

## SECOND TERM (SA-II)

### CBSE SAMPLE PAPER 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 volume of two spheres are in the ratio 64 : 27. The ratio of their curved surfaces are  
(a) 16 : 9 (b) 9 : 16  
(c) 4 : 3 (d) 3 : 4
- A chord of a circle of radius 14 cm subtends a right angle at the centre. The area of the minor sector is  
(a) 140 cm<sup>2</sup> (b) 147 cm<sup>2</sup>  
(c) 154 cm<sup>2</sup> (d) 161 cm<sup>2</sup>
- If  $\alpha$  and  $\beta$  are the roots of the equation  $x^2 - 5x - 4 = 0$ , then the equation whose roots are  $\alpha + 1$  and  $\beta + 1$  is  
(a)  $x^2 - 7x + 2 = 0$  (b)  $x^2 - 7x + 1 = 0$   
(c)  $x^2 + 7x + 1 = 0$  (d)  $x^2 + 7x + 2 = 0$
- Which term of the sequence  $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \dots$  is the first negative term ?  
(a) 28th (b) 27th  
(c) 26th (d) 25th
- The 10th term of the sequence  $\sqrt{2}, \sqrt{8}, \sqrt{18}, \dots$  is  
(a)  $\sqrt{288}$  (b)  $\sqrt{242}$

(c)  $\sqrt{200}$

(d)  $\sqrt{162}$

6. If one root of the quadratic equation  $3x^2 - kx - 4 = 0$  is 2, then the values of  $k$  and the other root are

(a)  $k = 4$  and other root =  $-\frac{2}{3}$

(b)  $k = 3$  and other root =  $\frac{2}{3}$

(c)  $k = 3$  and other root =  $-\frac{2}{3}$

(d)  $k = 4$  and other root =  $\frac{2}{3}$

7. The sum of probability of all the events of an experiment is :

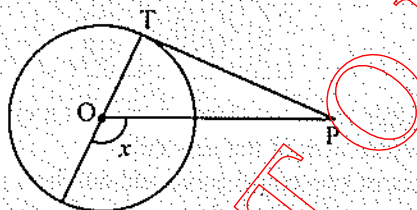
(a)  $\frac{2}{3}$

(b) 3

(c) 1

(d) 2

8. In figure, if  $PT$  is a tangent to the circle with centre  $O$  and  $\angle TPO = 25^\circ$ , then the measure of  $x$  is :



(a)  $120^\circ$

(b)  $125^\circ$

(c)  $110^\circ$

(d)  $115^\circ$

9. The coordinates of the centroid of a triangle, whose vertices are (3, 2), (5, 7), and (8, 8) is

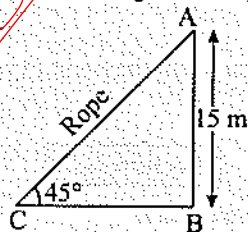
(a)  $(\frac{16}{3}, \frac{17}{3})$

(b)  $(\frac{16}{3}, 5)$

(c)  $(\frac{17}{3}, 5)$

(d)  $(\frac{17}{3}, \frac{16}{3})$

10. A circus artist is climbing from the ground along a rope stretched from the top of a vertical pole and tied at the ground. The height of the pole is 15 m and the angle made by the rope with ground level is  $45^\circ$ . The distance covered by the artist in climbing to the top of the pole is



(a)  $\frac{15}{\sqrt{2}}$  m

(b)  $15\sqrt{2}$  m

(c) 15 m

(d) 30 m

### Section 'B'

Question numbers 11 to 18 carry 2 marks each.

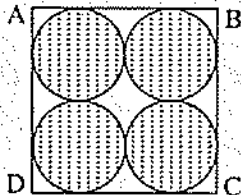
11. A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel.

Or

The inner circumference of a circular track is 220 m. The track is 7 m wide every where. Calculate the cost of putting up a fence along the outer circle at the rate of ₹ 4 per metre. [Use  $\pi = \frac{22}{7}$ ]

12. How many times will the wheel of a car rotate in a journey of 2002 m, if the radius of the wheel is 49 cm ?

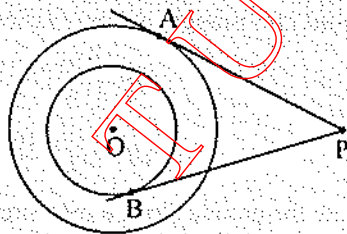
13. Find the area of the shaded region in the figure, where  $ABCD$  is a square of side 14 cm.



14. Three cubes whose edges measures 3 cm, 4 cm and 5 cm respectively to form a single cube. Find its edge. Also, find the surface area of the new cube.

15. The sum of the squares of two consecutive odd numbers is 394. Find the numbers.

16. In figure, there are two concentric circles, with centre  $O$  and of radii 5 cm and 3 cm. From an external point  $P$ , tangents  $PA$  and  $PB$  are drawn to these circles. If  $AP = 12$  cm, find the length of  $BP$ .



17. A die is thrown once. Find the probability of getting

(i) a prime number.

(ii) a number divisible by 3.

18. Find a relation between  $x$  and  $y$  such that the point  $P(x, y)$  is equidistant from the points  $A(2, 5)$  and  $B(-3, 7)$ .

### Section 'C'

Question numbers 19 to 28 carry 3 marks each.

19. The first term, common difference and last term of an A.P. are 12, 6 and 252 respectively. Find the sum of all terms of this A.P.

Or

The angles of a triangle are in A.P. The greatest angle is twice the least. Find all angles of the triangle.

