Grade 10
Unit 10

Maths

Course Outline

- Circle
- Area Related to Circles
- Surface Area and Volumes

MAT
(Monthly Achievement Tests)

Short Code: 447311

Test ID: NMM10U0100

SOUVENIR INFOTECH

Guide Lines

1. Each set consists of:

   50 | Warm-up/Foundation Questions

   30 | Regular Questions

   20 | Thinking Ability Questions

2. The time allocation and instructions regarding the questions are printed clearly in the beginning of each question types. The answers should be written or tick marked as per the instructions given. It is suggested to use pencil initially, so as to enable you to reuse the practice papers.

3. **According to the new pattern of CBSE these practice papers will be very useful especially for syllabus related Quiz, Debates, Visuals related checking and Orals etc.,**

4. After marking the answers, the scores of students can be checked and for marks obtained guidelines are given along with the question solving instructions. Follow those instructions and if, you are fully satisfied with your performance then check for your expected grades as per the CBSE guidelines as given on the back of each set.

5. Remember that this is only a guideline not the finally worked out result. You can further improve your performance by increase your practice.

6. For your convenience please follow following essential examiner's advices:

   a. Answer all the questions
   b. Read all the Options carefully
   c. Understand and use correct scientific language in your responses.

We from SOUVENIR INFOTECH **wish skillful learning for your bright future.**

Before going for the test, look at least :

1. First of all go through the syllabus of the test according to the **Course Outline** provided at the front page of each MAT.
2. After going through the syllabus once or twice or even more time as per your satisfaction, first of all do the Warm-up questions. If you score A+ grade in those 50 questions go to the next level otherwise go through the chapter again.
3. The box for **Specific Information** is very useful as it adds to your concept building. Try to fill specific information in the proper way so that you will get the maximum benefit of it.
4. **Let's Chat** portion will help you to prepare for oral assessment. Through this you can increase your capacity to interact on a particular topic related to your syllabus.
5. The **Extra Diet** portion is also there to enhance you knowledge through visulization of concept. This portion provides you added knowledge on various related concepts.
6. The information related to time factor is there to enhance your time management skills.
7. From the examiners point of view it is always advised to use Pencil for initial efforts. The use of pen is fruitful only when the final effort comes.

Examiner's Tips:

- Read the question carefully. Make sure you understand exactly what is required.
- If you find that you are unable to do a part of a question, do not give up. The next part may be easier and may provide a clue to what you might have done in the part you found difficult.
- Note the number of marks per question as guide to the depth of response needed.
- Underline or note the key words that tell you what is required.
- Underline or note data as you read the question.
- Structure your answer carefully.
- Show all steps in calculations. Include equations you use and show the substitution of data. remember to work according to units given.
- Make sure that your answers contain suitable significant figures (wherever necessary) and must include units in numericals.
- Draw diagrams and graphs carefully.
- Read data from graphs carefully; note scales and prefixes on axes.
- Keep your eye on the clock but don't panic.
- If you have time at the end, use it. Check that your descriptions and explanations make sense. Consider whether there is anything you could add to an explanation or description. Repeat calculations to ensure that you have not made a mistake.

50 Warm-up/Foundation Questions

Opening Window

To enlighten your fundamental/basic topic knowledge.

A+. If you score 45 or above marks, move to the next section confidently.

A. If you score between 40 and 45 marks, it is satisfactory. Bit more knowledge will bring excellent result.

B. If you score below 40, kindly go through the topic more seriously.

Section A (50 marks) **Time given – 50 minutes + 5 minutes for revision**

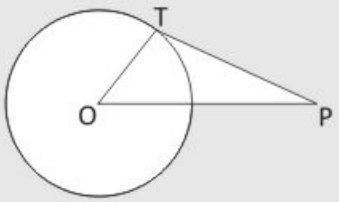
Questions 1 to 50 carry 1 mark each.

For questions 1 to 20 four options are given one of them is the correct answer make your choice and write its name (a, b, c or d) in the answer box provided.

1. In the given figure, PT is a tangent to the circle with centre O. If $OT = 6$ cm and $OP = 10$ cm, then the length fo tangent PT is

T – 1 min
S – Circle

(a) 8 cm
(b) 12 cm
(c) 10 cm
(d) 16 cm



Ans.

