

# 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.

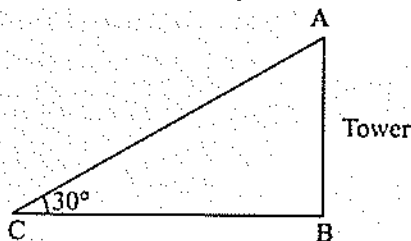
### Section 'A'

Question numbers 1 to 10 are of one mark each.

1. In a throw of a pair of dice, what is the probability of getting a doublet ?

- (a)  $\frac{1}{3}$  (b)  $\frac{1}{6}$   
(c)  $\frac{5}{12}$  (d)  $\frac{2}{3}$

2. If the height of a tower is 15 m, then the length of its shadow when Sun's altitude is  $30^\circ$  is



- (a)  $10\sqrt{3}$  m (b)  $15\sqrt{3}$  m  
(c)  $12\sqrt{3}$  m (d)  $5\sqrt{3}$  m
3. The value of  $a_{20} - a_{10}$  for the A.P. 5, 9, 13, 17, ... is
- (a) 10 (b) 20  
(c) 30 (d) 40

4. If one root of the quadratic equation  $kx^2 - 14x + 8 = 0$  is six times the other, then  $k$  is equal to

- (a) 1 (b) 3  
(c) 2 (d) 4

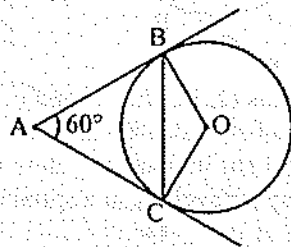
5. The ratio of the areas of a circle and an equilateral triangle whose diameter and a side are respectively equal is

- (a)  $\sqrt{3} : \pi$  (b)  $\sqrt{2} : \pi$   
(c)  $\pi : \sqrt{3}$  (d)  $\pi : \sqrt{2}$

6. If radii of the two concentric circles are 6 cm and 10 cm, then the length of each chord of one circle which is tangent to other is

- (a) 8 cm (b) 16 cm  
(c) 20 cm (d) 10 cm

7. In figure,  $AB$  and  $AC$  are tangents to the circle with centre  $O$  such that  $\angle BAC = 60^\circ$ , then  $\angle OBC$  is equal to



- (a)  $20^\circ$  (b)  $40^\circ$   
(c)  $30^\circ$  (d)  $50^\circ$

8. The length of the tangent drawn from a point 8 cm away from the centre of a circle, of radius 6 cm, is

- (a)  $\sqrt{7}$  cm (b)  $2\sqrt{7}$  cm  
(c) 10 cm (d) 5 cm

9. To draw a pair of tangents to a circle which are inclined to each other at an angle of  $80^\circ$ , it is required to draw tangents at end points of those two radii of the circle, the angle between which should be

- (a)  $100^\circ$  (b)  $50^\circ$   
(c)  $80^\circ$  (d)  $200^\circ$

10. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base and its volume is  $\frac{1}{27}$ th the volume of original cone. The height from the base at which the section is made is

- (a) 10 cm (b) 30 cm  
(c) 15 cm (d) 20 cm

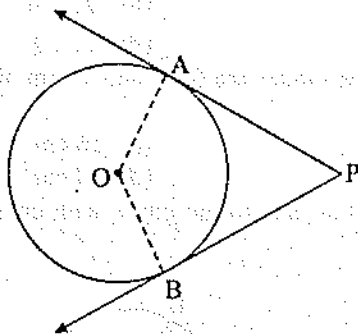
**Section 'B'**

Question numbers 11 to 18 carry 2 marks each.

11. Solve for  $x$ :  $\frac{6}{x} - \frac{2}{x-1} = \frac{1}{x-2}$ ;  $x \neq 0, 1, 2$ .

12. A jar contains 28 marbles, some are white and others are red. If a marble is drawn at random from the jar, the probability that it is white is  $\frac{3}{4}$ . Find the numbers of red marbles in the jar.

