20 MENSURATION

2 DIMENSIONAL

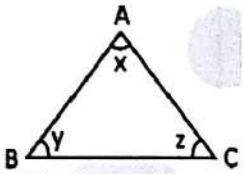
Area

Definition : Total space in side the boundary of a plane figure.

Perimeter

Definition : Perimeter is the length of border around any enclosed part. Therefore sum of the sides of a plane figure is the perimeter of that particular figure. Unit of perimeter is same as the unit of sides of a given figure

Triangle



Any closed figure with three sides called triangle.
A,B,C are called vertices and a,b,c are length of the sides and x,y,z are angles.

1. Sum of angles of a triangle is 180°.
2. Sum of exterior angles of triangle is 360°

Rules for a Triangle

1. Sum of the lengths of any two sides of a triangle has to be alway greater than the 3rd side.
2. Difference between the lengths any two sides must be always less than 3rd side.
3. Side opposite to the greatest angle will be the greatest and the side opposite to the smallest angle will be the smallest.

Example 1 : Can we draw a triangles with the 3 sides 3, 5, 7

Rule 1 : 3 + 5 = 8 > 7
5 + 7 = 13 > 3 ∴ 3, 5, 7 forms
3 + 7 = 10 > 5 a triangles

Example 2 : Can we a draw a triangle with the following 3 sides, 5, 16, 10
5 + 16 > 10
16 + 10 > 5
5 + 10 < 16
∴ 5, 16, 10 does not form a triangle

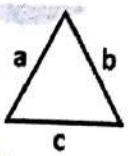
TRIANGLES

Equilateral Triangle

(i) Area $= \frac{\sqrt{3}}{4}a^2$ (ii) Height $= \frac{\sqrt{3}}{2}a$

(iii) Perimeter = 3a
Where, a = side each angle = 60°

Scalene Triangle

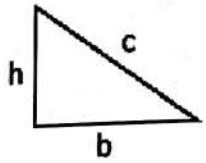


(i) Area $= \sqrt{s(s-a)(s-b)(s-c)}$

Where, $s = \frac{a+b+c}{2}$ and a, b and c are the sides of the triangle.

(ii) Perimeter = a + b + c

Right Angled Triangle



(i) Area $= \frac{1}{2}$ Base × Height $= \frac{1}{2}$ b × h

(ii) $c^2 = h^2 + b^2$ (Pythagoras theorem)
Where b = base, h = height, c = hypotenuse

Polygons

Polygons are plane figures formed by a closed series of rectilinear (straight).

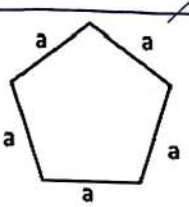
Example : Triangle, rectangle, pentagon, Hexagon....Polygons can broadly be divided into two types

1. Regular polygons.
2. Irregular polygons

Regular Polygon

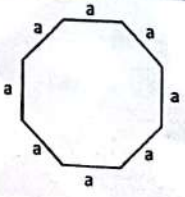
If each side of a regular polygon of n sides = a Then,

(i) Area of regular pentagon $= 5a^2\frac{\sqrt{3}}{4}$



(ii) Area of regular hexagon $= 6a^2\frac{\sqrt{3}}{4}$

(iii) Area of regular octagon $= 2\left(\sqrt{2}+1\right)a^2$



Regular polygons with all the sides and angles equal.

Irregular polygons plygons in which all the sies or angles are not of the same measure. polygons can also be divided into 2 types.

1. Concave
2. Convex polygon

Convex polygons are the polygons in which all the diagonals lie inside the figure. other wise it is concave polygons.

Polygons can also be divided on the basis of the number of side they have.

Types of Polygon

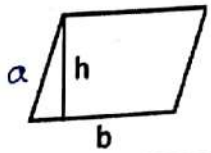
interior $(n-2)\times 180^\circ$

S.No	No. of Sides	Name	$(2n-4)90^\circ$ Sum of angles	360° sum of Exterior Angles	No. of Diag $\frac{n(n-3)}{2}$
1	3	Triangle	180°	360°	$\frac{3(3-3)}{2}=0$
2	4	Quadrilateral	360°	360°	$\frac{4(4-3)}{2}=2$
3	5	Pentagon	510	360°	$\frac{5(5-3)}{2}=5$
4	6	Hexagon	720	360°	$\frac{6(6-3)}{2}=9$
5	7	Heptagon	$(2(7)-4)\,90=900$	360°	$\frac{7(7-3)}{2}=14$
6	8	Octagon	1080	360°	$\frac{8(8-3)}{2}=20$
7	9	Nanogon	1260°	360°	$\frac{9(9-3)}{2}=27$
8	10	Decagon	1440°	360°	$\frac{10(7)}{2}=35$

Note

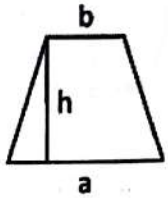
1. The sum of angles in a regular polygon is $(2n-4)90^\circ = (n-2)180^\circ$
   Where n = no. of sides
2. The sum of exterior angles of a regular polygon $= 360^\circ$
3. No. of diagonals in a regular polygon $= \frac{n(n-3)}{2}$
4. Each exterior angle $= \frac{360^\circ}{n}$
5. Each interior angle $= 180^\circ -$ Exterior angle $= \frac{(n-2)180^\circ}{n}$
6. Area of a regular polygon
   $A = \frac{na^2}{4}\cot\frac{180^\circ}{n}$
   n = no. of sides
   a = length of side
7. Area of hexagon $= 6\times\frac{\sqrt{3}}{4}a^2$ (only for reg. hexagon)
   In a hexagon there are 6 equilateral triangles.
   Hence Hexagon area
   = 6 × Area of equilateral triangle.

Parallelogram



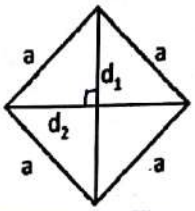
(i) Area = Base × Height = b × h
(ii) Perimeter = 2(a + b)

Trapezium



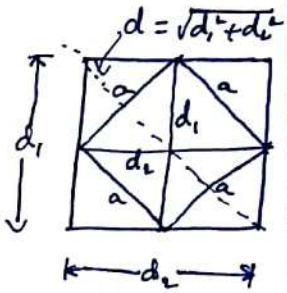
Area $= \frac{1}{2}$(sum of the parallel sides) × (Height) $= \frac{1}{2}(a+b)h$

Rhombus



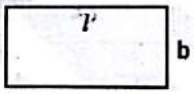
(i) Area $= \frac{1}{2}\times d_1\times d_2$
(ii) Side (a) $= \frac{1}{2}\sqrt{d_1^2+d_2^2}$
(iii) Perimeter = 4a
(iv) $4a^2 = d_1^2 + d_2^2$ ← same

Where, a = side, d_1 and d_2 are diagonals.



diagonal of rectangle $d=\sqrt{d_1^2+d_2^2}$
side of rhombus $a=\frac{d}{2}=\frac{\sqrt{d_1^2+d_2^2}}{2}$

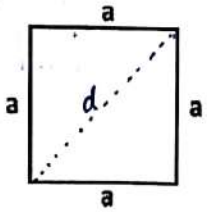
Rectangle



(i) Area = Length × Breadth = $\ell\times b$
(ii) Perimeter = $2(\ell\times b)$
(iii) Diagonal (d) $= \sqrt{l^2+b^2}$
(iv) Area of 4 walls of rectangular room $= 2\times(\ell+b)\times h$

Where, l = length, b = breadth, h = height

Square



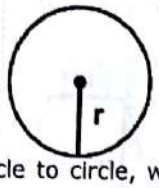
$d^2=\sqrt{a^2+a^2}$
$d=\sqrt{2}a$

(i) Area = $(\text{side})^2 = a^2$ or $\frac{1}{2}d^2$ → Area $= a^2 = \frac{d^2}{2}$
(ii) Perimeter = 4 × side = 4a
(iii) Diagonal (d) $= a\sqrt{2}$

Where, a = side, d = diagonal

Volume = base area × height
lateral surface area = base perimeter × height

Circle



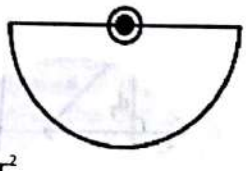
From centre of a circle to circle, we draw a line called radius.

$2r$ = diameter

Circumference = $2\pi r$

Area = πr^2

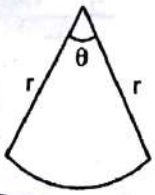
Semicircle



Area = $\frac{\pi r^2}{2}$

Circumference = $\pi r + 2r$

Sector



Arc length = $\frac{\theta}{360} \times 2\pi r$

Perimeter = 2r + Arc length

Area = $\frac{\theta}{360} \times \pi r^2$

$360^\circ \rightarrow 2\pi r$

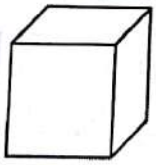
$\theta^\circ \rightarrow \frac{\theta}{360} \times 2\pi r$

$360^\circ \rightarrow \pi r^2$

$\theta \rightarrow \frac{\theta}{360} \times \pi r^2$

VOLUME AND SURFACE AREA

Cube



(i) Volume of the cube = a^3

(ii) Whole surface of a cube = $6a^2$

(iii) Diagonal of the cube = $a\sqrt{3}$

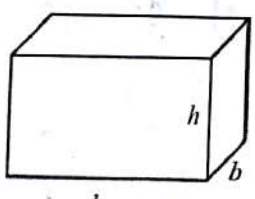
Where, a = side (edge) of the cube

$d^2 = a^2 + a^2 + a^2 = 3a^2$

$d = \sqrt{3}a$

(iv) LSA/Area of 4 walls = $4a^2$

Cuboid



(i) Volume of hollow cuboid = ℓbh

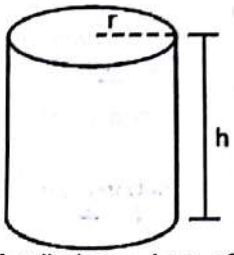
(ii) Whole surface or surface area of the cuboid = $2(\ell b + bh + \ell h)$

(iii) Diagonal of the cuboid = $\sqrt{\ell^2 + b^2 + h^2}$

Where l = length, b = breadth, h = height

(iv) LSA/Area of 4 walls = $2 \times (\ell + b) \times h$

Solid Cylinder



(i) Volume of cylinder = Area of base × Height

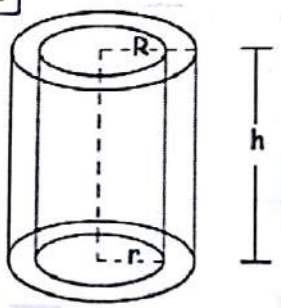
$\pi r^2 h$

(ii) Curved surface area = $2\pi rh$

(iii) TSA = $2\pi rh + 2\pi r^2 = 2\pi r(r + h)$

Where, r = radius of base, h = height

Hollow cylinder (pipe)



(i) Volume of hollow cylinder = $\pi h(R^2 - r^2)$

(ii) Curved surface area = $2\pi h(R + r)$

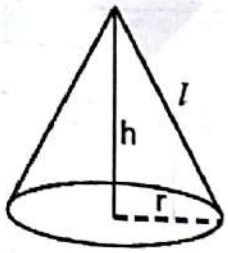
(iii) Total surface area of hollow cylinder

$= 2\pi h(R + r) + 2\pi(R^2 - r^2)$

Where, R = external radius of base

r = internal radius of base, h = height

Cone



(i) Volume = $\frac{1}{3} \times$ Base area × Height

$= \frac{1}{3}\pi r^2 h$ ← $\frac{1}{3}$ (volume of cylinder)

(ii) Slant height (l) = $\sqrt{r^2 + h^2}$

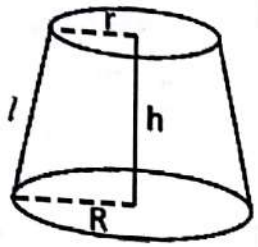
(iii) Curved surface area =

$\pi r \ell = \pi r\left(\sqrt{r^2 + h^2}\right)$

(iv) Total surface area = $\pi r\ell + \pi r^2 = \pi r(\ell + r)$

Where, r = radius of base, h = height, l = slant height

Frustrum of Cone



(i) Slant height (l) = $\sqrt{h^2 + (R-r)^2}$

(ii) Curved surface area = $\pi(R+r)l$

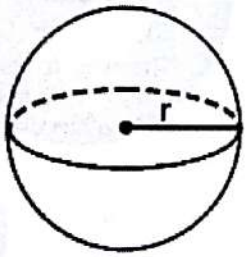
(iii) Total surface area = $\pi\{(r+R)l + r^2 + R^2\}$

(iv) Volume = $\frac{\pi h}{3}(r^2 + R^2 + rR)$

Where, r = radius of top, R = radius of base,

h = height, l = slant height

Sphere

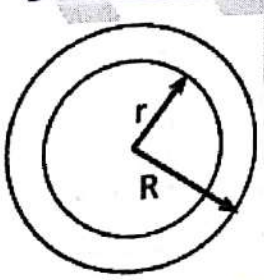


(i) Volume of the sphere = $\frac{4}{3}\pi r^3$

(ii) Total surface area = $4\pi r^2$

where, r = radius

Hollow Sphere of Spherical Shell



(i) Volume of hollow sphere = $\frac{4}{3}\pi(R^3 - r^3)$

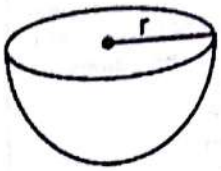
(ii) Internal surface area = $4\pi r^2$

(iii) External surface area = $4\pi R^2$

where, R = external radius,

r = internal radius

Hemisphere



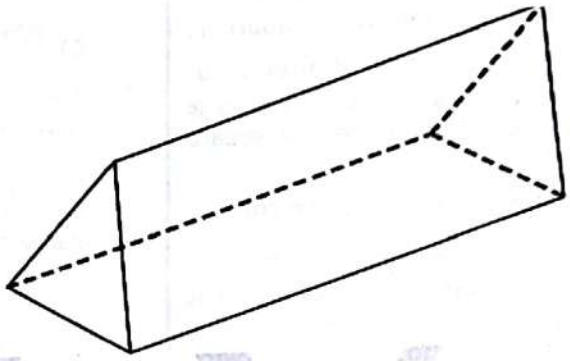
(i) Volume of the hemisphere = $\frac{2}{3}\pi r^3$