2. The minute hand of a clock is 12 cm long. Find the area of the face of the clock described by the minute hand in 35 minutes.

T – 1 min
S – Area related to circle

(a) 265 cm^2 (b) 254 cm^2
(c) 260 cm^2 (d) 254 cm^2

Ans.

3. The length of the longest pole that can be kept in a room (12m × 9m × 8m) is

T – 1 min
S – Area related to circle

(a) 29 m (b) 21 m
(c) 19 m (d) 17 m

Ans.

4. The diameter of the base of a cylinder is 4 cm and its height is 12 cm. The volume of the cylinder is

T – 1 min
S – Surface area and volumes

(a) 176 cm^3 (b) 196 cm^3
(c) 276 cm^3 (d) 352 cm^3

Ans.

5. Find the circumference of a circle of radius 10.5cm

(a) 66 cm (b) 22 cm

(c) 33 cm (d) none

T – 1 min
S – Area of circle

Ans.

6. Find the area of a circle of radius 10.5

(a) 255 cm^2 (b) 222 cm^2

(c) 346.5 cm^2 (d) 348.2 cm^2

T – 1 min
S – Area of circle

Ans.

7. How many bags of grain can be stored in a cuboidal granary ($8m \times 6m \times 3m$), if each bag occupies a space of 0.64 m^3 ?

(a) 8256 (b) 90

(c) 212 (d) 225

T – 1 min
S – Surface area and volumes

Ans.

8. The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3. The height of the pillar is

(a) 4 m (b) 5 m

(c) 6 m (d) 7 m

T – 1 min
S – Circle

Ans.

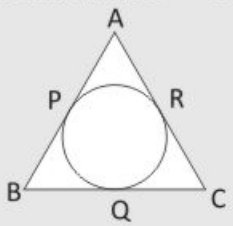
9. In the given figure, ΔABC is circumscribed touching the circle at P, Q, R. If $AP = 4$ cm, $BP = 6$ cm, $AC = 12$ cm and $BC = x$ cm then x is equal to

(a) 10 cm

(b) 6 cm

(c) 14 cm

(d) 18 cm



T – 1 min
S – Circle

Ans.

10. The wire is looped in the form of a circle of radius 28 cm. It is rebent into a square then, determine the length of the side of the square.

(a) 44 cm (b) 34 cm

(c) 43 cm (d) 42 cm

T – 1 min
S – Area related to circle

Ans.

11. A cube of side 6 cm is cut into a number of cubes each of side 2 cm. The number of cubes formed is

(a) 6 (b) 9

(c) 12 (d) 27

T – 1 min
S – Surface area and volumes

Ans.

12. Find the area of a circle of radius 7 cm.

(a) $49\pi\,cm^2$ (b) $14\pi\,cm^2$

(c) $7\pi\,cm^2$ (d) none

T – 1 min
S – Circle

Ans.

13. The perimeter of a sector of a circle of radius 5.6 cm is 27.2 cm. Find the area of the sector.

(a) $44.5\,cm^2$ (b) $44.8\,cm^2$

(c) $44.3\,cm^2$ (d) $44.9\,cm^2$

T – 1 min
S – Area related to cirlce

Ans.

14. The diameter of a sphere is 14 cm. Its volume is

(a) $1428\,cm^3$ (b) $1439\,cm^3$

(c) $1437\,cm^3$ (d) $1440\,cm^3$

T – 1 min
S – Area related to cirlce

Ans.

15. The diameter of the base of a cone is 42 cm and its volume is 12936 cm^3. Its height is

(a) 28 cm (b) 21 cm

(c) 35 cm (d) 14 cm

T – 1 min
S – Surface area and volumes

Ans.

16. A circus tent is cylindrical to a height of 4 m and conical above it. If its diameter is 105 m and its slant height is 40 m, the total area of canvas required is

(a) $1760\,m^2$ (b) $2640\,m^2$

(c) $3960\,m^2$ (d) $7920\,m^2$

T – 1 min
S – Surface area and volumes

Ans.