13. In the figure,  $O$  is the centre of the circle.  $PA$  and  $PB$  are tangents segments. Show that  $AOBP$  is a cyclic quadrilateral.



14. For what value of  $k$  are the points  $(2, 1)$ ,  $(k, -1)$  and  $(-1, 3)$  collinear?

15. A 6 cm cube is cut into 1 cm cubes. Calculate the total surface area of all the small cubes.

16. A car has wheels which are 80 cm in diameter. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?

Or

A copper wire, when bent in the form of a square, encloses an area of  $484 \text{ cm}^2$ . If the same wire is bent in the form of a circle, find the area enclosed in it. [ Use  $\pi = \frac{22}{7}$  ]

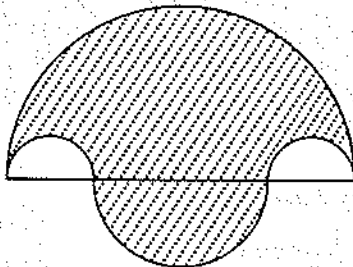
17. Point  $P(5, -3)$  is one of the two points of trisection of the line segment joining the points  $A(7, -2)$  and  $B(1, -5)$  near to  $A$ . Find the coordinates of the other point of trisection.

18. Find the sum of the first 25 terms of an A.P. whose  $n$ th term is given by  $t_n = 2 - 3n$ .

### Section 'C'

Question numbers 19 to 28 carry 3 marks each.

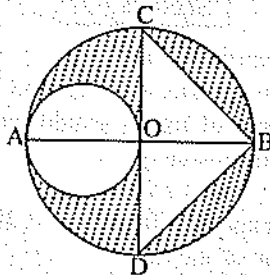
19. In figure the boundary of shaded region consists of four semi-circular arc, two smallest being equal. If diameter of the largest is 14 cm and that of the smallest is 3.5 cm. Calculate the area of the shaded region. [ Use  $\pi = \frac{22}{7}$  ]



Or

In figure,  $AB$  and  $CD$  are two perpendicular diameters of a circle with centre  $O$ . If  $OA = 7$  cm, find the area of the shaded region.

$$\left[ \text{Use } \pi = \frac{22}{7} \right]$$



20. The rain-water collected on the roof of a building of dimensions  $22 \text{ m} \times 20 \text{ m}$  is drained into cylindrical vessel having base diameter  $2 \text{ m}$  and height  $3.5 \text{ m}$ . If the vessel is fill upto the brim, find the height of rain-water on the roof.

$$\left[ \text{Use } \pi = \frac{22}{7} \right]$$

21. From the top of a tower  $50 \text{ m}$  high the angles of depression of the top and bottom of a pole are observed to be  $45^\circ$  and  $60^\circ$  respectively. Find the height of the pole.

22. The line joining the points  $(2, 1)$ ,  $(5, -8)$  is trisected at the points  $P$  and  $Q$ . If point  $P$  lies on the line  $2x - y + k = 0$ , find the value of  $k$ .

23. If all the sides of a parallelogram touch a circle, prove that the parallelogram is a rhombus.

24. A lot contains  $90$  discs which are numbered from  $1$  to  $90$ . If one disc is drawn at random from the box, find the probability that it bears

(i) a two digit number.

(ii) a perfect square number.

(iii) a number divisible by  $5$ .

25. How many terms of the series  $54, 51, 48, \dots$  be taken so that their sum is  $513$ ? Explain the double answer.

Or

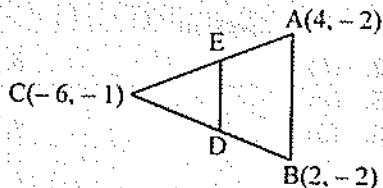
If  $S_n$  denotes the sum of the first  $n$  terms of an A.P., prove that  $S_{12} = 3(S_8 - S_4)$ .

26. The difference of squares of two natural numbers is  $45$ . The square of the smaller number is four times the larger number. Find the numbers.