(ii) Total surface area = $3\pi r^2$

(iii) Curved surface area = $2\pi r^2$

Where, r = radius

Prism



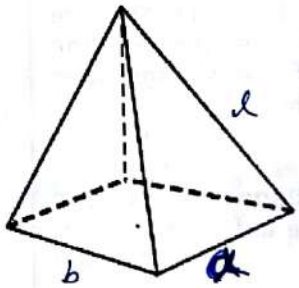
(i) Volume of prism = Area of base × Height

(ii) Lateral surface area (area of all vertical sides)

= Perimeter of base × Height

(iii) TSA = LSA + (2 × Area of base)

Pyramid



Volume of pyramid = $\frac{1}{3}$ × Area of base × Height

$\frac{1}{3}$ (volume of cuboid)

TYPE-I

1. If the length of the diagonal AC of a square ABCD is 5.2 cm, then the area of the square is:
A) 15.12 sq.cm
B) 13.52 sq.cm
C) 12.62 sq.cm
D) 10.00 sq.cm

2. The length of the diagonal of a square is 'a' cm. Which of the following represents the area of the square (in sq. cm.)?
A) 2a B) $\frac{a}{\sqrt{2}}$
C) $a^2/2$ D) $a^2/4$

3. The diagonal of a square is $4\sqrt{2}$ cm. The diagonal of another square whose area is double that of the first square is:
A) $8\sqrt{2}$ cm B) 16 cm
C) $\sqrt{32}$ cm D) 8 cm

4. The diagonal of a square A is (a+b). The diagonal of a square whose area is twice the area of square A, is
A) 2(a+b) B) $2(a+b)^2$
C) $\sqrt{2}(a+b)$ D) $\sqrt{2}(a-b)$

5. The difference of the areas of two squares drawn on two line segments of different lengths is 32 sq.cm. Find the length of the greater line segment if one is longer than the other by 2 cm.
A) 7 cm B) 9 cm
C) 11 cm D) 16 cm

6. If the diagonals of two squares are in the ratio 2 : 5, their areas will be in the ratio of
A) $\sqrt{2}:\sqrt{5}$ B) 2 : 5
C) 4 : 25 D) 4 : 5

7. The perimeter of five squares are 24 cm, 32 cm, 40 cm, 76 cm and 80 cm respectively. The perimeter of another square equal in area to sum of the area of these square is:
A) 31 cm B) 62 cm
C) 124 cm D) 961 cm

8. The ratio of the area of a square to that of the square drawn on its diagonal is:
A) 1 : 1 B) 1 : 2
C) 1 : 3 D) 1 : 4

9. From four corners of a square sheet of side 4 cm, four pieces, each in the shape of arc of a circle with radius 2 cm, are cut out. The area of the remaining portion is:
A) $(8-\pi)$ sq.cm.
B) $(16-4\pi)$ sq.cm.
C) $(16-8\pi)$ sq.cm.
D) $(4-2\pi)$ sq.cm.

10. The length of diagonal of a square is $15\sqrt{2}$ cm. Its area is
A) 112.5 cm^2 B) 450 cm^2
C) $\frac{225\sqrt{2}}{2}$ cm^2 D) 225 cm^2

11. A kite in the shape of a square with a diagonal 32 cm attached to an equilateral triangle of the base 8 cm. approximately how much paper has been used to make it? (Use $\sqrt{3}=1.732$)
A) 539.712 cm^2
B) 538.721 cm^2
C) 540.712 cm^2
D) 539.217 cm^2

12. The breadth of a rectangular hall is three-fourth of its length. If the area of the floor is 768 sq. m. then the difference between the length and breadth of the hall is:
A) 8 metres B) 12 metres
C) 24 metres D) 32 metres

13. The length of a plot is five times its breadth. A playground measuring 245 square metres occupies half of the total area of the plot. What is the length of the plot?
A) $35\sqrt{2}$ metres
B) $175\sqrt{2}$ metres
C) 490 metres
D) $5\sqrt{2}$ metres

14. The length of a rectangular garden is 12 metres and its breadth is 5 metres. Find the length of the diagonal of a square garden having the same area as that of the rectangular garden:
A) $2\sqrt{30}$m B) $\sqrt{13}$ m
C) 13 m D) $8\sqrt{15}$ m

15. A circular wire of diameter 42 cm is folded in the shape of rectangle whose sides are in the ratio 6 : 5. Find the area enclosed by the rectangle. $\left(\text{Take } \pi=\frac{22}{7}\right)$
A) 540 B) 1080
C) 2160 D) 4320

16. A took 15 sec. To cross a rectangular field diagonally walking at the rate of 52 m/ min. and B took the same time to cross the same field along its sides walking at the rate of 68 m/ min. The area of the field is:
A) 30 m^2 B) 40 m^2
C) 50 m^2 D) 60 m^2

17. The difference between the length and breadth of a rectangle is 23m. If its perimeter is 206 m, then its area is
A) 1520 m^2 B) 2420 m^2
C) 2480 m^2 D) 2520 m^2

18. There is a rectangular tank of length 180 m and breadth 120 m in a circular field. If the area of the land portion of the field is 40000 m^2, what is the radius of the field? $\left(\text{Take } \pi=\frac{22}{7}\right)$
A) 130 m B) 135 m
C) 140 m D) 145 m

19. The length of a rectangular hall is 5 m more than its breadth. The area of the hall is 750 m^2. The length of the hall is:
A) 15 m B) 22.5 m
C) 25 m D) 30 m

20. If the length and breadth of a rectangle are in the ratio 3 : 2 and its perimeter is 20 cm, then the area of the rectangle (in cm^2) is:
A) 24 B) 48
C) 72 D) 96

21. A path of uniform width runs round the inside of a rectangular field 38m long and 32m wide. If the path occupies 600 m^2, then the width of the path is
A) 30 m B) 5 m
C) 18.75 m D) 10 m

22. The length and breadth of a rectangle are increased by 20% and 25% respectively. The increase in the area of the resulting rectangle will be:
A) 60% B) 50%
C) 40% D) 30%

23. The length of a room floor exceeds its breadth by 20 m. The area of the floor remains unaltered when the length is decreased by 10 m but the breadth is increased by 5 m. The area of the floor (in square metres) is:
A) 280 B) 325
C) 300 D) 420

24. A street of width 10 metres surrounds from outside a rectangular garden from whose measurement is 200 m × 180 m. The area of the path (in square metres) is
A) 8000 B) 7000
C) 7500 D) 8200

25. In measuring the sides of a rectangle, there is an excess of 5% on one side and 2% deficit on the other. Then the error percent in the area is
A) 3.3% B) 3.0%
C) 2.9% D) 2.7%

26. A lawn is in the form of a rectangle having its breadth and length in the ratio 3 : 4. The area of the lawn is $\frac{1}{12}$ hectare. The breadth of the lawn is
A) 25 metres
B) 50 metres
C) 75 metres
D) 100 metres

27. The area of a rectangle is thrice that of a square. The length of the rectangle is 20 cm and the breadth of the rectangle is $\frac{3}{2}$ times that of the side of the square. The side of the square. (in cm) is
A) 10 B) 20
C) 30 D) 60

28. The length and breadth of a rectangular field are in the ratio 7 : 4. A path 4m wide running all around outside has an area of 416 m^2 . The breadth (in m) of the field is
A) 28 B) 14
C) 15 D) 16

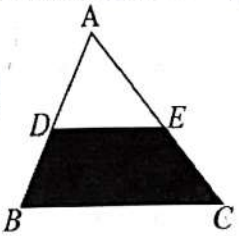
29. ABC is a triangle with base AB. D is a point on AB such that AB =5 and DB =3. What is the ratio of the area of ΔADC to the area of ΔABC?
A) 3/2 B) 2/3
C) 3/5 D) 2/5

30. If the area of a triangle is 1176 cm^2 and base: corresponding altitude is 3 : 4. Then the altitude of the triangle is
A) 42 cm B) 52 cm
C) 54 cm D) 56 cm

31. The base of a triangle is 15 cm and height is 12 cm. The height of another triangle of double the area having the base 20 cm is:
A) 9 cm B) 18 cm
C) 8 cm D)12.5 cm

32. The sides of a triangle are 3 cm, 4 cm and 5 cm. The area (in cm^2) of the triangle formed by joining the mid points of this triangle is:
A) 6 B) 3
C) $\frac{3}{2}$ D) $\frac{3}{4}$

33. If D and E are the mid-points of the side AB and AC respectively of the ΔABC in the figure given here, the shaded region of the triangle is what percent of the whole triangular region?



A) 50% B) 25%
C) 75% D) 60%

34. The ratio of base of two triangles is x : y and that of their areas is a : b. Then the ratio of their corresponding altitudes will be:
A) $\frac{a}{y} : \frac{b}{x}$ B) ax : by
C) ay : bx D) $\frac{x}{a} : \frac{b}{y}$

35. The diagonal of a right angle isosceles triangle is 5 cm. Its area will be
A) 5 sq.cm B) 6.25 sq.cm
C) 6.50 sq.cm D) 12.5 sq.cm

36. In an isosceles triangle, the measure of each of equal sides is 10 cm and the angle between them is 45°. The area of the triangle is
A) 25 cm^2 B) $\frac{25}{2}\sqrt{2}$ cm^2
C) $25\sqrt{2}$ cm^2 D) $25\sqrt{3}cm^2$

37. From a point in the interior of an equilateral triangle, the length of the perpendiculars to the three sides are 6 cm, 8 cm and 10 cm respectively. The area of the triangle is
A) 48 cm^2 B) $16\sqrt{3}$ cm^2
C) $192\sqrt{3}$ cm^2 D) 192 cm^2

38. The area of two equilateral triangles are in the ratio 25 : 36. Their altitudes will be in the ratio
A) 36 : 25 B) 25 : 36
C) 5 : 6 D) $\sqrt{5} : \sqrt{6}$

39. ABC is an equilateral triangle of side 2 cm. With A, B, C as centre and radius 1 cm three arcs are drawn. The area of the region within the triangle bounded by the three arcs is
A) $\left(3\sqrt{3} - \frac{\pi}{2}\right)$ cm^2
B) $\left(\sqrt{3} - \frac{3\pi}{2}\right)$ cm^2
C) $\left(\sqrt{3} - \frac{\pi}{2}\right)cm^2$
D) $\left(\frac{\pi}{2} - \sqrt{3}\right)$ cm^2

40. The area of a right angled isosceles triangle having hypotenuse $16\sqrt{2}$ cm is
A) 144 cm^2 B) 128 cm^2
C) 112 cm^2 D) 110 cm^2

41. The sides of a triangle are in the ratio 2 : 3 : 4. The perimeter of the triangle is 18 cm. The area (in cm^2) of the triangle is
A) 9 B) 36
C) $\sqrt{42}$ D) $3\sqrt{15}$

42. If the numerical value of the perimeter of an equilateral triangle is $\sqrt{3}$ times the area of it, then the length of each side of the triangle is
A) 2 units B) 3 units
C) 4 units D) 6 units

43. Each side of an equilateral triangle is 6 cm. Find its area.
A) $9\sqrt{3}$ sq.cm
B) $6\sqrt{3}$ sq.cm
C) $4\sqrt{3}$ sq.cm
D) $8\sqrt{3}$ sq.cm

44. If a triangle with base 8 cm has the same area as a circle with radius 8 cm, then the corresponding altitude (in cm) of the triangle is
A) 12π B) 20π
C) 16π D) 32π

45. The measures (in cm) of sides of a right angle triangle are given by consecutive integers. Its area (in cm^2) is
A) 9 B) 8
C) 5 D) 6

46. The area of an equilateral triangle is $4\sqrt{3}\,cm^2$. The length of each side of the triangle is:
A) 3 cm B) $2\sqrt{2}$ cm
C) $2\sqrt{3}$ cm D) 4 cm

47. The length of three medians of a triangle are 9 cm, 12 cm and 15 cm. The area (in sq. cm) of the triangle is
A) 24 B) 72
C) 48 D) 144

48. The area of the triangle formed by the straight line $3x + 2y = 6$ and the co-ordinate axes is
A) 3 square units
B) 6 square units
C) 4 square units
D) 8 square units

49. The ratio of length of each equal side and the third side of an isosceles triangle is 3 : 4. If the area of the triangle is $18\sqrt{5}$ square units, the third side is
A) 16 units B) $5\sqrt{10}$ units
C) $8\sqrt{2}$ units D) 12 units

50. The ratio of sides of a triangle is 3 : 4 : 5. If area of the triangle is 72 square unit, then the length of the smallest side is:
A) $4\sqrt{3}$ unit B) $5\sqrt{3}$ unit
C) $6\sqrt{3}$ unit D) $3\sqrt{3}$ unit

51. If the length of each side of an equilateral triangle is increased by 2 unit, the area is found to be increased by $3+\sqrt{3}$ square unit. The length of each side of the triangle is
A) $\sqrt{3}$ unit
B) 3 unit
C) $3\sqrt{3}$ unit
D) $1+3\sqrt{3}$ unit

52. What is the area of the triangle whose sides are 9cm, 10cm and 11 cm?
A) 30 cm^2
B) 60 cm^2
C) $30\sqrt{2}$ cm^2
D) $60\sqrt{2}$ cm^2

53. The area of an isosceles triangle is 4 square unit. If the length of the third side is 2 unit, the length of each equal side is
A) 4 units B) $2\sqrt{3}$ unit
C) $\sqrt{17}$ units D) $3\sqrt{2}$ units

54. The ratio of sides of a triangles is 3 : 4 : 5 and area of the triangle is 72 square unit. Then the area of an equilateral triangle whose perimeter is same as that of the previous triangle is
A) $32\sqrt{3}$ square units
B) $48\sqrt{3}$ square units
C) 96 square units
D) $60\sqrt{3}$ square units

55. A right angled isosceles triangle is inscribed in a semi-circle of radius 7 cm. The area enclosed by the semi-circle but exterior to the triangle is
A) 14 cm^2 B) 28 cm^2
C) 44 cm^2 D) 68 cm^2

56. What is the area of a triangle having perimeter 32 cm, one side 11 cm and difference of other two sides 5 cm?
A) $8\sqrt{30}$ cm^2 B) $5\sqrt{35}$ cm^2
C) $6\sqrt{30}$ cm^2 D) $8\sqrt{2}$ cm^2

57. The area of the triangle formed in the first quadrant by the line $3x+4y=12$ is
A) 8 B) 12
C) 6 D) 4

58. The height of an equilateral triangle is 15 cm. The area of the triangle is
A) $50\sqrt{3}$ sq.cm.
B) $70\sqrt{3}$ sq.cm.
C) $75\sqrt{3}$ sq.cm.
D) $150\sqrt{3}$ sq.cm.