20. Solve for  $x$  :  $a^2x^2 - 3abx + 2b^2 = 0$ .

Or

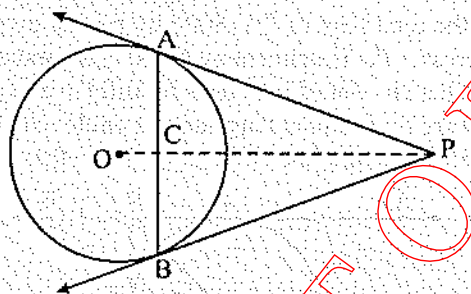
If  $(-5)$  is a root of the quadratic equation  $2x^2 + px - 15 = 0$  and the quadratic equation  $p(x^2 + x) + k = 0$  has equal roots, then find the values of  $p$  and  $k$ .

21. Card numbered from 1 to 64 are placed in a box. A card is drawn at random from the box. Find the probability that the card number on the card drawn is a perfect cube.

22. Show that tangent lines at the end points of a diameter of a circle are parallel.

23. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of  $60^\circ$ .

24. From an external point  $P$ , two tangents  $PA$  and  $PB$  are drawn to the circle with the centre  $O$ . Prove that  $OP$  is the perpendicular bisector of  $AB$ .

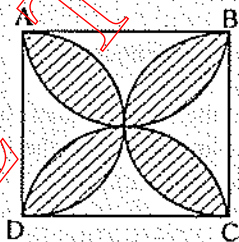


25. Prove that  $(2, -2)$ ,  $(-2, 1)$  and  $(5, 2)$  are the vertices of a right-angled triangle. Find the area of the triangle and the length of the hypotenuse.

26. From the top of a 7 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  $45^\circ$ . Determine the height of the tower.

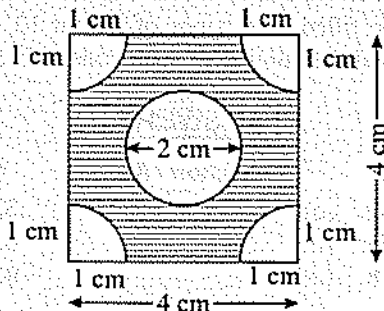
27. Find the area of the shaded region in figure, where  $ABCD$  is a square of side 10 cm.

[Use  $\pi = 3.14$ ]



Or

Find the area of the shaded portion shown in figure, if the side of a square is 4 cm.





28. A solid sphere of diameter 14 cm is cut into two halves by a plane passing through the centre. Find the combined surface area of the two hemispheres so formed.

Section 'D'

Question numbers 29 to 34 carry 4 marks each.

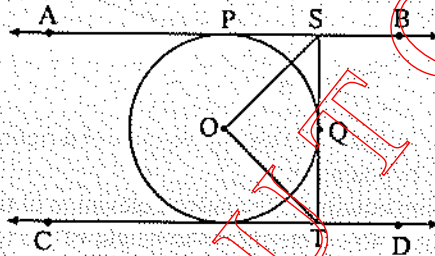
29. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of stream.

Or

A girl is twice as old as her sister. Four years hence, the product of their ages (in years) will be 160. Find their present ages.

30. Jaipal Singh repays the total loan of ₹ 118000 by paying every month starting with the first instalment of ₹ 1000. If he increases the instalment by ₹ 100 every month, what amount will be paid by him in the 30th instalment? What amount of loan does he still have to pay after 30th instalment.

31. In figure,  $AB$  and  $CD$  are two parallel tangents to a circle with centre  $O$ .  $ST$  is tangent segment between the two parallel tangents touching the circle at  $Q$ . Show that  $\angle SOT = 90^\circ$ .



32. If  $P$  and  $Q$  are two points whose coordinates are  $(at^2, 2at)$  and  $(\frac{a}{t^2}, -\frac{2a}{t})$  respectively and  $S$  is the point  $(a, 0)$ . Show that  $\frac{1}{SP} + \frac{1}{SQ}$  is independent of  $t$ .

33. From a building 60 metres high, the angle of depression of the top and bottom of a lamp-post are  $30^\circ$  and  $60^\circ$  respectively. Find the distance between the lamp-post and the building. Also, find the difference of height between the building and lamp-post.

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.

Or

A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice-cream. The ice-cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice-cream.

ANSWERS

Section 'A'

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

Section 'B'

11. Diameter of the wheel = 70 cm Or ₹ 1056  
12. 650 times  
13.  $42 \text{ cm}^2$   
14. Edge of new cube = 6 cm, Surface area of the new cube =  $216 \text{ cm}^2$   
15. Consecutive odd numbers = 13 and 15 or - 15 and - 13  
16.  $BP = 12.6 \text{ cm}$  (approx)  
17. (i)  $\frac{1}{2}$ , (ii)  $\frac{1}{3}$   
18.  $10x + 29 = 4y$

Section 'C'

19. Sum of all terms of this A.P. = 5412 Or  $40^\circ, 60^\circ, 80^\circ$   
20.  $x = \frac{2b}{a}$  or  $x = \frac{b}{a}$  Or  $p = 7, k = \frac{7}{4}$   
21.  $\frac{1}{16}$   
25. Area of the triangle =  $\frac{25}{2}$  sq. units, Length of the hypotenuse =  $5\sqrt{2}$  units  
26. Height of the tower =  $7(\sqrt{3} + 1)$  m  
27.  $57 \text{ cm}^2$  Or  $9\frac{5}{7} \text{ cm}^2$   
28.  $924 \text{ cm}^2$

Section 'D'

29. Speed of the stream = 6 km/h Or Present age of the girl = 12 years and Present age of her sister = 6 years  
30. ₹ 3,900 ₹ 44,500  
33. Distance between the lamp-post and the building =  $20\sqrt{3}$  m and difference between the height of the building and lamp-post = 20 m  
34.  $48 \text{ cm}^2$  Or 15