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NTSE (Mathematics)

(Sheet 3)

MENSURATION

1. The volume of a sphere of diameter 2p cm is given by

   (A) $\pi p^2 cm^3$ (B) $\pi p^3\ cm^3$ (C) $4\ \pi p^3\ cm^3$ (D) $\frac{4}{3}\pi p^3\ cm^3$

2. The maximum length of pencil. Which can be put in side box whose dimensions are 8 cm × 6 cm × 2 cm.

   (A) $2\sqrt{13}$ cm (B) $2\sqrt{14}$ cm (C) $2\sqrt{26}$ cm (D) $10\sqrt{2}$ cm

3. One room's breadth is double its height and half its length. If volume of room is 512 cubic meter then the length of the room will be –

   (A) 12 m (B) 16 m (C) 20 m (D) 32 m

4. A rectangular wooden block whose dimensions are 15cm long, 12 cm. Wide 6cm high. How many minimum cubes to be made by this block.

   (A) 6 (B) 11 (C) 33 (D) 40

5. Diameter of a cylindrical vessel is 60cm. It is filled with water such that a sphere of diameter 30cm. is mersed fully into it. Then what is the increase in height of the surface after putting the sphere in the vessels.

   (A) 2 cm (B) 3 cm (C) 4 cm (D) 5 cm

6. Area of rectangle mat is 60 cm^2, it sum of its diagonal & longer side is five times of its smaller side then length of the mat will be –

   (A) 5 m (B) 12 m (C) 13 m (D) 14.5 m

7. If Area of equilateral triangles increase $2\sqrt{3}$ sq. cm. when its sides increases by 2cm then length of its side will be –

   (A) 1 cm (B) $\sqrt{3}$ cm (D) 3 cm (D) $\left(\sqrt{3}+2\right)$ cn.

8. A village, having a population of 4000, requires 150 / water per head per day. It has a tank measuring 20 m by 15 m by 6 m. For how many days the water of this tank will last :

   (A) 6 days (B) 5 days (C) 4 days (D) 3 days

9. A drum of water is $\frac{3}{5}$ fill/ When 57 litres are drawn from it, it is just $\frac{1}{8}$ full. find the total capacity of drum

   (A) 120 ml (B) 120 lit (C) 100 lit (D) 240 lit

10. If the perimeter of a square is (4y + 12)m, then the length of its diagonal is :

    (A) $\frac{y+3}{\sqrt{2}}$m (B) $\sqrt{2}(y+3)$m (C) $\sqrt{3}(4y+12)$m (D) $\frac{4y+12}{\sqrt{2}}$m

11. A rectangular garden has an area 2000 m^2 and its length and breadth are in the ratio 5: 4. A road of uniform width runs inside the garden around the perimeter and has an area 344 m^2, then the width of the road is :

    (A) 4 m (B) 3.5 m (C) 3 m (D) 2 m

12. The area of a right angled triangle is 20 cm^2 and one of the sides containing the right triangle is 4 cm. Then the altitude on the hypotenuse is :

(A) 8 cm (B) 10 cm (C) $\frac{10}{\sqrt{41}}$ cm (D) $\frac{20}{\sqrt{29}}$ cm

13. The diagonal of a square A is (x + y). The diagonal of square B with twice the area of A is

(A) 2 (x + y) (B) x + 2y (C) $\sqrt{2}$ (x + y) (D) 2x + 4y

14. If the length, breadth and height of a cube are increased, decreased and increased by 1%, 3% and 2% respectively, then the volume of the solid

(A) Increased (B) Decreased

(C) Increases or decreases depending upon the original dimensions

(D) Increase or decrease this cannot be computed with the data available

15. Solids of various shapes are cost from equal volumes of metal. The least surface will be possessed by

(A) cylinder (B) sphere (C) cube (D) hemisphere

16. A wire in the shape of an equilateral triangle has an area S sq. cms. If the same wire is bent to form a circle. the area of the circle will be

(A) $\pi S^2 / 9$ (B) $3S / \pi$ (C) $3S^2 / \pi$ (D) $3\sqrt{3}S / \pi$

17. A wire of length 2p is bent to form a circle, a triangle, a rectangle and a polygon. State which figure has greatest area