59. The area of an equilateral triangle is $9\sqrt{3}$ m^2. The length (in m) of the median is
A) $2\sqrt{3}$ B) $3\sqrt{3}$
C) $3\sqrt{2}$ D) $2\sqrt{2}$

60. The sides of a triangle are 16 cm, 12 cm and 20 cm. Find the area
A) 64 cm^2 B) 112 cm^2
C) 96 cm^2 D) 81 cm^2

61. 360 sq. cm and 250 sq. cm are the area of two similar triangles. If the length of one of the sides of the first triangle be 8 cm. then the length of the corresponding side of the second triangle is
A) $6\frac{1}{5}$ cm B) $6\frac{1}{3}$ cm
C) $6\frac{2}{3}$ cm D) 6 cm

62. The perimeter of an isosceles triangle is 544 cm and each of the equal sides is $\frac{5}{6}$ times the base. What is the area (in cm^2) of the triangle?
A) 38172 B) 18372
C) 31872 D) 13872

63. The altitude drawn to the base of an isosceles triangle is 8 cm and its perimeter is 64 cm. The area (in cm^2) of the triangle is
A) 240 B) 180
C) 360 D) 120

64. The perimeter of a rhombus is 40 m and its height is 5m. Its area is:
A) 60 m^2 B) 50 m^2
C) 45m^2 D) 55m^2

65. The area of a field in the shape of a trapezium measures 1440 m^2. The perpendicular distance between its parallel sides is 24m. If the ratio of the parallel sides is 5 : 3, the length of the longer parallel side is:
A) 75 m B) 45 m
C) 120 m D) 60 m

66. The area of a rhombus is 150 cm^2. The length of one of its diagonals is 10 cm. The length of the other diagonal is
A) 25 cm B) 30 cm
C) 35 cm D) 40 cm

67. The perimeter of a rhombus is 100 cm. If one of its diagonals is 14 cm, then the area of the rhombus is
A) 144 cm² B) 225 cm²
C) 336 cm² D) 400 cm²

68. If the measure of one side and one diagonal of a rhombus are 10 cm and 16 cm respectively, then its area (in cm²) is:
A) 60 B) 64
C) 96 D) 100

69. The ratio of the length of the parallel sides of a trapezium is 3 : 2. The shortest distance between them is 15 cm. If the area of the trapezium is 450 cm², the sum of the length of the parallel sides is
A) 60 cm B) 45 cm
C) 75 cm D) 96 cm

70. A parallelogram has sides 15 cm and 7 cm long. The length of one of the diagonals is 20 cm. The area of the parallelogram is
A) 42 cm² B) 60 cm²
C) 84 cm² D) 96 cm²

71. Sides of a parallelogram are in the ratio 5 : 4. Its area is 1000 sq. units. Altitude to the greater side is 20 units. Altitude on the smaller side is
A) 30 units B) 25 units
C) 10 units D) 15 units

72. The perimeter of a rhombus is 40 cm and the measure of angle is 60°, then the area of it is:
A) $100\sqrt{3}$ cm² B) $50\sqrt{3}$ cm²
C) $160\sqrt{3}$ cm² D) 100 cm²

73. The parallel sides of a trapezium are in a ratio2 : 3 and their shortest distance is 12 cm. If the area of the trapezium is 480 sq. cm. the longer of the parallel sides is of length:
A) 56 cm B) 36 cm
C) 42 cm D) 48 cm

74. If the sum of the length, breadth and height of a rectangular parallelepiped is 24 cm and the length of its diagonal is 15 cm, then its total surface area is
A) 256 cm² B) 265 cm²
C) 315cm² D) 351cm²

75. The perimeter of a non-square rhombus is 20 cm. One of its diagonal is 8 cm. The area of the rhombus is
A) 28 sq. cm B) 20 sq. cm
C) 22 sq. cm D) 24 sq. cm

76. The perimeter of a rhombus is 100 cm and one of its diagonals is 40cm. Its area (in cm²) is
A) 1200 B) 1000
C) 600 D) 500

77. In ΔABC, D and E are the points of sides AB and AC respectively such that DE || AC and AD : DB = 3 : 2. The ratio of area of trapezium ACED to that of ΔBED is
A) 4 : 15 B) 15 : 4
C) 4 : 21 D) 21 : 4

78. ABCD is a trapezium in which AB || DC and AB = 2 CD. The diagonals AC and BD meet at O. The ratio of area of triangles AOB and COD is
A) 1 : 1 B) $1 : \sqrt{2}$
C) 4 : 1 D) 1 : 4

79. The length of each side of a rhombus is equal to the length of the side of a square whose diagonal is $40\sqrt{2}$ cm. if the length of the diagonals of he rhombus are in the ratio 3 : 4, then its area (in cm²) is
A) 1550 B) 1600
C) 1535 D) 1536

80. The area of a regular hexagon of side $2\sqrt{3}$ cm is:
A) $18\sqrt{3}$ cm² B) $12\sqrt{3}$ cm²
C) $36\sqrt{3}$ cm² D) $27\sqrt{3}$ cm²

81. Each side of a regular hexagon is 1 cm The area of the hexagon is
A) $\frac{3\sqrt{3}}{2}$ cm² B) $\frac{3\sqrt{3}}{4}$ cm²
C) $4\sqrt{3}$ cm² D) $3\sqrt{2}$ cm²

82. An equilateral triangle of side 6 cm has its corners cut off to form a regular hexagon. Area (in cm²) of this regular hexagon will be
A) $3\sqrt{3}$ B) $3\sqrt{6}$
C) $6\sqrt{3}$ D) $\frac{5\sqrt{3}}{2}$

83. The ratio of the area of a regular hexagon and an equilateral triangle having same perimeter is
A) 2 : 3 B) 6 : 1
C) 3 : 2 D) 1 : 6

84. The area of a sector of a circle of radius 5 cm, formed by an arc of length 3.5 cm is:
A) 8.5 cm² B) 8.75 cm²
C) 7.75 cm² D) 7.50 cm²

85. The area (in sq.cm.) of the largest circle that can be drawn inside a square of side 28 cm, is:
A) 17248 B) 784
C) 8624 D) 616

86. If the circumference of a circle increases from 4π to 8π. What change occurs in its area?
A) It doubles B) It triples
C) It quadruples D) It is halved

87. The area of the ring between two concentric circles. Whose circumference are 88 cm and 132 cm is:
A) 780 cm² B) 770 cm²
C) 715 cm² D) 660 cm²

88. Three circles of radius 3.5 cm each are placed in such a way that each touches the other two. The area of the portion enclosed by the circles is
A) 1.975 cm² B) 1.967 cm²
C) 19.67 cm² D) 21.21 cm²

89. The area of a circular garden is 2464 sq. m. How much distance will have to be covered if you like to cross the garden along its diameter?
(Use $\pi = \frac{22}{7}$)
A) 56m B) 48m
C) 28m D) 24m

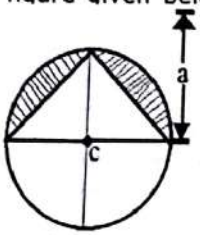
90. Four equal circles each of radius 'a' units touch one another. The area enclosed between them ($\pi = \frac{22}{7}$), in square units, is
A) $3a^2$ B) $\frac{6a^2}{7}$
C) $\frac{41a^2}{7}$ D) $\frac{a^2}{7}$

91. Three coins of the same size (radius 1cm) are placed on a table such that each of them touches the other two. The area enclosed by the coins is
A) $\left(\frac{\pi}{2} - \sqrt{3}\right)$ cm²
B) $\left(\sqrt{3} - \frac{\pi}{2}\right)$ cm²
C) $\left(2\sqrt{3} - \frac{\pi}{2}\right)$ cm²
D) $\left(3\sqrt{3} - \frac{\pi}{2}\right)$ cm²

92. The area of the largest triangle that can be inscribed in a semicircle of radius r cmm, is
A) 2 r cm² B) r² cm²
C) 2 r² cm² D) $\frac{1}{2}$ r² cm²

93. The area of circle whose radius is 6 cm is trisected by two concentric circles. The radius of the smallest circle is
A) $2\sqrt{3}$ cm B) $2\sqrt{6}$ cm
C) 2 cm D) 3 cm

94. The area of the shaded region in the figure given below is



A) $\frac{a^2}{2}\left(\frac{\pi}{2}-1\right)$ sq. units
B) $a^2(\pi-1)$ sq. units
C) $a^2\left(\frac{\pi}{2}-1\right)$ sq. units
D) $\frac{a^2}{2}(\pi-1)$ sq. units

95. The area of a circle is increased by 22 cm its radius is increased by 1 cm. The original radius of the circle is
A) 6 cm B) 3.2 cm
C) 3 cm D) 3.5 cm

96. The radius of circle A is twice that of circle B and the radius of circle B is twice that of the radius of circle C. Their areas will be in the ratio
A) 16 : 4 : 1 B) 4 : 2 : 1
C) 1 : 2 : 4 D) 1 : 4 : 16

97. The circumference of a circle is 11 cm and the angle of a sector of the circle is 60°. The area of the sector is $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) $1\frac{29}{48}$ cm² B) $2\frac{29}{48}$ cm²
C) $1\frac{27}{48}$ cm² D) $2\frac{27}{48}$ cm²

98. A 7 m wide road runs outside around a circular park, whose circumference is 176 m. The area of the road is: $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 1386 m² B) 1472 m²
C) 1512 m² D) 1760 m²

99. The four equal circles of radius 4cm drawn on the four corners of a square touch each other externally. Then the area of the portion between the square and the four sectors is
A) 9 (π-4) sq. cm.
B) 16 (π-4) sq. cm.
C) 9 (4-π) sq. cm.
D) 16 (4-π) sq. cm.

100. If the four equal circles of a radius 3 cm touch each other externally, then the area of the region bounded by the four circles is
A) 4(9-π) sq. cm
B) 9(4-π) sq. cm
C) 5(6-π) sq.cm
D) 6(5-π) sq. cm

101. The radii of two circles are 5 cm and 12 cm. The area of a third circle is equal to the sum of the area of the two circles. The radius of the third circle is:
A) 13 cm B) 21 cm
C) 30 cm D) 17 cm

102. The perimeter of a semicircular path is 36 m. Find the area of this semicircular path.
A) 42 sq. m B) 54 sq. m
C) 63 sq. m D) 77 sq. m

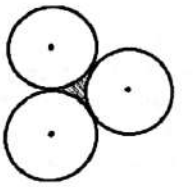
103. The ratio between the area of two circles is 4 : 7. What will be the ratio of their radii?
A) 2 : $\sqrt{7}$ B) 4 : 7
C) 16 : 49 D) 4 : $\sqrt{7}$

104. Three circles of radius a, b, c touch each other externally. The area of the triangle formed by joining their centre is
A) $\sqrt{(a+b+c)abc}$
B) $(a+b+c)\sqrt{ab+bc+ca}$
C) ab + bc + ca
D) None of the above

105. The area of a circle is proportional to the square of its radius. A small circle of radius 3 cm is drawn within a larger circle of radius 5 cm. Find the ratio of the area of the annual zone to the area of the larger circle. (Area of the annular zone is the difference between the area of the larger circle and that of the smaller circle).
A) 9 : 16 B) 9 : 25
C) 16 : 25 D) 16 : 27

106. The diameter of two circles are the side of a square and the diagonal of the square. The ratio of the area of the smaller circle and larger circle is
A) 1 : 2 B) 1 : 4
C) $\sqrt{2}$: $\sqrt{3}$ D) 1 : $\sqrt{2}$

107. Three circles of equal radius 'a' cm touch each other. The area of the shaded region is:



A) $\left(\frac{\sqrt{3}+\pi}{2}\right)a^2$ sq.cm
B) $\left(\frac{6\sqrt{3}-\pi}{2}\right)a^2$ sq.cm
C) $\left(\sqrt{3}-\pi\right)a^2$ sq.cm
D) $\left(\frac{2\sqrt{3}-\pi}{2}\right)a^2$ sq.cm

108. The radii of two circles are 10 cm and 24 cm. The radius of a circle whose area is the sum of the area of these two circles is
A) 36 cm B) 17 cm
C) 34 cm D) 26 cm

109. The area of the greatest circle inscribed inside a square of side 21 cm is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 344. 5 cm² B) 364.5 cm²
C) 346.5 cm² D) 366.5 cm²