Or

Seven years ago Varun's age was five times the square of Swati's age. Three years hence Swati's age will be two-fifth of Varun's age. Find their present ages.

27. In figure, in  $\triangle ABC$ ,  $D$  and  $E$  are the mid-points of the sides  $BC$  and  $AC$  respectively. Find the length of  $DE$ . Prove that  $DE = \frac{1}{2} AB$ .



28. Construct a  $\triangle ABC$  in which  $BC = 6.5$  cm,  $AB = 4.5$  cm and  $\angle ACB = 60^\circ$ . Construct another triangle similar to  $\triangle ABC$  such that each side of new triangle is  $\frac{4}{5}$  of the corresponding sides of  $\triangle ABC$ .

**Section 'D'**

Question numbers 29 to 34 carry 4 marks each.

29. In a class test the sum of Gagan's marks in Maths and English is 45. If he had 1 more mark in Maths and 1 less in English, the product of marks would have been 500. Find the original marks obtained by Gagan in Maths and English separately.

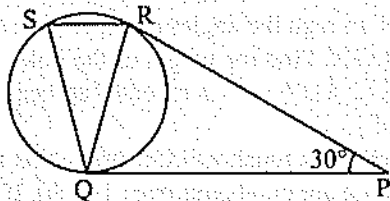
*Or*

A person on tour has ₹ 4200 for his expenses. If he extends his tour for 3 days he has to cut down his daily expenses by ₹ 70. Find the duration of the tour.

30. If  $S_n$  denotes the sum of  $n$  terms of an A.P. whose common difference is  $d$ , show that

$$d = S_n - 2S_{n-1} + S_{n-2}$$

31. In figure, tangents  $PQ$  and  $PR$  are drawn to a circle such that  $\angle RPQ = 30^\circ$ . A chord  $RS$  is drawn parallel to the tangent  $PQ$ . Find the  $\angle RQS$ .



32. A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of  $30^\circ$ . A girl standing on the roof of 20 metre high building, find the angle of elevation of the same bird to be  $45^\circ$ . Both the boy and the girl are on opposite sides of the bird. Find the distance of bird from the girl.

*Or*

The height of a tower is half the height of the flagstaff on it. The angle of elevation of the top of the tower as seen from a point on the ground is  $30^\circ$ . Find the angle of elevation of the top of the flagstaff as seen from the same point.

33. A tent is in the shape of a cylinder, surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Find the cost of the canvas of the tent at the rate of ₹ 500 per  $m^2$ . Also find the volume of air enclosed in the tent.

34. The slant height of a frustum of a cone is 4 cm and the perimeters (circumference) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum.

**ANSWERS**

Section 'A'

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

## Section 'B'

11.  $x = 3$  or  $x = \frac{4}{3}$       12. Red marbles = 7      14.  $k = 5$   
 15. Total surface area =  $1296 \text{ cm}^2$   
 16. 4375 revolutions in 10 minutes Or  $616 \text{ cm}^2$   
 17.  $(3, -4)$       18.  $-925$

## Section 'C'

19.  $72.2 \text{ cm}^2$  Or  $66.5 \text{ cm}^2$       20.  $2.5 \text{ cm}$       21. Height of the pole =  $21.13 \text{ m}$   
 22.  $k = -8$       24. (i)  $\frac{9}{10}$  (ii)  $\frac{1}{10}$  (iii)  $\frac{1}{5}$       25.  $n = 18$  or  $n = 19$   
 26. Larger number = 9 and smaller number = 6 Or 9 years, 27 years

## Section 'D'

29. Maths = 24 marks and English = 21 marks or Maths = 19 marks and English = 26 marks  
 Or 12 days  
 31.  $30^\circ$   
 32. Distance of bird from the girl =  $30 \text{ m}$  Or Angle of elevation of the top of the flagstaff =  $60^\circ$   
 33. Area of the canvas =  $44 \text{ m}^2$ ; Cost of the canvas of the tent = ₹ 22,000; Volume of air enclosed =  $34.60 \text{ m}^3$   
 34.  $48 \text{ cm}^2$