17. If the radii of the ends of a bucket are 5 cm and 15 cm and it is 24 cm high then its surface area is

(a) $1815.3\,cm^2$ (b) $1711.3\,cm^2$

(c) $2025.3\,cm^2$ (d) $2360\,cm^2$

T – 1 min
S – Surface area and volumes

Ans.

18. The ratio of the total surface area to the lateral surface area of a cylinder with base radius 80 cm and height 20 cm, is

(a) 2 : 1 (b) 3 : 1

(c) 4 : 1 (d) 5 : 1

T – 1 min
S – Surface area and volumes

Ans.

19. Lengths of the two tangents from on external point to a circle are

(a) equal

(b) twice the other

(c) one is thrice the other

(d) none of these

T – 1 min
S – Circle

Ans.

20. A circle is touching the side BC of a ΔABC at P and touching AB and AC when produced at Q and R respectively, then

(a) $AQ = \frac{1}{3}$ (Perimeter of ΔABC)

(b) $AQ = \frac{1}{2}$ (Perimeter of ΔABC)

(c) $AQ = \frac{1}{4}$ (Perimeter of ΔABC)

(d) $AQ = \frac{3}{2}$ (Perimeter of ΔABC)

T – 1 min
S – Circle

Ans.

Fill in the blanks

21. Two circles touch each other externally at C, then the common tangents at C _____ the other two common tangents.

T – 1 min
S – Circle

Ans.

22. The line containing the radius through the point of contact is called _____ .

T – 1 min
S – Circle

Ans.

23. Volume of the frustum of the cone = _____ .

T – 1 min
S – Surface area and volumes

Ans.

24. Slant height of the cone (l) = _____ .

T – 1 min
S – Surface area and volumes

Ans.

25. Volume of a frustum of a cone _____ .

T – 1 min
S – Surface area and volumes

Ans.

26. Area of segment of a circle = Area of the corresponding sector = _____.

T – 1 min
S – Area related to circle

Ans.

27. Area of the sector of angle θ = _____.

T – 1 min
S – Area related to circle

Ans.

28. The _____ of a circle is known as circumference.

T – 1 min
S – Area related to circle

Ans.

29. The length of the segment of the tangent from the external point and the point of contact with the circle is called _____ from the point to the circle.

T – 1 min
S – Circle

Ans.

30. The tangent to a circle is perpendicular to the radius through the _____.

T – 1 min
S – Circle

Ans.

True or False

31. The total surface area of the new solid is the sum of the surface areas of each of the individual parts.

T – 1 min
S – Surface area and volumes

Ans.

32. $\frac{\text{Circumference}}{\text{Diameter}} = \pi$

T – 1 min
S – Area related to circle

Ans.

33. A line intersecting a circle in two points called a secant.

T – 1 min
S – Circle

Ans.

34. A circle can have two parallel tangents at the most.

T – 1 min
S – Circle

Ans.

35. The volume of the solid formed by joining two basic solids will actually be the sum of the volumes of the constituents.

T – 1 min
S – Surface area and volumes

Ans.

36. $\pi = \frac{22}{7}$

T – 1 min
S – Surface area and volumes

Ans.

37. The tangents drawn at the ends of a diameter of a circle are parallel.

T – 1 min
S – Circle

Ans.

38. The common point of the tangent and the circle is called point of contact.

T – 1 min
S – Circle

Ans.

39. At any point on a circle, there can be two tangent.

T – 1 min
S – Circle

Ans.

40. The part of circular region enclosed by two radii and the corresponding arc is called sector of a circle.

T	– 1 min
S	– Area related to circle

Ans.

Simple Questions

41. Find the area of a circle whose circumferences is 50π cm.

T	– 1 min
S	– Area of circle

Ans.

42. A wire is looped in the form of a circle of radius 42 cm. It is repent into a square form. Determine the length of the side of the square.

T	– 1 min
S	– Area of circle

Ans.

43. If the radii of the circular ends of conical bucket of height 45 cm be 28 cm and 7 cm, find the capacity of the bucket use $\left(\pi = \frac{22}{7}\right)$.

T	– 1 min
S	– Surface area and volumes

Ans.

44. A tent is in the form of a right circular cylinder surmounted by a cone. The diameter of the cylinder is 24 m. The height of the cylindrical portion is 11 m while the vertex of the cone is 16 m above the ground. Find the area of the canvas required for the tent.