110. The area of the greatest circle, which can be inscribed in a square whose perimeter is 120 cm, is:
A) $\frac{22}{7}\times(15)^2$ cm²
B) $\frac{22}{7}\times\left(\frac{7}{2}\right)^2$ cm²
C) $\frac{22}{7}\times\left(\frac{15}{2}\right)^2$ cm²
D) $\frac{22}{7}\times\left(\frac{9}{2}\right)^2$ cm²

111. The area of the incircle of an equilateral triangle of side 42 cm is : $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 231 cm² B) 462 cm²
C) $22\sqrt{3}$ cm² D) 924 cm²

112. The ratio of the area of the incircle and the circum-circle of a square is
A) 1 : 2 B) $\sqrt{2}:1$
C) $1:\sqrt{2}$ D) 2 : 1

113. The area of an equilateral triangle inscribed in a circle is $4\sqrt{3}$ cm². The area of the circle is
A) $\frac{16}{3}\pi$ cm² B) $\frac{22}{3}\pi$ cm²
C) $\frac{28}{3}\pi$ cm² D) $\frac{32}{3}\pi$ cm²

114. The area of the largest circle, that can be drawn inside a rectangle with sides 18 cm. by 14 cm. is
A) 49 cm² B) 154 cm²
C) 378cm² D) 1078 cm²

115. A circle is inscribed in an equilateral triangle of side 8 cm. The area of the portion between the triangle and the circle is
A) 11 cm² B) 10.95 cm²
C) 10 cm² D) 10.50 cm²

116. If the difference between areas of the circumcircle and the incircle of an equilateral triangle is 44, then the area of the triangle is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 28 cm² B) $7\sqrt{3}$ cm²
C) $14\sqrt{3}$ cm² D) $21\sqrt{3}$ cm²

117. If the area of a circle inscribed in a square is 9π cm², then the area of the square is
A) 24 cm² B) 30 cm²
C) 36 cm² D) 81 cm²

118. The sides of a triangle are 6 cm, 8 cm and 10 cm. The area of the greatest square that can be inscribed in it, is
A) 18 cm² B) 15 cm²
C) $\frac{2304}{49}$ cm² D) $\frac{576}{50}$ cm²

119. The length of a side of an equilateral triangles is 8 cm. The area of the region lying between the circumcircle and the incircle of the triangle is $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) $50\frac{1}{7}$ cm² B) $50\frac{2}{7}$ cm²
C) $75\frac{1}{7}$ cm² D) $75\frac{2}{7}$ cm²

120. The length of each side of an equilateral triangle is $14\sqrt{3}$ cm. The area of the incircle (in cm²), is
A) 450 B) 308
C) 154 D) 77

121. The area of a circle inscribed in a square of area 2 m² is
A) $\frac{\pi}{4}$m² B) $\frac{\pi}{2}$m²
C) πm² D) 2πm²

122. Length of the perpendiculars from a point in the interior of an equilateral triangle on its sides are 3cm, 4cm and 5 cm. Area of the triangle is
A) $48\sqrt{3}$ cm² B) $54\sqrt{3}$ cm²
C) $72\sqrt{3}$ cm² D) $80\sqrt{3}$ cm²

123. The ratio of the areas of the circumcircle and the incircle of an equilateral triangle is
A) 2 : 1 B) 4 : 1
C) 8 : 1 D) 3 : 2

124. Area of the incircle of an equilateral triangle with side 6 cm is
A) $\frac{\pi}{2}$ sq. cm.
B) $\sqrt{3}\pi$ sq. cm.
C) 6 π sq. cm.
D) 3 π sq. cm

125. The area of the square inscribed in a circle of radius 8 cm is
A) 256 sq. cm.
B) 250 sq. cm.
C) 128 sq. cm.
D) 125 sq. cm.

126. A circle is inscribed in an equilateral triangle and a square is inscribed in that circle. The ratio of the areas of the triangle and the square is
A) $\sqrt{3}:4$ B) $\sqrt{3}:8$
C) $3\sqrt{3}:2$ D) $3\sqrt{3}:1$

127. The ratio of the area of an equilateral triangle and that of its circumcircle is
A) $2\sqrt{3}:2\pi$ B) $4:\pi$
C) $3\sqrt{3}:4\pi$ D) $7\sqrt{2}:2\pi$

128. Between a square of perimeter 44 cm and a circle of a circumference 44 cm, which figure has larger area and by how much?
A) Square, 33 cm²
B) Circle, 33 cm²
C) Both have equal area,
D) Square, 495 cm²

129. The perimeter of a square and a circular field are the same. If the area of the circular field is 3850 sq metres, what is the area (in m²) of the square?
A) 4225 B) 3025
C) 2500 D) 2025

130. The areas of a square and a rectangle are equal. The length of a the rectangle is greater than the length of any side of the square by 5 cm and the breadth is less by 3 cm. Find the perimeter of the rectangle.
A) 17 cm B) 26 cm
C) 30 cm D) 34 cm

131. If a wire is bent into the shape of a square, the area of the square is 81 sq. cm. When the wire is bent into a semicircular shape, the area of the semicircle $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 154 cm² B) 77cm²
C) 44 cm² D) 22 cm²

132. The perimeter of a rectangle is 160 metre and the difference of two sides is 48 metre. Find the side of a square whose area is equal to the area of this rectangle.
A) 32 m B) 8m
C) 4 m D) 16 m

133. If the area of a triangle with base 12 cm is equal to the area of a square with side 12 cm. The altitude of the triangle will be
A) 12 cm B) 24 cm
C) 18 cm D) 36 cm

134. The area (in m²) of the square which has the same perimeter as a rectangle whose length is 48m and is 3 times its breadth, is:
A) 1000 B) 1024
C) 1600 D) 1042

135. A square and an equilateral triangle are drawn on the same base. The ratio of their area is
A) 2 : 1 B) 1 : 1
C) $\sqrt{3}:4$ D) $4:\sqrt{3}$

136. A wire, when bent in the form of a square, encloses a region having area 121 cm² . If the same wire is bent into the form of a circle, then the area of the circle is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 144 cm² B) 180 cm²
C) 154 cm² D) 176 cm²

137. A copper wire is bent in the form of an equilateral triangle and has area $121\sqrt{3}$ cm². If the same wire is bent into the form of a circle the area (in cm²) enclosed by the wire is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 364.5 B) 693.5
C) 346.5 D) 639.5

138. A copper wire is bent in the shape of a square of area 81 cm². If the same wire is bent in the form of a semicircle, the radius (in cm) of the semicircle is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 16 B) 14
C) 10 D) 7

139. At each corner of a triangular field of sides 26 m, 28m and 30m, a cow is tethered by a rope of length 7m. The area (in cm²) ungrazed by the cows is
A) 336 B) 259
C) 154 D) 77

140. An equilateral triangle is drawn on the diagonal of a square. The ratio of the area of the triangle to that of the square is
A) $\sqrt{3}:2$ B) $\sqrt{2}:\sqrt{3}$
C) $2:\sqrt{3}$ D) $1:\sqrt{2}$

141. A cow is tied on the corner of a rectangular field of size 30 m × 20 m by a 14 m long rope. The area of the region, that she can graze, is $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 350 m² B) 196 m²
C) 154 m² D) 22 m²

142. A circle and a square have equal areas. The ratio of a side of the square and the radius of the circle is:
A) $1:\sqrt{\pi}$ B) $\sqrt{\pi}:1$
C) $1:\pi$ D) $\pi:1$

143. If the perimeters of a rectangle and a square are equal and the ratio of two adjacent sides of the rectangle is 1 : 2 then the ratio of area of the rectangle and that of the square is
A) 1 : 1 B) 1 : 2
C) 2 : 3 D) 8 : 9

144. The perimeter of a rectangle and an equilateral triangle are same. Also, one of the sides of the rectangle is equal to the side of the triangle. The ratio of the area of the rectangle and the triangle is
A) $\sqrt{3}:1$ B) $1:\sqrt{3}$
C) $2:\sqrt{3}$ D) $4:\sqrt{3}$

145. The radius of a circle is a side of a square. The ratio of the area of the circle and the square is
A) $1:\pi$ B) $\pi:1$
C) $\pi:2$ D) $2:\pi$

146. If the length of a rectangle is increased by 25% and the width is decreased by 20%, then the area of the rectangle:
A) increases by 5%
B) decreases by 5%
C) remains unchanged
D) increases by 10%

147. The length of a rectangle is decreased by 10% and its breadth is increased by 10%. By what percent is its area changed?
A) 0% B) 1%
C) 5% D) 100%

148. The percentage increases in the area of a rectangle. If each of its sides is increased by 20%, is:
A) 40% B) 42%
C) 44% D) 46%

149. If the circumference of a circle is reduced by 50%. Its area will be reduced by
A) 12.5% B) 25%
C) 50% D) 75%

150. If the side of a square is increased by 25%, then its area is increased by:
A) 25% B) 55%
C) 40.5% D) 56.25%

151. If the radius of a circle is in increased by 50%, its area is increased by:
A) 125% B) 100%
C) 75% D) 50%

152. If the length of a rectangle is increased by 20% and its breadth is decreased by 20%, then its area
A) increases by 4%
B) decreases by 4%
C) decreases by 1%
D) remains unchanged

153. If each side of a rectangle is increased by 50%, its area will be increased by
A) 50% B) 125%
C) 100% D) 250%

154. If the altitude of a triangle is increased by 10% while its area remains same, its corresponding base will have to be decreased by
A) 10% B) 9%
C) $9\frac{1}{11}\%$ D) $11\frac{1}{9}\%$

155. If the circumference of a circle is increased by 50% then the area will be increased by
A) 50% B) 75%
C) 100% D) 125%

156. The length and breadth of a rectangle are increased by 12% and 15% respectively. Its area will be increased by:
A) $27\frac{1}{5}\%$ B) $28\frac{4}{5}\%$
C) 27% D) 28%

157. Each side of a rectangular field is diminished by 40%. By how much percent is the area of the field diminished?
A) 32% B) 64%
C) 25% D) 16%

158. The length of rectangle is increased by 60%. By what percent would the breadth to be decreased to maintain the same area?
A) $37\frac{1}{2}\%$ B) 60%
C) 75% D) 120%

159. If each side of a square is increased by 10%. Its area will be increased by
A) 10% B) 21%
C) 44% D) 100%

160. If the length of a rectangular plot of land is increased by 5% and the breadth is decreased by 10%, how much will its area increase or decrease?
A) 6.5% increase
B) 5.5% decrease
C) 5.5% increase
D) 6.5% decrease

161. The radius of a circle is increased by 1%. How much does the area of the circle increase?
A) 1% B) 1.1%
C) 2% D) 2.01%

162. In measuring the sides of a rectangle, there is an excess of 5% on one side and 2% deficit on the other. Then the error percent in the area is
A) 3.3% B) 3.0%
C) 2.9% D) 2.7%

163. The length and breadth of a square are increased by 30% and 20% respectively. The area of the rectangle so formed exceeds the area of the square by
A) 46% B) 66%
C) 42% D) 56%

164. If each edge of a cube is increased by 40%. The percentage increase in its surface area is
A) 40% B) 60%
C) 80% D) 96%

165. If the diameter of a circle is increased by 8%, then its area is increased by:
A) 16.64% B) 6.64%
C) 16% D) 16.46%

166. One side of a square is increased by 30%. To maintain the same area, the other side will have to decrease
A) $23\frac{1}{13}\%$ B) $76\frac{12}{13}\%$
C) 30% D) 15%

167. The length and breadth of a rectangle are doubled. Percentage increase in area is
A) 150% B) 200%
C) 300% D) 400%

168. ABC is an equilateral triangle. P and Q are two points on $\overline{AB}$ and $\overline{AC}$ respectively such that $\overline{PQ} \| \overline{BC}$. If $\overline{PQ} = 5cm$, then area of ΔAPQ is:
A) $\frac{25}{4}$ sq.cm B) $\frac{25}{\sqrt{3}}$ sq.cm
C) $\frac{25\sqrt{3}}{4}$ sq.cm D) $25\sqrt{3}$ sq.cm

169. If area of an equilateral triangle is a and height b, then value of $\frac{b^2}{a}$ is:
A) 3 B) $\frac{1}{3}$
C) $\sqrt{3}$ D) $\frac{1}{\sqrt{3}}$

170. ABC is an isosceles right angled triangle with $\angle B = 90°$. On the sides AC and AB, two equilateral triangles ACD and ABE have been constructed. The ratio of area of ΔABE and ΔACD is
A) 1 : 3 B) 2 : 3
C) 1 : 2 D) $1 : \sqrt{2}$

171. Two triangles ABC and DEF are similar to each other in which AB = 10 cm, DE = 8 cm. Then the ratio of the area of triangles ABC and DEF is
A) 4 : 5 B) 25 : 16
C) 64 : 125 D) 4 : 7

172. If ΔABC is similar to ΔDEF such that BC = 3cm, EF = 4cm and area of $\Delta ABC = 54\ cm^2$ then the area of ΔDEF is:
A) 66 cm^2 B) 78 cm^2
C) 96 cm^2 D) 54 cm^2

173. The area of two similar triangles ABC and DEF are 20 and 45 respectively. If AB=5cm, then DE is equal to:
A) 6.5 cm B) 7.5 cm
C) 8.5 cm D) 5.5 cm

174. ABCD is a parallelogram, BC is produced to Q such that BC = CQ. Then
A) area (Δ BCP) = area (Δ DPQ)
B) area (Δ BCP) > area (Δ DPQ)
C) area (Δ BCP) < area (Δ DPQ)
D) area (Δ BCP) + area (Δ DPQ) = area (Δ BCD)

175. The ratio of the length of the parallel sides of a trapezium is 3 : 2. The shortest distance between them is 15 cm. If the area of the trapezium is 450, the sum of the length of the parallel sides is
A) 15 cm B) 36 cm
C) 42 cm D) 60 cm

176. C_1 and C_2 are two concentric circles with centre at O. Their radii are 12 cm and 3cm, respectively. B and C are the point of contact of two tangents drawn to C_2 from a point A lying on the circle C_1. Then the area of the quadrilateral ABOC is
A) $\frac{9\sqrt{15}}{2}$ sq.cm.
B) $12\sqrt{15}$ sq. cm
C) $9\sqrt{15}$ sq. cm
D) $6\sqrt{15}$ sq. cm

177. From a point P which is at a distance of 13 cm from centre O of a circle of radius 5 cm, in the same plane, a pair of tangents PQ and PR are drawn to the circle. Area of quadrilateral PQOR is
A) 65 cm^2 B) 60 cm^2
C) 30 cm^2 D) 90 cm^2

178. In Δ ABC, O is the centroid and AD, BE, CF are three medians and the area of Δ AOE = 15 cm^2 then area of quadrilateral BDOF is
A) 20 cm^2 B) 30 cm^2
C) 40 cm^2 D) 25 cm^2

179. A straight line parallel to the base BC of the triangle ABC intersects AB and AC at the points D and E respectively. If the area of the ΔABE be 36 sq.cm, then the area of the ΔACD is
A) 18 sq. cm. B) 36 sq. cm.
C) 18 cm. D) 36 cm.

