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

Using the above theorem, prove the following :

A quadrilateral  $ABCD$  is drawn to circumscribe a circle. Prove that  $AB + CD = AD + BC$ .



### ANSWERS

#### Section 'A'

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

#### Section 'B'

- |   |                              |                       |
|---|------------------------------|-----------------------|
| 11. 1 : 2 internally and (3, 0)             | 12. $q = 16$                 | 13. 0.5 cm            |
| 14. (i) $\frac{5}{26}$ (ii) $\frac{21}{26}$ | 16. Width of the track = 7 m | 17. $2\frac{2}{3}$ cm |
| 18. Area = 192.5 cm <sup>2</sup>            |                              |                       |

#### Section 'C'

- |   |                                   |
|---|-----------------------------------|
| 19. (i) $\frac{1}{2}$ , (ii) $\frac{13}{20}$                  | 20. ₹ 475.20                      |
| 24. Number of silver coins = 400 Or 16.5 minutes              |                                   |
| 25. 24 square units   | 26. Height of light-house = 200 m |
| 27. $n = 18$ or $n = 19$ Or $n = 13$                          |                                   |
| 28. Two numbers are 18, 12 or 18, -12 Or $x = -a$ or $x = -b$ |                                   |

#### Section 'D'

- |  |               |
|--|---------------|
| 29. Duration of flight = 1 hour Or Original number of persons = 25 |               |
| 30. $(p + q)$ th term = 0  | 31. 1.5588 km |
| 32. ₹ 440 Or 787.5 cm  |               |