T	– 1 min
S	– Surface area and volumes

Ans.

45. A vessel is in the form of a hemispherical bowl mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the capacity of the vessel. ($\pi = 22 / 7$)

T	– 1 min
S	– Surface area and volumes

Ans.

46. A circular park, 42 m in diameter, has a path 3.5 m wide running round it on the outside. Find the cost of gravelling the path at Rs 4 per m^2.

T	– 1 min
S	– Area related to circle

Ans.

47. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

T	– 1 min
S	– Area related to circle

Ans.

48. A square *ABCD* is inscribed in a circle of radius 2. Find the area of the square.

T	– 1 min
S	– Circle

Ans.

49. Find circumference of a circle whose radius is 14 cm

T	– 1 min
S	– Circle

Ans.

50. Find the curved surface area of the hemisphere of radius 2π cm.

T	– 1 min
S	– Circle

Ans.

30 Regular Questions

Opening Window

To enlighten your regular knowledge of topic. If you score more than 55 marks here, you have achieved this level brilliantly. Move to the next level of test papers.

Section B (60 marks) **Time given – 45 minutes + 5 minutes for revision**

Questions 51 to 80 carry 2 marks each.

Q.51 to Q. 52 A bucket made up of a metal sheet is in the form of frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. (Take $\pi = 3.14$)

51. Find the cost of the milk which can completely fill the bucket at the rate of Rs 20 per litre.

T – 1 min
S – Surface area and volumes

Ans.

52. Find the cost of metal sheet used, if it costs Rs 10 per 100 cm^2.

T – 1 min
S – Surface area and volumes

Ans.

53. A square *ABCD* is inscribed in a circle of radius *r*. Find the area of the square.

T – 1 min
S – Area related to circle

Ans.

54. If the perimeters of a semicircular protractor is 36 cm. Find its diameter.

T	– 1 min
S	– Circle

Ans.

55. A hollow sphere of external and internal diameter 38 cm and 4 cm respectively is melted into a cone of base diameter 8 cm. Find the height of the cone.

T	– 1 min
S	– Surface area and volumes

Ans.

56. If the radii of the ends of a 42 cm being bucket are 16 cm and 11 cm. Determine its capacity. ($\pi = 22 / 7$)

T	– 1 min
S	– Surface area and volumes

Ans.

57. Find the area of the sector of a circle with radius 4 cm and of angle 30°. Also, find the area of the corresponding major sector. ($\pi = 3.14$)

T	– 1 min
S	– Circle

Ans.

58. If a square is inscribed in a circle. Find the ratio of the areas of the circle and the square.

T	– 1 min
S	– Area related to circle

Ans.

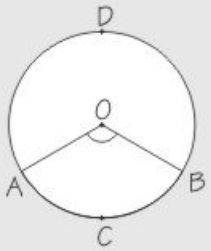
59. Find the area of a right angled triangle, if the radius of its circumcircle is 2.5 cm and the altitude drawn to the hypotenuse is 2 cm long.

T	– 1 min
S	– Area related to circle

Ans.

Q.60 to Q.63 In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find

60. Length of the arc



T – 4 min
S – Area related to circle

Ans.

61. Area of the sector.

Ans.

62. Area of minor segment *ACBA*.

Ans.

63. Area of the major segment *BDAB*.

Ans.

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

T	– 1 min
S	– Circle

Ans.

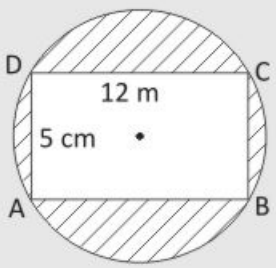
65. From a point P, 10 cm away from the centre of a circle, a tangent PT of length 8 cm is drawn. Find the radius of the circle.

T	– 1 min
S	– Circle

Ans.

66. Find the area of the shaded region in the given figure. Take $\pi = 3.14$

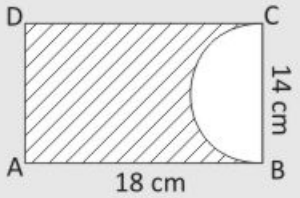
T	– 2 min
S	– Area related to circle



Ans.