180. If in a ΔABC, the medians CD and BE intersect each other at O, then the ratio of the areas of ΔODE and ΔABC is
A) 1 : 6 B) 6 : 1
C) 1 : 12 D) 12 : 1

181. Three circles of radii 4 cm, 6 cm and 8 cm touch each other pairwise externally. The area of the triangle formed, by the line-segments joining the centres of the three circles is
A) $144\sqrt{3}$ sq.cm
B) $12\sqrt{105}$ sq.cm
C) $6\sqrt{6}$ sq.cm
D) $24\sqrt{6}$ sq.cm

182. Two circles with centre A and B and radius 2 units touch each other externally at 'C'. A third circle with centre 'C' and radius '2' units meets other two at D and E. Then the area of the quadrilateral ABDE is
A) $2\sqrt{2}$ sq.units
B) $3\sqrt{3}$ sq.units
C) $3\sqrt{2}$ sq.units
D) $2\sqrt{3}$ sq.units

183. ABC is a right angled triangle B being the right angle. Mid-points of BC and AC are respectively B' and A'. The ratio of the area of the quadrilateral AA' B'B to the area to the triangle ABC is
A) 1 : 2
B) 2 : 3
C) 3 : 4
D) None of the above

184. Two triangles ABC and PQR are congruent. If the area of ΔABC is 60 sq. cm, then area of ΔPQR will be
A) 60 sq. cm B) 30 sq. cm
C) 15 sq. cm D) 120 sq. cm

185. In ΔPQR, the line drawn from the vertex P intersects QR at a point S. If QR = 4.5 cm and SR=1.5 cm then the ratios of the area of triangle PQS and triangle PSR is
A) 4 : 1 B) 3 : 1
C) 3 : 2 D) 2 : 1

186. The difference between the radii of the bigger circle and smaller circle is 14 cm and the difference between their areas is $1056\ cm^2$. Radius of the smaller circle is
A) 7 cm B) 5cm
D) 9 cm D) 3 cm

187. ABCD is parallelogram. P and Q are the mid points of sides BC and CD respectively. If the area of ΔABC is $12cm^2$, then the area of ΔAPQ is
A) 12 B) 8
C) 9 D) 10

188. ABC is a right angled triangle. B being the right angle. Mid-points of BC and AC are respectively B' and A'. Area of $\Delta A'B'C'$ is
A) $\frac{1}{2}\times$ area of ABC
B) $\frac{2}{3}\times$ area of ABC
C) $\frac{1}{4}\times$ area of ABC
D) $\frac{1}{8}\times$ area of ABC

189. A wire of length 44 cm is first bent to form a circle and then rebent to form a square. The difference of the two enclosed areas is
A) $44\ cm^2$ B) $33\ cm^2$
C) $55\ cm^2$ D) $66\ cm^2$

190. A parallelogram has sides 60 m and 40 m and one of its diagonals is 80m long. Its area is
A) $500\sqrt{15}\ m^2$
B) $600\sqrt{15}\ m^2$
C) $400\sqrt{15}\ m^2$
D) $450\sqrt{15}\ m^2$

191. $\angle ACB$ is an angle in the semicircle of diameter AB=5 and AC : BC = 3 :4. The area of the triangle ABC is
A) $6\sqrt{2}$ sq.cm B) 4 sq. cm
C) 12 sq. cm. D) 6 sq. cm.

192. If the lengths of the sides AB, BC and CA of a triangle ABC are 10 cm, 8 cm and 6 cm respectively and if M is the mid-point of BC and MN || AB to cut AC at N, then the area of the trapezium ABMN is equal to
A) 18 sq. cm. B) 20 sq. cm
C) 12 sq. cm. D) 16 sq. cm.

193. ABCD is a trapezium with AD and BC parallel sides. E is a point on BC. The ratio of the area of ABCD to that of AED is
A) $\frac{\overline{AD}}{\overline{BC}}$ B) $\frac{\overline{BE}}{\overline{EC}}$
C) $\frac{\overline{Ad}+\overline{BE}}{\overline{AD}+\overline{CE}}$ D) $\frac{\overline{AD}+\overline{BC}}{\overline{AD}}$

194. In an equilateral triangle of side 24 cm, a circle is inscribed touching its sides. The area of the remaining portion of the triangle is $\left(\sqrt{3}=1.732\right)$
A) 98.55 sq cm B) 100 sq cm
C) 101 sq cm D) 95 sq cm

195. Perimeter of a rhombus is 2p unit and sum of length of diagonals is m unit, then area of the rhombus is
A) $\frac{1}{4}m^2p$ sq.unit
B) $\frac{1}{4}mp^2$ sq.unit
C) $\frac{1}{4}\left(m^2-p^2\right)$ sq.unit
D) $\frac{1}{4}\left(p^2-m^2\right)$ sq.unit

196. Two sides of a plot measuring 32m and 24m and the angle between them is a perfect right angle. The other two sides measure 25 m each and the other three angles are not right angles. The area of the plot in m^2 is
A) 768 B) 534
C) 696.5 D) 684

197. a and b are two sides adjacent to the right angle of a right angled triangle and p is the perpendicular drawn to the hypotenuse from the opposite vertex, Then p^2 is equal to
A) a^2+b^2 B) $\frac{a^2\times b^2}{a^2+b^2}$
C) $\frac{1}{a^2}+\frac{1}{b^2}$ D) a^2-b^2

198. A is the centre of circle whose radius is 8 and B is the centre of a circle whose diameter is 8. If these two circles touch externally, then the area of the circle with diameter AB is
A) 36π B) 64π
C) 144π D) 256π

199. The length of a rectangle is increased by 10% and breadth decreased by 10%. The area of the new rectangle is
A) neither increased nor decreased
B) increased by 1%
C) decreased by 2%
D) decreased by 1%

200. If the numerical values of the height and the area of an equilateral triangle be same, then the length of each side of the triangle is
A) 2 units B) 4 units
C) 5 units D) 8 units

201. If the length of a side of the square is equal to that of the diameter of a circle, then the ratio of the area of the square and that of the circle is $\left(\pi=\frac{22}{7}\right)$
A) 14 : 11 B) 7 : 11
C) 11 : 14 D) 11 : 7

202. The median of an equilateral triangle is $6\sqrt{3}$ cm. The area (in cm^2) of the triangle is
A) 72 B) 108
C) $72\sqrt{3}$ D) $36\sqrt{3}$

203. If the numerical value of the circumference and area of a circle is same, then the area is
A) 6π sq.unit B) 4π sq.unit
C) 8π sq.unit D) 12π sq.unit

204. The area of an equilateral triangle is 48 sq. cm. The length of the side is
A) $8\sqrt[4]{3}$ cm B) $4\sqrt{3}$ cm
C) 8 cm D) 16 cm

205. Area of regular hexagon with side 'a' is

A) $\frac{3\sqrt{3}}{4}a^2$ sq.unit

B) $\frac{12}{2\sqrt{3}}a^2$ sq.unit

C) $\frac{9}{2\sqrt{3}}a^2$ sq.unit

D) $\frac{6}{\sqrt{2}}a^2$ sq.unit

206. The external fencing of a circular path around a circular plot of land is 33 m more than its interior fencing. The width of the path around the plot is
A) 5.52m B) 5.25m
C) 2.55 m D) 2.25 m

207. In ΔABC, D and E are two points on the sides AB and AC respectively so that DE || BC and $\frac{AD}{BD}=\frac{2}{3}$, then

$\frac{\text{the area of trapezium DECB}}{\text{the area of } \Delta ABC}$ is equal to

A) $\frac{5}{9}$ B) $\frac{21}{25}$

c) $1\frac{4}{5}$ D) $5\frac{1}{4}$

208. The sides of a rhombus are 10 cm each and a diagonal measures 16 cm. Area of the rhombus is
A) 96 sq. cm B) 160 sq. cm
C) 100 sq. cm D) 40 sq. cm

209. The perimeter of a triangle is 54 m and its sides are in the ratio fo 5 : 6: 7. The area of the triangle is
A) $18m^2$ B) $54\sqrt{6}\ m^2$
C) $27\sqrt{2}\ m^2$ D) $25\ m^2$

210. The lengths of two parallel sides of a trapezium are 6 cm and 8 cm. If the height of the trapezium be 4 cm, then its area is
A) 28 cm B) 28 sq. cm
C) 30 sq. cm D) 30 cm

211. If a and b are the lengths of the sides of a right triangle whose hypotenuse is 10 and whose area is 20, then the value of $(a+b)^2$ is
A) 140 B) 180
C) 120 D) 160

212. A wire is bent into the form of a circle, whose area is 154 cm^2. If the same wire is bent into the form of an equilateral triangle, the approximate area of the equilateral triangle is
A) 93.14 cm^2 B) 90.14 cm^2
C) 83.14 cm^2 D) 39.14 cm^2

213. If the ratio of the altitudes of two triangles be 3 : 4 and the ratio of their corresponding areas be 4 : 3, then the ratio of their corresponding lengths of bases is
A) 1 : 1 B) 16 : 9
C) 1 : 2 D) 2 : 1

214. Let A be the area of a square whose each side is 10 cm. Let B be the area of a square whose diagonals are 14 cm each. Then (A-B) is equal to
A) 0 B) 1
C) 2 D) 4

215. Two sides of a parallelogram are 20 cm and 25 cm. If the altitude corresponding to the side of length 25 cm is 10 cm, then the altitude corresponding to the other pair of sides is
A) 10.5 cmB) 12 cm
C) 12.5 cm D) 10 cm

216. If the sides of an equilateral triangle be increased by 1 m its area is increased by $\sqrt{3}$ sq. metre. The length of any of its sides is
A) 2 metre B) $\frac{5}{2}$metre
C) $\frac{3}{2}$metre D) $\sqrt{3}$metre

217. The in-radius of a triangle is 6 cm, and the sum of the lengths of its sides is 50 cm. The area of the triangle (in square cm.) is
A) 150 B) 50
C) 300 D) 56

218. One of the angles of a right angled triangle is 15°, and the hypotenuse is 1 metre. The area of the triangle (in square cm.) is
A) 1220 B) 1200
C) 1250 D) 1215

219. If for an isosceles triangle the length of each equal side is 'a' units and that of the third side is 'b' units, then its area will be
A) $\frac{a}{4}\sqrt{4b^2-a^2}$ square units
B) $\frac{a}{2}\sqrt{2a^2-b^2}$ square units
C) $\frac{b}{4}\sqrt{4a^2-b^2}$ square units
D) $\frac{b}{2}\sqrt{a^2-2b^2}$ square units

220. The outer and inner diameter of a circular path be 728 metre and 700 metre respectively. The breadth of the path is
A) 7 metre B) 28 metre
C) 14 metre D) 20 metre

221. The area of the parallelogram whose length is 30 cm, width is 20 cm and one diagonal is 40 cm is
A) 200 $\sqrt{15}$ cm^2
B) 100 $\sqrt{15}$ cm^2
C) 300 $\sqrt{15}$ cm^2
D) 150 $\sqrt{15}$ cm^2

222. On increasing each side of a square by 50%, the ratio of the area of new square formed and the given square will be
A) 9 : 5 B) 9 : 3.5
C) 9 : 7 D) 9 : 4

223. The area of a circle is 324π square cm. The length of its longest chord (in. cm.) is
A) 36 B) 28
C) 38 D) 32

224. The area of a rhombus is 256 square cm. and one of its diagonals is twice the other in length. Then length of its larger diagonal
A) 32 cm B) 16 cm
C) 48 cm D) 24 cm

225. If the side of a square is $\frac{1}{2}(x+1)$ units and its diagonal is $\frac{3-x}{\sqrt{2}}$ units, then the length of the side of the square would be
A) $\frac{4}{3}$ units B) $\frac{1}{2}$ units
C) 1 unit D) 2 units

226. The circumference of a triangle is 24 cm and the circumference of its in-circle is 44 cm. Then the area of the triangle is (taking $\pi=\frac{22}{7}$)
A) 56 square cm. B) 84 square cm.
C) 48 square cm. D) 68 square cm.

