

# 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.

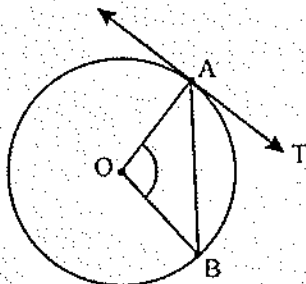
1. The roots of the equation  $x^2 + x - p(p+1) = 0$ , where  $p$  is a constant, are

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

2. In an A.P., if  $d = -2$ ,  $n = 5$  and  $a_n = 0$ , then the value of  $a$  is

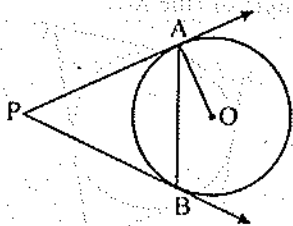
- |        |       |
|--------|-------|
| (a) 10 | (b) 5 |
| (c) -8 | (d) 8 |

3. In figure,  $O$  is the centre of a circle,  $AB$  is a chord and  $AT$  is the tangent at  $A$ . If  $\angle AOB = 100^\circ$ , then  $\angle BAT$  is equal to



- |                 |                |
|-----------------|----------------|
| (a) $100^\circ$ | (b) $40^\circ$ |
| (c) $50^\circ$  | (d) $90^\circ$ |

4. In figure,  $PA$  and  $PB$  are tangents to the circle with centre  $O$ . If  $\angle APB = 60^\circ$ , then  $\angle OAB$  is



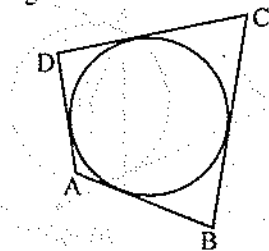
- (a)  $30^\circ$  (b)  $60^\circ$   
(c)  $90^\circ$  (d)  $15^\circ$
5. The radii of two circles are 4 cm and 3 cm respectively. The diameter of the circle having area equal to the sum of the areas of the two circles (in cm) is  
(a) 5 (b) 7  
(c) 10 (d) 14
6. A sphere of diameter 18 cm is dropped into a cylindrical vessel of diameter 36 cm, partly filled with water. If the sphere is completely submerged, then the water level rises (in cm) by  
(a) 3 (b) 4  
(c) 5 (d) 6
7. 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 the tower is  $45^\circ$ . The height of the tower (in metres) is  
(a) 15 (b) 30  
(c)  $30\sqrt{3}$  (d)  $10\sqrt{3}$
8. The point  $P$  which divides the line segment joining the points  $A(2, -5)$  and  $B(5, 2)$  in the ratio 2 : 3 lies in the quadrant  
(a) I (b) II  
(c) III (d) IV
9. The mid-point of segment  $AB$  is the point  $P(0, 4)$ . If the coordinates of  $B$  are  $(-2, 3)$  then the coordinates of  $A$  are  
(a)  $(2, 5)$  (b)  $(-2, -5)$   
(c)  $(2, 9)$  (d)  $(-2, 11)$
10. Which of the following cannot be the probability of an event ?  
(a) 1.5 (b)  $\frac{3}{5}$   
(c) 25% (d) 0.3

**Section 'B'**

Question numbers 11 to 18 carry 2 marks each.

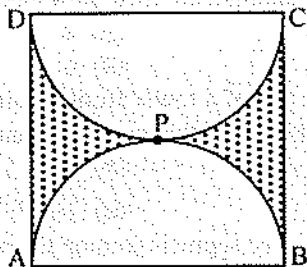
11. Find the value of  $m$  so that the quadratic equation  $mx(x - 7) + 49 = 0$  has two equal roots.  
12. Find how many two-digit numbers are divisible by 6.

13. In figure, a circle touches all the four sides of a quadrilateral  $ABCD$  whose sides are  $AB = 6$  cm,  $BC = 9$  cm and  $CD = 8$  cm. Find the length of side  $AD$ .



14. Draw a line segment  $AB$  of length 7 cm. Using ruler and compasses, find a point  $P$  on  $AB$  such that  $\frac{AP}{AB} = \frac{3}{5}$ .

15. Find the perimeter of the shaded region in figure, if  $ABCD$  is a square of side 14 cm and  $APB$  and  $CPD$  are semi-circles. [Use  $\pi = \frac{22}{7}$ ]



16. Two cubes each of volume  $27 \text{ cm}^3$  are joined end to end to form a solid. Find the surface area of the resulting cuboid.

Or

A cone of height 20 cm and radius of base 5 cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the diameter of the sphere.

17. Find the value(s) of  $y$  for which the distance between the points  $A(3, -1)$  and  $B(11, y)$  is 10 units.

18. A ticket is drawn at random from a bag containing tickets numbered from 1 to 40. Find the probability that the selected ticket has a number which is a multiple of 5.

### Section 'C'

Question numbers 19 to 28 carry 3 marks each.