67. A paper is in the form of a rectangle *ABCD* in which $AB = 18$ cm and $BC = 14$ cm. A semicircular position with *BCDB* diameter is cut off. Find the area of the remaining paper

T – 2 min
S – Area related to circle



Ans.

68. Two circles touch internally. The sum of their areas is $(116\pi)\,cm^2$ and the distance between their centres is 6 cm. Find the radii of the circles.

T – 2 min
S – Area related to circle

Ans.

69. A hemispherical bowl of internal radius 9 cm is full of liquid. The liquid is to be filled in to cylindrical shaped small bottles, each of diameter 3 cm and height 4 cm. How many bottles are needed to empty the bowl?

T – 2 min
S – Area related to circle

Ans.

70. How many spherical bullets can be made out of a solid cube of lead whose edge measures 44 cm, each bullet being 4 cm in diameter ?

T – 2 min
S – Surface area and volumes

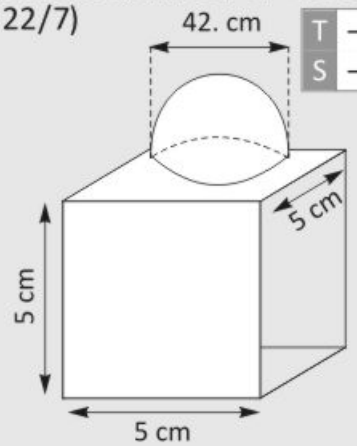
Ans.

71. Find the number of coins, 1.5 cm in diameter and 0.2 cm thick, to be melted to form a right circular cylinder of height 10 cm and diameter 4.5 cm.

T – 2 min
S – Surface area and volumes

Ans.

72. The decorative block shown in figure is made of two solids a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm. Find the total surface area of the block. (take $\pi = 22/7$)



T – 2 min
S – Surface area and volumes

Ans.

73. A metallic cone having base radius 2.1 cm and height 8.4 cm is melted and moulded into a sphere. Find the radius of the sphere.

T – 2 min
S – Surface area and volumes

Ans.

74. The radius of the base of a cone is 5 cm and its height is 12 cm. Find its curved surface area.

T	– 2 min
S	– Surface area and volumes

Ans.

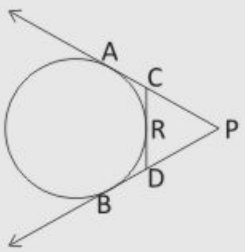
75. The volume of a wall, 5 times as high as it is broad and 8 times as long as it is high, is 12.8 m^3. Find the breadth of the wall.

T	– 2 min
S	– Surface area and volumes

Ans.

76. In figure *PA* and *PB* are tangents from *P* to the circle with centre *O*. *R* is a point on the circle. Prove that $PC + PR = PD + DR$

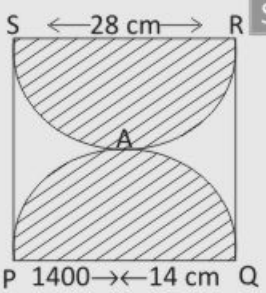
T	– 2 min
S	– Circle



Ans.

77. *PQRS* is a square land of side 28 cm. Two semicircular grass covered portion are to be made on two of its opposite sides as shown in the figure. How much area will be left uncovered ? ($\pi = 22/7$)

T	– 2min
S	– Surface area and volumes



Ans.

78. What is the distance between two parallel tangents to a circle of the radius 4 cm ?

T	– 2 min
S	– Circle

Ans.

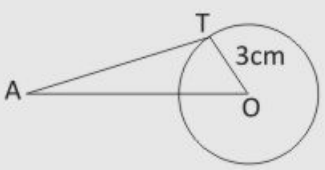
79. The radii of the two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumference of two circles.

T	– 2 min
S	– Circle

Ans.

80. The length of the tangent from a point *A* to a circle of radius 3 cm, is 4 cm. Find the distance of *A* from the centre of the circle.

T	– 2 min
S	– Circle



Ans.

20 Thinking Ability Questions

Opening Window

To enlighten your regular knowledge of topic. If you score more than 50 marks here, you have achieved this level brilliantly. Move to the next level of test papers.