227. If the length of each of two equal sides of an isosceles triangle is 10 cm. and the adjacent angle is 45°, then the area of the triangle is

A) $20\sqrt{2}$ sq.cm

B) $12\sqrt{2}$ sq.cm

C) $25\sqrt{2}$ sq.cm

D) $15\sqrt{2}$ sq.cm

228. The length of the diagonal of a rectangle with sides 4 m and 3 m would be
A) 12 m B) 7 m
C) 5 m D) 14 m

229. In a right angled triangle ΔPQR, PR is the hypotenuse of length 20 cm, $\angle PRQ = 30°$, the area of the triangle is
A) $50\sqrt{3}$ cm^2 B) $100\sqrt{3}$ cm^2
C) $25\sqrt{3}$ cm^2 D) $\frac{100}{\sqrt{3}}$ cm^2

230. The perimeter of an equilateral triangle is equal to the circumference of a circle. The ratio of their areas is (Use $\pi = \frac{22}{7}$)
A) 22 : 21 B) 21 : 22
C) $21 : 22\sqrt{3}$ D) $22 : 21\sqrt{3}$

231. From any point inside an equilateral triangle, the lengths of perpendiculars on the sides are 'a' cm. 'b' cm 'c' cm. Its area (in cm^2) is

A) $\frac{\sqrt{2}}{3}(a+b+c)$

B) $\frac{\sqrt{3}}{3}(a+b+c)^2$

C) $\frac{\sqrt{3}}{3}(a+b+c)$

D) $\frac{\sqrt{2}}{3}(a+b+c)^2$

232. The areas of a circle and a square are same. The ratio of the side of the square to the radius of the circle is
A) $2\pi : 1$ B) $1 : \sqrt{\pi}$
C) $\sqrt{\pi} : 1$ D) $1 : \pi$

233. ABCD is a square inscribed in a circle of radius r. Then the total area (in square units) of the portions of the circle lying outside the square is
A) $\pi(r^2 - 4)$ B) $2\pi(r^2 - 1)$
C) $\pi^2 r(r - 7)$ D) $r^2(\pi - 2)$

234. The lengths of the two parallel sides of trapezium are 28 cm and 40 cm. If the length of each of its other two sides be 12 cm, then the area (in cm^2) of the trapezium is
A) $312\sqrt{5}$ B) $408\sqrt{3}$
C) $204\sqrt{3}$ D) $504\sqrt{3}$

235. The perimeter of a sheet of paper in the shape of a quadrant of a circle is 75 cm. Its area would be $\left(\pi = \frac{22}{7}\right)$
A) 100 cm^2 B) 346.5 cm^2
C) 693 cm^2 D) 512.25 cm^2

236. The diagonal of a quadrilateral shaped field is 24m and the perpendiculars dropped on it from the remaining opposite vertices are 8m and 13m. The area of the field is
A) 252 m^2 B) 156 m^2
C) 96 m^2 D) 1152 m^2

237. Two isosceles triangles have equal vertical angles and their areas are in the ratio 9 : 16. Then the ratio of their corresponding height is
A) 4.5 : 8 B) 4 : 3
C) 8 : 4.5 D) 3 : 4

238. In ΔABC, a line through A cuts the side BC at D such that BD : DC = 4 : 5. If the area of $\Delta ABD = 60$ cm^2, then the area of ΔADC is
A) 90 cm^2 B) 50 cm^2
C) 60 cm^2 D) 75 cm^2

239. If the area of a circle is A. radius of the circle is r and circumference of it is C, then
A) $\frac{A}{r} = C$ B) rC=2A
C) $\frac{C}{A} = \frac{r}{2}$ D) $AC = \frac{r^2}{4}$

240. In a rhombus ABCD, $\angle A = 60°$ and AB = 12cm. Then the diagonal BD is
A) 10 cm B) $2\sqrt{3}$ cm
C) 6 cm D) 12 cm

241. If two medians BE and CF of a triangle ABC, intersect each other at G and if BG = CG, $\angle BGC = 60°$ and BC = 8 cm then area of the triangle ABC is
A) $96\sqrt{3}$ cm^2 B) $64\sqrt{3}$ cm^2
C) $48\sqrt{3}$ cm^2 D) 48 cm^2

242. Two circles touch each other externally. The sum of their areas is 130π sq. cm. and the distance between their centres is 14 cm. The radius of the smaller circle is
A) 2 cm B) 4 cm
C) 5 cm D) 3 cm

243. Let C_1 and C_2 be the inscribed and circumscribed circles of a triangle with sides 3cm. 4cm and 5cm then $\frac{\text{area of } C_1}{\text{area of } C_2}$ is
A) $\frac{9}{25}$ B) $\frac{4}{25}$
C) $\frac{9}{16}$ D) $\frac{16}{25}$

244. If the altitude of an equilateral triangle is $12\sqrt{3}$ cm, then its area would be:
A) 12 cm^2 B) $144\sqrt{3}$ cm^2
C) 72 cm^2 D) 36 cm^2

245. Given that: $\Delta ABC \sim \Delta PQR$, if $\frac{\text{area}(\Delta PQR)}{\text{area}(\Delta ABC)} = \frac{256}{441}$ and PR = 12 cm, then AC is equal to
A) 15.75 cm B) 16 cm
C) $12\sqrt{2}$ cm D) 15.5 cm

246. ABCD is a cyclic quadrilateral. Diagonals AC and BD meets at P. If $\angle APB = 110°$ and $\angle CBD = 30°$, then ADB measures
A) 55° B) 30°
C) 70° D) 80°

247. A circular swimming pool is surrounded by a concrete wall 4m wide. If the area of the concrete wall surrounding the pool is $\frac{11}{25}$ that of the pool, then the radius (in m) of the pool is
A) 8 B) 16
C) 30 D) 20

248. ΔABC is similar to ΔDEF. The ratio of their perimeters is 4 : 1. The ratio of their areas is
A) 4 : 1 B) 16 : 1
C) 8 : 1 D) $8\sqrt{2} : 1$

249. The amount of rice produced in a square field of side 50 m is 750 kg. The amount of rice produced in a similar square field of side 100 m will be
A) 2000 kg B) 3000 kg
C) 3500 kg D) 1500 kg

250. The time required for a boy to travel along the external and internal boundaries of a circular path are in the ratio 20 : 19. If the width of the path be 5 metres, the internal diameter is:
A) 195 metres
B) 192 metres
C) 180 metres
D) 190 metres

251. In triangle ABC, DE || BC where D is a point on AC, DE divides the area of ΔABC into two equal parts. Then DB : AB is equal to

A) $\sqrt{2}:\left(\sqrt{2}+1\right)$

B) $\sqrt{2}:\left(\sqrt{2}-1\right)$

C) $\left(\sqrt{2}-1\right):\sqrt{2}$

D) $\left(\sqrt{2}+1\right):\sqrt{2}$

252. The centroid of a ΔABC is G. The area of ΔABC is 60 cm^2. The area of ΔGBC is

A) 10 cm^2 B) 30 cm^2
C) 40 cm^2 D) 20 cm^2

253. In trapezium ABCD, AB || CD and AB = 2CD, its diagonals intersect at O. If the area of $\Delta AOB = 84\ cm^2$, then the area of a ΔCOD is equal to

A) 72 cm^2 B) 21 cm^2
C) 42 cm^2 D) 26 cm^2

254. Given that the ratio of altitudes of two triangles is 4 : 5, ratio of their areas is 3 : 2. The ratio of their corresponding bases is

A) 8 : 15 B) 15 : 8
C) 5 : 8 D) 8 : 5

255. The area of an isosceles trapezium is 176 cm^2 and the height is $\frac{2}{11}$th of ratio of the length of the parallel sides is 4 : 7, then the length of a diagonal (in cm) is

A) 28 B) $\sqrt{137}$
C) $2\sqrt{137}$ D) 24

256. The area of a circle whose radius is the diagonal of a square whose area is 4 sq. units is:

A) 16π sq. units

B) 4π sq. units

C) 6π sq. units

D) 8π sq. units

257. A rectangular carpet has an area of 120 m^2 and a perimeter of a 46 metre. The length of its diagonal is:

A) 23 metre B) 13 metre
C) 17 metre D) 21 metre

258. A plate on square base made of brass is of length x cm and width 1 mm. The plate weighs 4725 gm. If 1 cubic cm of brass weighs 8.4 gram, then the value of x is:

A) 75 B) 76
C) 72 D) 74

259. The length of two parallel sides of a trapezium are 15 cm and 20 cm. If its area is 175 sq. cm, then its height is:

A) 15 cm B) 10 cm
C) 20 cm D) 25 cm

260. ABCD is a square. Draw a triangle QBC on side BC considering BC as base and draw a triangle PAC on AC as its base such that

$\Delta QBC \sim \Delta PAC$. Then

$\frac{\text{Area of } \Delta QBC}{\text{Area of } \Delta PAC}$ is equal to

A) $\frac{1}{2}$ B) $\frac{2}{1}$

C) $\frac{1}{3}$ D) $\frac{2}{3}$

261. The hypotenuse of a right-angled triangle is 39 cm and the difference of other two sides is 21 cm. Then, the area of the triangle is

A) 270 sq. cm B) 450 sq. cm
C) 540 sq. cm D) 180 sq. cm

TYPE-II

1. The perimeter of two squares are 24 cm and 32 cm. The perimeter (in cm) of a third square equal in area to the sum of the areas of these squares is:

A) 45 B) 40
C) 32 D) 48

2. The perimeter of two squares are 40 cm and 32 cm. The perimeter of a third square whose area is the difference of the area of the two squares is

A) 24 cm B) 42 cm
C) 40 cm D) 20 cm

3. If the ratio of areas of two squares is 225 : 256, then the ratio of their perimeter is:

A) 225 : 256 B) 256 : 225
C) 15 : 16 D) 16 : 15

4. The perimeter of two squares are 40 cm and 24 cm. The perimeter of a third square, whose area is equal to the difference of the area of these squares, is

A) 34 cm B) 32 cm
C) 38 cm D) 30 cm

5. The length and breadth of a rectangular field are in the ratio of 3 : 2. If the perimeter of the field is 80 m, its breadth (in metres) is:

A) 18 B) 16
C) 10 D) 24

6. The sides of a rectangular plot are in the ratio 5 : 4 and its area is equal to 500sq. m. The perimeter of the plot is:

A) 80m B) 100m
C) 90m D) 95 m.

7. The perimeter of the top of a rectangular table is 28m., whereas its area is 48 m^2. What is the length of its diagonal?

A) 5m. B) 10m.
C) 12m. D) 12.5m.

8. If the length and the perimeter of a rectangle are in the ratio 5 : 16, then its length and breadth will be in the ratio

A) 5 : 11 B) 5 : 8
C) 5 : 4 D) 5 : 3

9. The length and perimeter of a rectangle are in the ratio 5:18. Then length and breadth will be in the ratio

A) 4 : 3 B) 3 : 5
C) 5 : 4 D) 4 : 7

10. If the area of a rectangle be $\left(x^2+7x+10\right)$ sq. cm, then one of the possible perimeter of it is

A) $(4x+14)$ cm

B) $(2x+14)$ cm

C) $(x+14)$ cm

D) $(2x+7)$ cm

11. The perimeter of a rectangular plot is 48m and area is 108 m^2. The dimensions of the plot are

A) 36m and 3m
B) 12 m and 9m
C) 27m and 4m
D) 18 m and 6m

12. The sides of a triangle are in the ratio $\frac{1}{2}:\frac{1}{3}:\frac{1}{4}$. If the perimeter of the triangle is 52cm, the length of the smallest side is:

A) 24cm B) 10 cm
C) 12cm D) 9cm

13. The area of an equilateral triangle is $400\sqrt{3}$ sq.m. Its perimeter is:

A) 120m B) 150m
C) 90m D) 135m

SHORT ANSWERS

Type – I

1.(B)	2.(C)	3.(D)	4.(C)
5.(B)	6.(C)	7.(C)	8.(B)
9.(B)	10.(D)	11.(A)	12.(A)
13.(A)	14.(A)	15.(B)	16.(D)
17.(D)	18.(C)	19.(D)	20.(A)
21.(B)	22.(B)	23.(C)	24.(A)
25.(C)	26.(A)	27.(A)	28.(D)
29.(C)	30.(D)	31.(B)	32.(C)
33.(C)	34.(C)	35.(B)	36.(C)
37.(C)	38.(C)	39.(C)	40.(B)
41.(D)	42.(C)	43.(A)	44.(C)
45.(D)	46.(D)	47.(B)	48.(A)
49.(D)	50.(C)	51.(A)	52.(C)
53.(C)	54.(B)	55.(B)	56.(A)
57.(C)	58.(C)	59.(B)	60.(C)
61.(C)	62.(D)	63.(D)	64.(B)
65.(A)	66.(B)	67.(C)	68.(C)
69.(A)	70.(C)	71.(B)	72.(B)
73.(D)	74.(D)	75.(D)	76.(C)
77.(D)	78.(C)	79.(D)	80.(A)
81.(A)	82.(C)	83.(C)	84.(B)
85.(D)	86.(C)	87.(B)	88.(B)
89.(A)	90.(B)	91.(B)	92.(B)
93.(A)	94.(B)	95.(C)	96.(A)
97.(A)	98.(A)	99.(D)	100.(B)
101.(A)	102.(D)	103.(A)	104.(A)
105.(C)	106.(A)	107.(D)	108.(D)
109.(C)	110.(A)	111.(B)	112.(A)
113.(A)	114.(B)	115.(B)	116.(C)
117.(C)	118.(D)	119.(B)	120.(C)
121.(B)	122.(A)	123.(B)	124.(D)
125.(C)	126.(C)	127.(C)	128.(B)
129.(B)	130.(D)	131.(B)	132.(A)
133.(B)	134.(B)	135.(D)	136.(C)
137.(C)	138.(D)	139.(B)	140.(A)
141.(C)	142.(B)	143.(D)	144.(C)
145.(B)	146.(C)	147.(B)	148.(C)
149.(D)	150.(D)	151.(A)	152.(B)
153.(B)	154.(C)	155.(D)	156.(B)
157.(B)	158.(A)	159.(B)	160.(B)
161.(D)	162.(C)	163.(D)	164.(D)
165.(A)	166.(A)	167.(C)	168.(C)
169.(C)	170.(C)	171.(B)	172.(C)
173.(B)	174.(A)	175.(D)	176.(C)
177.(B)	178.(B)	179.(B)	180.(C)
181.(D)	182.(B)	183.(C)	184.(A)
185.(D)	186.(B)	187.(C)	188.(A)
189.(B)	190.(B)	191.(D)	192.(A)
193.(D)	194.(A)	195.(C)	196.(D)
197.(B)	198.(A)	199.(D)	200.(A)
201.(A)	202.(D)	203.(B)	204.(A)
205.(C)	206.(B)	207.(B)	208.(A)
209.(B)	210.(A)	211.(B)	212.(A)
213.(B)	214.(C)	215.(C)	216.(C)
217.(A)	218.(C)	219.(C)	220.(C)
221.(D)	222.(D)	223.(A)	224.(A)
225.(C)	226.(B)	227.(C)	228.(C)
229.(A)	230.(D)	231.(B)	232.(C)
233.(D)	234.(C)	235.(B)	236.(A)
237.(D)	238.(D)	239.(B)	240.(D)
241.(C)	242.(D)	243.(B)	244.(B)
245.(A)	246.(B)	247.(D)	248.(B)
249.(B)	250.(D)	251.(C)	252.(D)
253(B)	254.(B)	255.(C)	256.(D)
257.(C)	258.(A)	259.(B)	260.(A)
261.(A)			