(A) circle (B) rectangle (C) triangle (D) polygon

18. A right circular cylinder, a right circular cone and a hemisphere are all having equal base area and height. These volumes are in the ratio,

(A) 1 : 2 : 3 (B) 3 : 1 : 2 (C) 3 : 2 : 1 (D) 2 : 1 : 3

19. A rectangular sheet of cardboard is 9 cms by 6 cms. If greatest possible circle is cut off from card board the remaining area is

(A) 36 - π (B) 9 (6 - π) (C) (6 - π) (D) 6(9 - π)

20. A cone is cut half way through its axis and parallel to the base, the volumes of two portions are in the ratio

(A) 1 : 1 (B) 1 : 3 (C) 1 : 7 (D) 1 : 4

21. Three cubes of metal, of edges 6 cm, 8 cm and 10 cm are melted to form a new cube. Find the diagonal of this cube.

(A) 8 cm (B) 12 cm (C) 20.8 cm (D) 21.8 cm

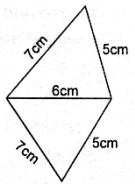
22. The dimensions of a brick are 24 cm × 12 cm × 8 cm. How many bricks will be required to build a wall 24 m × 8 m × 6 m if 20% of the walls is filled with mortar?

(A) 400000 (B) 450000 (C) 500000 (D) 550000

23. The area of 4 walls of the hall whose breadth is 15 m and height is 8 m is 1,068 sq. m., the length of the hall is

(A) 15 m (B) 17 m (C) 16 m (D) None of these

24. The length of four sides and a diagonal of the given quadrilateral are indicated in the diagram. If A denotes the area then A is



(A) $12\sqrt{6}$

(B $12\sqrt{6}$

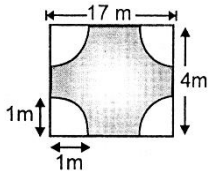
(C) $6\sqrt{6}$

(D) $6\sqrt{6}$

25. In an isosceles triangle ABC (AB = AC) the altitude to the base and to a lateral side are equal to 10 cm and 12 cm respectively. The length of the base is

(A) 12.5 (B) 15 (C) 16 (D) 18

26. The perimeter of the following shaded portion of the figure is :



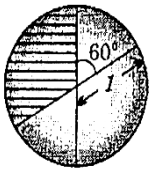
(A) 40 m

(B) 40.07 m

(C) 40.28 m

(D) 35 m

27. The area of the shaded region in the given figure is :



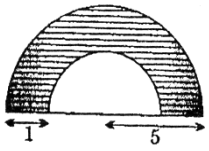
(A) $\frac{\pi}{3}$ sq. units

(B) $\frac{\pi}{2}$ sq. units

(C) $\frac{\pi}{4}$ sq. units

(D) π^2 sq. units

28. The area of the shaded portion in the given figure is :



(A) 7.5 π sq. units (B) 4.5 π sq. units

(C) 5.5 π sq. units (D) 6.5 π sq. units

29. The height of conical tent at the centre is 5m. The distance of any point on its circular base from the top of the tent is 13m. The are of the slant surface is :

(A) 144 π sq m (B) 130 π sq m (C) 156 π sq m (D) 169 π sq m

30. Inside a triangular garden there is a flower bed in the form of a similar triangle. Around the flower bed runs a uniform path of such a width that the side of the garden are double of the corresponding sides of the flower bed. The areas of the path and the flower bed are in the ratio :

(A) 1 : 1 (B) 1 : 2 (C) 1 : 3 (D) 3 : 1

31. There is cylinder circumscribing the hemisphere such that their bases are common. The ratio of their volume is

(A) 1 : 3 (B) 1 : 2 (C) 2 : 3 (D) 3 : 4

32. If each side of rectangle is increased by 50%, then its area will be increased by

(A) 150% (B) 120% (C) 125% (D) None of these

33. A cone and cylinder have the same base area. They also have the same curved surface area. If the height of the cylinder is 3m, then the slant height of the cone (in m) is

(A) 3 (B) 4 (C) 6 (D) 7

34. A sphere of radius 3 cms is dropped into a cylindrical vessel of radium 4 cms. If the sphere is submerged completely, then the height (in cm) to which the water rises, is

(A) 2.35 (B) 2.30 (C) 2.25 (D) 2.15

35. The area of a regular hexagon of side 8 cm is

(A) 96 $\sqrt{3}$ cm^2 (B) 64 $\sqrt{3}$ cm^2 (C) 48 $\sqrt{3}$ cm^2 (D) None of these

36. The height of a right circular cylinder is equal to its diameter. If it is melted and recast into a sphere of radius equal to the radius of the cylinder, find the part of the material that remained unused.