Section C (60 marks) **Time given – 45 minutes + 5 minutes for revision**

81. The diameter of a copper sphere is 6 cm. The sphere is melted and drawn in to a long wire of uniform circular cross section. If the length of the wire is 36 cm, find its radius.

T – 2 min
S – Surface area and volumes

Ans.

82. The slant height of the frustum of a cone is 14 cm and the perimeters of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum.

T – 2 min
S – Surface area and volumes

Ans.

83. A steel wire, when bent in the form of a square, encloses an area of 121 sq cm. The same wire is bent in the form of a circle. Find the area of circle.

T – 2 min
S – Area related to circle

Ans.

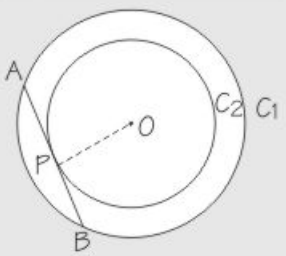
84. Prove that there is one and only one tangent at any point on the circumference of a circle.

T	– 2 min
S	– Circle

Ans.

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

T	– 2 min
S	– Circle



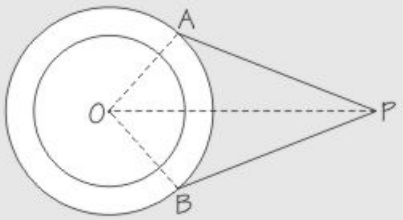
Ans.

86. *ABC* is a right triangle, right angled at *B*. A circle is inscribed in it. The length of the two sides containing the right angle are 6 cm and 8 cm. Find the radius of the circle.

T	– 2 min
S	– Circle

Ans.

87. In the given figure, O is the centre of two concentric circles of radii 4 cm and 6 cm respectively. PA and PB are tangents to the outer and inner circle respectively. If $PA = 10$ cm, find the length of PB up to one place of decimal.

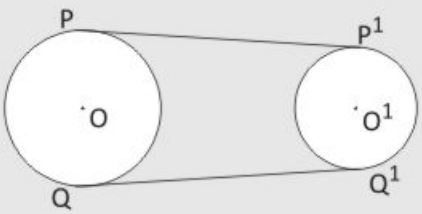


T	– 2 min
S	– Circle

Ans.

88. In the given figure, prove that $PP' = QQ'$.

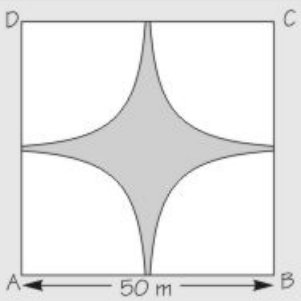
T	– 2 min
S	– Circle



Ans.

89. Four cows are tethered at the four corners of square field of side 50 m such that each can graze the maximum unshared area. What area will be left ungazed ? (Take $\pi = 3.14$)

T	– 2 min
S	– Area related to circle



Ans.

90. The area of a circle inscribed in an equilateral triangle is 154 cm^2. Find the perimeter of the triangle. Take $\sqrt{3} = 1.72$.

T – 2 min
S – Area related to circle

Ans.

91. A tent is in the form of a cylinder of diameter 4.2 m and height 4 m, surmounted by a cone of equal base and height 2.8 m. Find the capacity of the tent and the cost of canvas for making the tent at Rs 100 per square metre.

T – 2 min
S – Surface area and volumes

Ans.

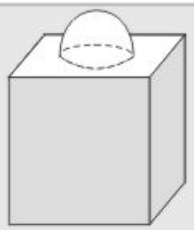
92. A solid toy is in the form of a right circular cylinder with a hemispherical shape at one end and a cone at the other end. Their common diameter is 4.2 cm, and the heights of the cylindrical and conical portions are 12 cm and 7 cm respectively, find the volume of the given toy. (Take $\pi = 22/7$)

T – 2 min
S – Surface area and volumes

Ans.

93. A solid is made up of a cube and a hemisphere attached on its top, as shown in the figure. Each edge of the cube measure 5 cm and the hemisphere has a dimeter of 4.2 cm. Find the total area to be painted. (Take $\pi = 22/7$).