19. Find the roots of the following quadratic equation :

$$2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$$

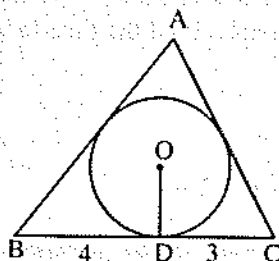
20. Find the value of the middle term of the following A.P. :

$$-6, -2, 2, \dots, 58.$$

Or

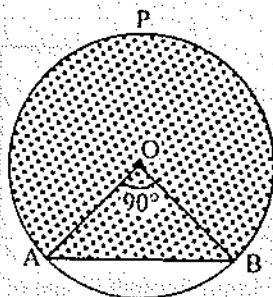
Determine the A.P. whose fourth term is 18 and the difference of the ninth term from the fifteenth term is 30.

21. In figure, a triangle  $ABC$  is drawn to circumscribe a circle of radius 2 cm such that the segments  $BD$  and  $DC$  into which  $BC$  is divided by the point of contact  $D$  are of lengths 4 cm and 3 cm respectively. If area of  $\Delta ABC = 21 \text{ cm}^2$ , then find the lengths of sides  $AB$  and  $AC$ .



22. Draw a triangle  $ABC$  in which  $AB = 5 \text{ cm}$ ,  $BC = 6 \text{ cm}$  and  $\angle ABC = 60^\circ$ . Then construct a triangle whose sides are  $\frac{5}{7}$  times the corresponding sides of  $\Delta ABC$ .

23. Find the area of the major segment  $APB$ , in figure, of a circle of radius 35 cm and  $\angle AOB = 90^\circ$ .



24. The radii of the circular ends of a bucket of height 15 cm are 14 cm and  $r \text{ cm}$  ( $r < 14 \text{ cm}$ ). If the volume of bucket is  $5390 \text{ cm}^3$ , then find the value of  $r$ .

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

25. Two dice are rolled once. Find the probability of getting such numbers on two dice, whose product is a perfect square.

Or

A game consists of tossing a coin 3 times and noting its outcome each time. Hanif wins if he gets three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game.

26. From the top of a tower 100 m high, a man observes two cars on the opposite sides of the tower with angles of depression  $30^\circ$  and  $45^\circ$  respectively. Find the distance between the cars.

$$[\text{Use } \sqrt{3} = 1.73]$$

27. If  $(3, 3)$ ,  $(6, y)$ ,  $(x, 7)$  and  $(5, 6)$  are the vertices of a parallelogram taken in order, find the values of  $x$  and  $y$ .

28. If two vertices of an equilateral triangle are  $(3, 0)$  and  $(6, 0)$ , find the third vertex.

Or

Find the value of  $k$ , if the points  $P(5, 4)$ ,  $Q(7, k)$  and  $R(9, -2)$  are collinear.

**Section 'D'**

Question numbers 29 to 34 carry 4 marks each.

29. Two water taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

Or

Solve the following equation for  $x$  :

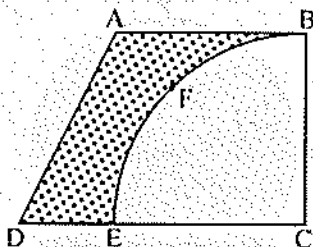
$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{5}{x+4}, \quad x \neq -1, -2, -4$$

30. In an A.P., if the 6th and 13th terms are 35 and 70 respectively, find the sum of its first 20 terms.

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

32. From a thin metallic piece, in the shape of a trapezium  $ABCD$  in which  $AB \parallel CD$  and  $\angle BCD = 90^\circ$ , a quarter circle  $BFEC$  is removed (figure). Given  $AB = BC = 3.5$  cm and  $DE = 2$  cm, calculate the area of the remaining (shaded) part of the metal sheet.

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



33. Water is flowing at the rate of 6 km/h through a pipe of diameter 14 cm into a rectangular tank which is 60 m long and 22 m wide. Determine the time in which the level of the water in the tank will rise by 7 cm.

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

Or

A hollow sphere of internal and external diameters 4 cm and 8 cm respectively is melted to form a cone of base diameter 8 cm. Find the height and the slant height of the cone.

34. The shadow of a tower standing on a level ground is found to be 30 m longer when the sun's altitude is  $30^\circ$  than when it is  $60^\circ$ . Find the height of the tower.

**ANSWERS****Section 'A'**

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

**Section 'B'**

- |             |        |          |
|-------------|--------|----------|
| 11. $m = 4$ | 12. 15 | 13. 5 cm |
|-------------|--------|----------|

15. 72 cm      16.  $90 \text{ cm}^2$  Or  $10 \text{ cm}$       17.  $y = -7$  or  $5$

18.  $\frac{1}{5}$

**Section 'C'**

19.  $x = \frac{\sqrt{3}}{2}$  and  $x = \frac{1}{\sqrt{3}}$       20. 26 Or 3, 8, 11, 16, ...

21. 7.5 cm and 6.5 cm

23.  $3500 \text{ cm}^2$

24. 7 cm

25.  $\frac{2}{9}$  Or  $\frac{3}{4}$

26. 273 m

27.  $x = 8$  and  $y = 4$

28.  $\left(\frac{9}{2}, \frac{3\sqrt{3}}{2}\right)$  or  $\left(\frac{9}{2}, \frac{-3\sqrt{3}}{2}\right)$  Or  $k = 1$

**Section 'D'**

29. 18 hours, 9 hours Or  $x = 2$  or  $x = -\frac{3}{2}$

30. 1150

32.  $6.125 \text{ cm}^2$

33. 1 hour Or Height = 14 cm, Slant Height =  $2\sqrt{53}$  cm

34. 25.95 metres