(A) $\frac{1}{5}$ (B) $\frac{1}{3}$ (C) $\frac{1}{4}$ (D) $\frac{1}{5}$

37. Determine the ratio of the volume of a cube to that of a sphere which will exactly fit inside the cube.

(A) 6 : π (B) π : 6 (C) π : 3 (D) 3 : π

38. If the diameter of the cross-section of a wire is decreased by 5%, how mush percent will the length be increased so that the volume remains the same ?

(A) 8% (B) 11.8% (C) 10.8% (D) 9.8%

39. An iron rod of length 1 m and diameter 4 cm is melted and cast into thin wires of length 20 cm each. If the number of such wires be 2000, find the radius of each thin wire.

(A) 1 cm (B) 0.4 cm (C) 0.2 cm (D) 0.1 cm

40. The shape of a solid is a cylinder surmounted by a cone. If the volume of the solid is 40656 cm^3, the diameter of the base is 42 cm and the height of the cylinder is 20 cm, find the slant height of the conical portion.

(A) 45 cm (B) 35 cm (C) 40 cm (D) 50 cm

41. A solid is in the form of a right circular cylinder with a hemisphere at one end and cone at the other end. Their common diameter is 4.5 cm and the height of the cylindrical and conical portions are respectively 1 cm and 8 cm. Taking π = 3.14. Find the cost of polishing the surface of the entire solid at the rate of Rs. 150 per cm^2.

(A) Rs. 38000 (B) Rs. 39000 (C) Rs. 39500 (D) Rs. 38500.

42. In the radii of the ends of a bucket, 45 cm high are 28 cm, and 7 cm, determine its surface area.

(A) 5556 cm^2 (B) 5456.50 cm^2 (C) 5616.49 cm^2 (D) 5676.49 cm^2

43. The diameter of circular wheel is 14 cm. How many revaluations will it make in moving 5.28 km ?

(A) 12,000 (B) 12,500 (C) 1200 (D) 1250

44. How many balls, each of radius 2 cm, can be made from a solid sphere of lead of radius 16 cm ?

(A) 504 (B) 524 (C) 576 (D) 512

45. A hemispherical tank of radius $1\frac{3}{4}$ is full of water. it is connected with a pipe which empties it at the rate of 7 liters per second. How much time will it take to empty the tank completely ?

(A) 26.4 min. (B) 26.54 min. (C) 26.74 min. (D) 26 min.

46. The base radius of solid in the form of a cone is 4 cm and the height of the cone is 9 cm. it is melted and recast into spherical balls of radius 0.5 cm. Find the number of balls, thus obtained.

(A) 512 (B) 300 (C) 288 (D) 412

47. How many metres of cloth of 1.1 m width be required to make a conical tent whose vertical height is 12 m and base radius is 16 m ? Find also the cost of the cloth used at the rate of Rs. 14 per metre.

(A) 914.28 m, Rs. 12800 (B) 904.28 m, Rs. 13800

(C) 914.28 m, Rs. 12600 (D) 904.28 m Rs. 12000

48. The outer measurements of a closed wooden box are 42 cm, 30 cm and 27 cm. If the box is made of 1 cm thick wood, determine the capacity of the box.

(A) 28000 cm^3 (B) 28500 cm^3 (C) 29000 cm^3 (D) 30000 cm^3

49. The ratio a canal, 30 dm wide and 12 dm deep, is flowing with a speed of 10 km/hour. How much area will it irrigate in 30 minutes, if 8 cm of standing water is required for irrigation.

(A) 22500 m^2 (B) 205000 m^2 (C) 200000 m^2 (D) 225000 m^2