Type – II

1.(B)	2.(A)	3.(C)	4.(B)
5.(B)	6.(C)	7.(B)	8.(D)
9.(C)	10.(A)	11.(D)	12.(C)
13.(A)	14.(C)	15.(C)	16.(D)
17.(C)	18.(A)	19.(C)	20.(C)
21.(A)	22.(A)	23.(C)	24.(A)
25.(D)	26.(A)	27.(D)	28.(C)
29.(A)	30.(B)	31.(A)	32.(B)
33.(C)	34.(B)	35.(B)	36.(A)
37.(A)	38.(A)	39.(B)	40.(D)
41.(A)	42.(B)	43.(B)	44.(C)
45.(A)	46.(B)	47.(B)	48.(B)
49.(C)	50.(B)	51.(A)	52.(B)
53.(A)	54.(D)	55.(A)	56.(B)
57.(C)	58.(C)	59.(C)	60.(B)
61.(C)	62.(B)	63.(D)	64.(A)
65.(C)	66.(D)	67.(B)	68.(A)

Solutions

TYPE – I

1. (B) Area of square
$= (\text{side})^2 = \frac{(\text{diagonal})^2}{2}$
$= \frac{(5.2)^2}{2} = \frac{27.04}{2}$
$= 13.52$ sq.cm

2. (C) Area $= \frac{(\text{diagonal})^2}{2} = \frac{a^2}{2}$

3. (D) Area $= \frac{(\text{diagonal})^2}{2}$
$\Rightarrow 2 \times \frac{1}{2}(4\sqrt{2})^2 = \frac{d^2}{2}$
$\Rightarrow d^2 = 2(4\sqrt{2})^2$
$\Rightarrow d = 4\sqrt{2} \times \sqrt{2} = 8$ cm

4. (C) $2 \times \frac{(a+b)^2}{2} = \frac{d^2}{2}$
$\Rightarrow d^2 = 2(a+b)^2$
$\Rightarrow d = \sqrt{2}(a+b)$

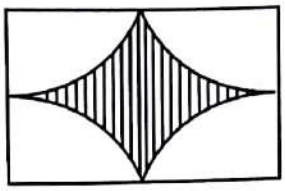
5. (B) Let the Length of small segment = a
Length of large segment = a + 2
$(a+2)^2 - a^2 = 32$
$(a+2+a)(a+2-a) = 32$
$4(a+1) = 32$
$\Rightarrow (a+1) = 8$
$\Rightarrow a = 7$
$\therefore$ Large segment a + 2 = 7 + 2 = 9

6. (C) $d_1 : d_2 = 2 : 5$
$d_1^2 : d_2^2 = 4 : 25$
Area 1 : Area 2 $= \frac{d_1^2}{2} : \frac{d_2^2}{2}$
$= d_1^2 : d_2^2$
$= 4 : 25$

7. (C) Perimeter of square = 4a
Area $a^2 = \left(\frac{P}{4}\right)^2$
Sum of areas
$= \left(\frac{24}{4}\right)^2 + \left(\frac{32}{4}\right)^2 + \left(\frac{40}{4}\right)^2 + \left(\frac{76}{4}\right)^2 + \left(\frac{80}{4}\right)^2$
$= 6^2 + 8^2 + 10^2 + 19^2 + 20^2$
$= 36 + 64 + 100 + 361 + 400$
$= 961$
$\therefore$ side of square
$= \sqrt{961} = 31$ cm
$\therefore$ Perimeter
$= 4 \times 31 = 124$ cm

8. (B) diagonal $D = \sqrt{2}a$
$A : D = a^2 : (\sqrt{2}a)^2$
$= a^2 : 2a^2$
$= 1 : 2$

9. (B)



Area of square $= 4^2 = 16$
Area of arcs $= 4 \times \frac{90}{360} \times \pi(2)^2$
$= 4 \times \frac{1}{4} \times \pi(4)$
$\therefore$ Remaining portion $= 16 - 4\pi$

10. (D) Area $= \frac{d^2}{2}$
$= \frac{(15\sqrt{2})^2}{2} = 225$ sq cm

11. (A) Paper used = Area of square + Area of triangle
$= \frac{(32)^2}{2} + \frac{\sqrt{3}}{4}(8)^2$
$= 512 + 16\,(1.732)$
$= 539.712$ sq.cm

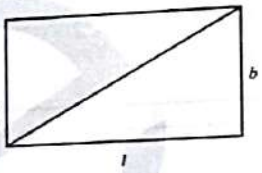
12. (A) $b = \frac{3}{4}l$
$l \times b = 768$
$l \times \frac{3}{4}l = 768$
$\Rightarrow l^2 = 468 \times \frac{4}{3} = 1024$
$\Rightarrow l = 32$
Difference between length and breadth
$= l - \frac{3l}{4} = \frac{l}{4} = \frac{32}{4} = 8$ m

13. (A) $l = 5b$
Area $= 5b(b) = 245 \times 2$
$\Rightarrow b^2 = 98$
$\Rightarrow b = 7\sqrt{2}$
$\therefore$ length $= 5 \times 7\sqrt{2}$
$= 35\sqrt{2}$ metres

14. (A) Area of square garden
= Area of rectangular garden
$= 12 \times 5 = 60\,m^2$
$a^2 = 60$
$a = \sqrt{60}$
Diagonal
$\sqrt{2}a = \sqrt{120} = 2\sqrt{30}$ m

15. (B) Diameter of wire = 42
$\Rightarrow$ Radius = 21 Length $\rightarrow 6x$
Breadth $\rightarrow 5x$
Circumference of circle = perimeter of rectangle
$2\frac{22}{7} \times 21 = 2(6x + 5x)$
$2 \times \frac{22}{7} \times 21 = 2 \times 11x$
$\Rightarrow x = 6$
Area = lb = $6x \times 5x$
$= 30(6)^2 = 30 \times 36 = 1080$ cm^2

16. (D)



A $\rightarrow$ Walking diagonally
$= \sqrt{l^2 + b^2}$
52m $\rightarrow$ 60 sec
$\Rightarrow 15\,\text{sec} = \frac{52}{4} = 13$ m
$\Rightarrow \sqrt{l^2 + b^2} = 13$
$\Rightarrow l^2 + b^2 = 169$
B $\rightarrow$ Walking along sides
$= l + b$
68m $\rightarrow$ 60 sec
$\Rightarrow$ In 15 sec $= \frac{68}{4} = 17$ m
$\Rightarrow l + b = 17$ m
$(l + b)^2 = l^2 + b^2 + 2lb$
$(17)^2 = 169 + 2lb$
$\frac{289 - 169}{2} = lb$
$\therefore$ Area $= lb = 60$ m^2

17. (D) Perimeter $= 2(l + b) = 206$
$\Rightarrow l + b = 103$
Given $l - b = 23$
$\Rightarrow l = 63$ and $b = 40$
$\therefore$ Area $= lb = 63 \times 40 = 2520$ m^2

18. (C) Area of circular field = Area of rectangular tank + Area of land portion
$\pi r^2 = 180 \times 120 + 40000$
$r^2 = \frac{7}{22}(21600 + 40,000)$

$r^2 = \frac{7}{22} \times 61,600$

$r^2 = (140)^2$

$\Rightarrow r = 140$ m

19. (D) $l(l-5) = 750$

$l^2 - 5l - 750 = 0$

$l^2 - 30l + 25l - 750 = 0$

$l(l-30) + 25(l-30) = 0$

$\Rightarrow l = 30$ or -25

(l can't be -ve)

$\therefore$ Length of the hall = 30 m

20. (A) $l : b = 3 : 2$

$l + b = 5$ parts

$2(l + b) = 20$

10 parts = 20

$\Rightarrow$ 1 part = 2

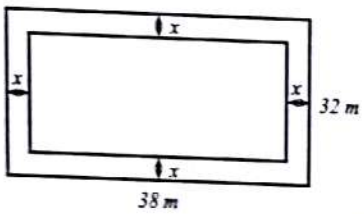
$\therefore l = 3 \times 2 = 6$

$b = 2 \times 2 = 4$

Area of rectangle

$= lb = 6 \times 4 = 24$ cm^2

21. (B)



$2(38x + x(32 - 2x)) = 600$

$38x + 32x - 2x^2 = 300$

$2x^2 - 70x + 300 = 0$

$x^2 - 35x + 150 = 0$

$x^2 - 30x - 5x + 150 = 0$

$x(x - 30) - 5(x - 30)$

$(x - 30)(x - 5) = 0$

$x \neq 30 \quad \therefore x = 5$m

22. (B) Let the area be 100%

Area = lb

$100 \xrightarrow[-20]{20\%\uparrow} 120 \xrightarrow[-30]{25\%\uparrow} 150$

$\therefore$ Increase in area

$= 150 - 100 = 50\%$

23. (C) $l = b + 20$

$\therefore$ Area $= (b + 20)b$

Length is decreased by 10

$\Rightarrow b + 20 - 10 = b + 10$

Breadth increased by 5

$= b + 5$

$\therefore (b + 20)b = (b + 10)(b + 5)$

$b^2 + 20b = b^2 + 15b + 50$

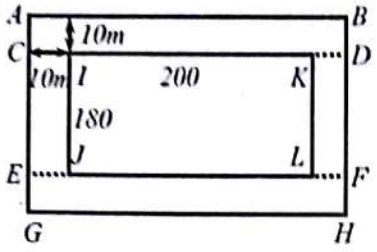
$5b = 50$

$\Rightarrow b = 10$

Area $= (b + 20)\, b = (10 + 20)\, 10 = 300$ m^2

24. (A) AB = 220 = GH

CE = 180 = DF



Area of path = Area of outer rectangle - Area of Inner rectangle

$= 220 \times 200 - 200 \times 180$

$= 200 \times 40 = 8000$ sq.mtrs

25. (C) Let the area be 100%

$100 \xrightarrow[+5]{5\%\uparrow} 105 \xrightarrow[-2.1]{2\%\downarrow} 102.9\%$

$\therefore$ Error $= 102.9 - 100 = 2.9\%$

26. (A) Breadth = 3x

Length = 4x

Area $= 4x \times 3x = 12x^2$

$12x^2 = \frac{1}{12} \times 10,000$

[1 Hectare = 10,000 m^2]

$x^2 = \left[\frac{100}{12}\right]^2$

$\Rightarrow x = \frac{100}{12}$

Breadth

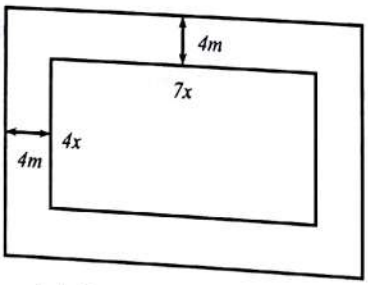
$= 3 \times \frac{100}{12} = 25$ metres

27. (A) Area of rectangle = 3 $\times$ area of square

$20 \times \frac{3}{2} a = 3a^2$

$\Rightarrow a = 10$ cm

28. (D)



Let length of rectangular field = 7x

Breadth = 4x

Area of outside path

$(7x + 8)(4x + 8) - 7x \times 4x$

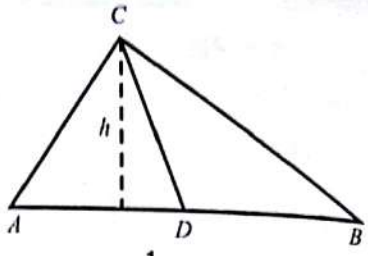
$2[28x + 32 + 16x] = 416$

$44x + 32 = 208$

$\Rightarrow x = 4$

Breadh = 4x = 16m

29. (C) Height of both the Δles ADC & ABC are same



$\frac{\Delta ADC}{\Delta ABC} = \frac{\frac{1}{2} \times DB \times h}{\frac{1}{2} \times AB \times h}$

$= \frac{DB}{AB} = \frac{3}{5}$

30. (D) Let base = 3x, corresponding altitude = 4x

Area $= \frac{1}{2} \times$ base $\times$ altitude

$\frac{1}{2} \times 3x \times 4x = 1176$

$6x^2 = 1176$

$\Rightarrow x^2 = 196$

$\Rightarrow x = 14$

$\therefore$ Altitude $= 4 \times 14 = 56$ cm

31. (B) $2A_1 = A_2$

$2 \times \frac{1}{2} \times 15 \times 12$

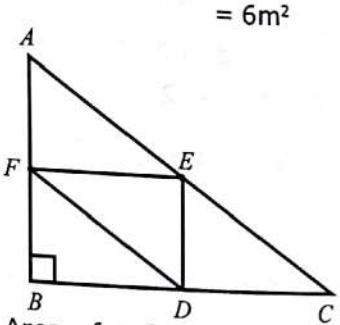
$= \frac{1}{2} \times 20 \times$ height

$\Rightarrow$ height = 18 cm

32. (C) ABC is right angled Δle

Area of Δle ABC $= \frac{1}{2} \times 3 \times 4$

$= 6$m^2



Area of Δ formed by joining midpoints $= \frac{1}{4}$ of area of ABC

Areaof

$\Delta DEF = \frac{1}{4} \times 6 = \frac{3}{2}$ cm^2

33. (C) ΔADE and ΔABC are similar as

$\angle A$ is common and

$\angle D = \angle B$ & $\angle E = \angle C$

(DE and BC are parallel & BA, CA are transversals)