T – 2 min
S – Surface area and volumes



Ans.

94. The inner diameter of a glass is 7 cm and it has a raised portion in the bottom in the shape of a hemisphere, as shown in the figure. If the height of the glass is 16 cm, find the apparent capacity. ($\pi = 22/7$)

T	– 2 min
S	– Surface area and volumes

Ans.

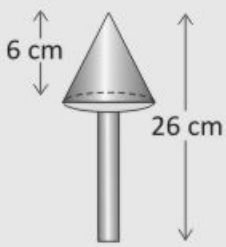
95. A solid toy is in the form of a hemisphere surmounted by a right circular cone of height 2 cm and diameter of base 4 cm. If a right circular cylinder circumscribes the toy, find how much more space than the toy it will cover?

T	– 2 min
S	– Surface area and volumes

Ans.

96. A wooden toy is in the shape of a cone mounted on a cylinder, as shown in the figure.The total height of the toy is 26 cm, while the height of the conical part is 6 cm. The diameter of the base of the conical part is 5 cm and that of the cylindrical part is 4 cm. The conical part and the cylindrical part are respectively painted red and white, find the area to be painted by each of these colours. [Take $\pi = 22/7$]

T	– 3 min
S	– Surface area and volumes



Ans.

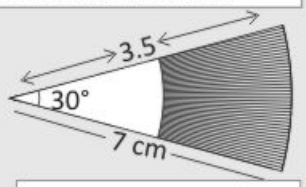
97. Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle is bisected at the point of contact.

T – 3 min
S – Area related to circle

Ans.

98. In the given figure, sectors of two concentric circle of radii 7cm and 3.5 cm are shown. Find the area of the shaded region?

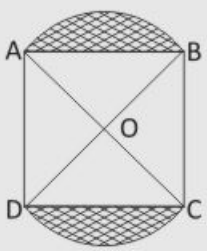
T – 3 min
S – Area related to circle



Ans.

99. In figure, two circular flower beds have been shown on two sides of a square lawn *ABCD* of side 56m. If the centre of each circular flower bed is the point of intersection *O* of the diagonals of the square lawn, find the sum of the areas of the lawn and the flower beds.

T – 3 min
S – Area related to circle



Ans.

100. Prove that the opposite side of a quadrilateral circumscribing circles subtend supplementary angles at the centre of the circle.

T – 3 min
S – Area related to circle

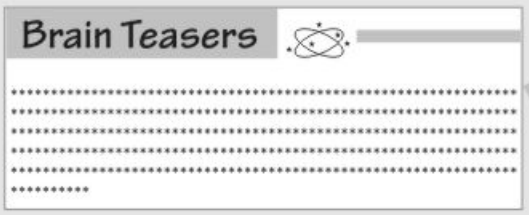
Ans.

Tools at a glance

Opening Window with instructions for your potential analysis and guideline to improve your performance.

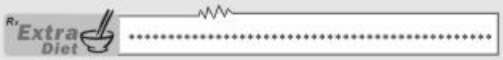
Let's Chat, the feature with suggestive topics for discussion so as to improve your capacity to debate on various topics.

Box with time break-up of questions **(T)** and its concept (**S**, i.e., subject)



Brain Teasers i.e., Questions with difference to make the concepts of students crystal clear. These are the questions with higher difficulty levels to check the grip of the students over the concepts.

Extra Diet, the web link, the notation: www._____ to provide additional information regarding the concept for more clarity of thoughts.



CBSE GRADING PATTERN

As the new pattern includes **CCE** (Continuous and Comprehensive Evaluation) which will be run in two terms i.e., from April to September and October to March. Thus the school will conduct four **Formative** and two **Summative** Assessments.

However, the most generalised version of grades is given below:

MARKS PERCENTAGE	GRADE	GRADE POINT	CATEGORY
91 to 100	A1	10	Exceptional
81 to 90	A2	9	Excellent
71 to 80	B1	8	Very Good
61 to 70	B2	7	Good
51 to 60	C1	6	Ordinary (Fair)
41 to 50	C2	5	Average
33 to 40	D	4	Below Average
21 to 32	E1	3	Improvement Needed
Below 20	E2	Below 2	Unsatisfactory