$\therefore \frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC}$

$= \frac{AD^2}{AB^2} = \frac{(AB/2)^2}{AB^2} = \frac{1}{4}$

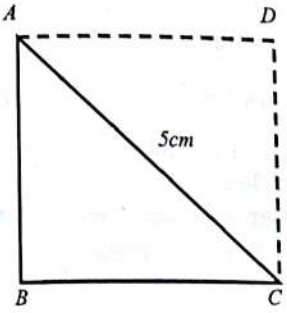
$\therefore$ Shaded portion $= \frac{3}{4} = 75\%$

34. (C) Area $= \frac{1}{2}$ base $\times$ height

$\frac{a}{b} = \frac{\frac{1}{2} \times x \times h_1}{\frac{1}{2} \times y \times h_2}$

$\Rightarrow h_1 : h_2 = ay : bx$

35. (B)

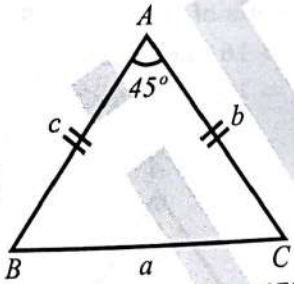


Area of $\Delta ABC = \frac{1}{2}$ of Area of ABCD

$= \frac{1}{2} \times \frac{\text{diagonal}^2}{2}$

$= \frac{1}{2} \times \frac{5^2}{2} = \frac{25}{4} = 6.25 \text{ cm}^2$

36. (C)



b = c = 10 cm $\quad \angle A = 45°$

Area $= \frac{1}{2}$ bc sin A

$= \frac{1}{2} \times 10 \times 10 \times \frac{1}{\sqrt{2}}$

$= 25\sqrt{2} \text{ cm}^2$

37. (C) Sum of lengths of prependicular from any point to sides of equilateral Δ = Height of the triangle

$6 + 8 + 10 = \frac{\sqrt{3}}{2} a$

$\Rightarrow a = \frac{48}{\sqrt{3}}$

Area of

$\Delta = \frac{\sqrt{3}}{4} a^2 = \frac{\sqrt{3}}{4} \times \frac{48}{\sqrt{3}} \times \frac{48}{\sqrt{3}}$

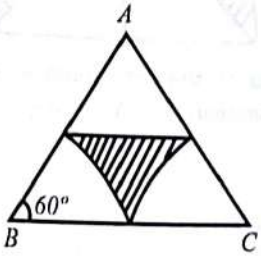
$= 192\sqrt{3} \text{ cm}^2$

38. (C) If the areas of the triangle are in the ratio 25 : 36 then their sides will be in the ratio

$\sqrt{25} : \sqrt{36} = 5 : 6$

39. (C) Angle of each arc $= 60° = \frac{\pi}{3}$

Area of shaded region



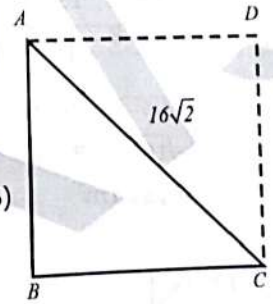
= Area of equilateral triangle - area of 3 arcs

$= \frac{\sqrt{3}}{4}(2)^2 - 3 \times \left(\frac{1}{2} \frac{\pi}{3} (1)^2\right)$

$= \frac{\sqrt{3}}{4} \times 4 - 3 \times \frac{\pi}{6}$

$= \left(\sqrt{3} - \frac{\pi}{2}\right) \text{cm}^2$

40. (B)



Area of $\Delta ABC = \frac{1}{2}$ Area of ABCD

$= \frac{1}{2} \times \frac{\text{diagonal}^2}{2}$

$= \frac{1}{2} \times \frac{(16\sqrt{2})^2}{2} = 128 \text{ cm}^2$

41. (D) Let the sides of Δ be are in ratio 2 : 3 : 4

9 parts = 18

$\Rightarrow$ 1 part = 2

$\therefore$ Sides are 4, 6, 8

$s = \frac{4+6+8}{2} = 9$

$\therefore$ area

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{9 \times 5 \times 3 \times 1} = 3\sqrt{15} \text{ cm}^2$

42. (C) $3a = \sqrt{3}\left(\frac{\sqrt{3}}{4} a^2\right)$

$12a = 3a^2$

$3(a^2 - 4a) = 0$

$\Rightarrow a = 4$ units

43. (A) Area of equilateral triangle $= \frac{\sqrt{3}}{4} a^2$

$= \frac{\sqrt{3}}{4} \times 36$

$= 9\sqrt{3} \text{ cm}^2$

44. (C) $\frac{1}{2} \times 8 \times h = \pi (8)^2$

$\Rightarrow h = 16\pi$

45. (D) Sides will be 3, 4, 5 with 3,4 as base & height and 5 as hypotensue

$\therefore$ Area $= \frac{1}{2} \times 3 \times 4 = 6 \text{ cm}^2$

46. (D) $\frac{\sqrt{3}}{4} a^2 = 4\sqrt{3}$

$\Rightarrow a^2 = 4 \times 4$

$\Rightarrow a = 4$ cm

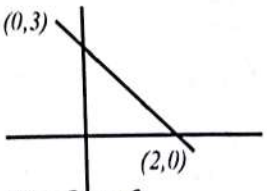
47. (B) Area of triangle $= \frac{4}{3} \times$ (Area of triangle with median as sides)

Area with sides 9, 12, 15 $\Rightarrow$ right angled $= \frac{1}{2} \times 9 \times 12 = 54$

$\therefore$ Area of triangle

$= \frac{4}{3} \times 54 = 72 \text{ cm}^2$

48. (A)



$3x + 2y = 6$

Intersecting x axis $\Rightarrow y = 0$

$3x + 2(0) = 6$

$\Rightarrow x = 2$, point is (2, 0)

Intersecting y axis $\Rightarrow x = 0$

$3(0) + 2y = 6$

$\Rightarrow y = 3$, point is (0, 3)

$\therefore$ Area $= \frac{1}{2} \times 2 \times 3$

$= 3$ square units

49. (D) Area of isosceles

$\Delta = \frac{b}{4}\sqrt{4a^2 - b^2}$

$a \rightarrow$ equal side

$b \rightarrow$ different side

$\therefore a = 3x \qquad b = 4x$

$18\sqrt{5} = \frac{4x}{4}\sqrt{4(3x)^2 - (4x)^2}$

$18\sqrt{5} = x\sqrt{36x^2 - 16x^2}$

$18\sqrt{5} = 2x^2\sqrt{5}$

$\Rightarrow x = 3$

$\therefore$ Third side $= 4x = 4 \times 3 = 12$ units

50. (C) Sides are 3x, 4x, 5x $\Rightarrow$ Right angled Δ

$\frac{1}{2} \times 3x \times 4x = 72$

$x^2 = 12 \qquad \Rightarrow x = 2\sqrt{3}$

Smallest side $= 3x = 6\sqrt{3}$ unit

51. (A) Let the length of each side $= a$

$\frac{\sqrt{3}}{4}\left((a+2)^2 - a^2\right) = 3 + \sqrt{3}$

$\frac{\sqrt{3}}{4}\left((2a+2)(2)\right) = 3 + \sqrt{3}$

$\sqrt{3}(a+1) = 3 + \sqrt{3}$

$a + 1 = \sqrt{3} + 1$

$\Rightarrow a = \sqrt{3}$ units

52. (C) $S = \frac{9+10+11}{2} = 15$

$\text{Area} = \sqrt{15 \times (15-9) \times (15-10) \times (15-11)}$

$= \sqrt{15 \times 6 \times 5 \times 4}$

$= 30\sqrt{2}$ cm^2

53. (C) Area of isoceles

$\Delta = \frac{b}{4}\sqrt{4a^2 - b^2}$

$a \rightarrow$ equal side

$b \rightarrow$ different side

$4 = \frac{2}{4}\sqrt{4a^2 - 4}$

$4 = \sqrt{a^2 - 1}$

$a^2 - 1 = 16$

$\Rightarrow a^2 = 17 \qquad \Rightarrow a = \sqrt{17}$

$\therefore$ Length of equal side $= \sqrt{17}$ units

54. (B) Sides 3x, 4x, 5x, $\Rightarrow$ right angled triangle

$\frac{1}{2} \times 3x \times 4x = 72$

$\Rightarrow x^2 = 12$

$\Rightarrow x = 2\sqrt{3}$

Perimeter $= 12x = 24\sqrt{3}$

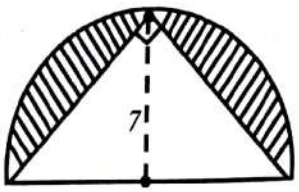
$\therefore \Rightarrow$ Perimeter of equilateral triangle $= 24\sqrt{3}$

$\Rightarrow$ side $= 8\sqrt{3}$

$\therefore$ Area $= \frac{\sqrt{3}}{4} \times 8\sqrt{3} \times 8\sqrt{3}$

$= 48\sqrt{3}$ square units

55. (B)



Area of shaded region = Area of semicircle − Area of Δ

$= \frac{\pi r^2}{2} - \frac{1}{2} \times 2r \times r$

$= \frac{\pi r^2}{2} - r^2$

$= r^2\left(\frac{\pi}{2} - 1\right)$

$= 49\left(\frac{11}{7} - 1\right)$

$= 28$ cm^2

56. (A) $a + b + c = 32$

$11 + b + c = 32$

$b + c = 21 \qquad \& \; b - c = 5$

$\Rightarrow b = 13 \; \& \; c = 8$

$\therefore$ sides are 11, 13, 8

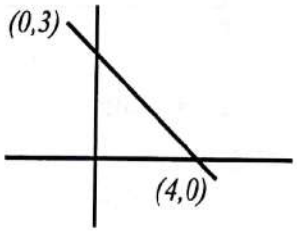
$S = \frac{11+13+8}{2} = 16$

$\text{Area} = \sqrt{16 \times (16-11) \times (16-13)(16-8)}$

$= \sqrt{16 \times 5 \times 3 \times 8}$

$= 8\sqrt{30}$ cm^2

57. (C)



Intersecting x axis $\Rightarrow y = 0$

$3x + 4(0) = 12 \Rightarrow x = 4$ (4,0)

Intersecting y axis $\Rightarrow x = 0$

$3(0) + 4y = 12 \Rightarrow y = 3$ (0, 3)

Area of triangle

$= \frac{1}{2} \times 4 \times 3 = 6$ square units

58. (C) Height $= \frac{\sqrt{3}}{2}a = 15$

$\Rightarrow a = 10\sqrt{3}$

Area $= \frac{\sqrt{3}}{4}a^2$

$= \frac{\sqrt{3}}{4} \times 10\sqrt{3} \times 10\sqrt{3}$

$= 75\sqrt{3}$ sq.cm

59. (B) $\frac{\sqrt{3}}{4}a^2 = 9\sqrt{3}$

$\Rightarrow a = 6$m

Length of median of equilateral triangle

$= \frac{\sqrt{3}}{2}a = 3\sqrt{3}$ m

60. (C) Side of triangle are 16, 12, 20

$\Rightarrow$ Right angled Δ

Area $= \frac{1}{2} \times 12 \times 16 = 96$ cm^2

61. (C) In similar triangles ratio of sides

Ratio of squares of sides = Ratio of areas

$\frac{(8)^2}{(\text{side})^2} = \frac{360}{250}$

$\frac{8}{\text{side}} = \frac{6}{5}$

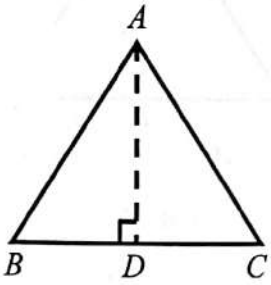
$\Rightarrow \text{side} = \frac{5 \times 8}{6} = \frac{20}{3} = 6\frac{2}{3}$ cm

62. (D) Side $= \frac{5}{6}$ base

Ratio of sides = 5 : 5 : 6

$\Rightarrow$ 16 parts = 544

$\Rightarrow$ 1 part = 34



Area of tiangle ABC = 2 × Area of ABD

AB = 5 × 34

BD = 3 × 34

so AD = 4 × 34 as ABD is right angled triangle

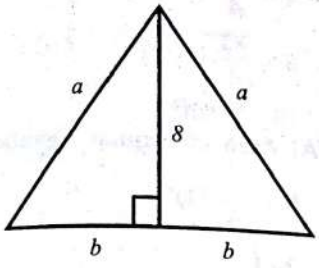
Area of triangle

$ABC = 2 \times \frac{1}{2} \times BD \times AD$

$= 3 \times 34 \times 4 \times 34$

$= 13872$ cm^2

63. (D)



Let the equal sides be a, a and different side be 2b

$a + a + 2b = 64$

$2a + 2b = 64$

$a + b = 32$

$a^2 = 64 + b^2$

$a^2 - b^2 = 64$

$(a + b)(a - b) = 64$

$32(a - b) = 64$

$\Rightarrow a - b = 2$

$a + b = 32$, $a - b = 2$

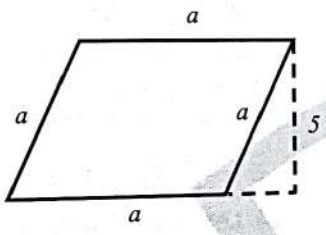
$\Rightarrow a = 17$ $b = 15$

Base $= 2b = 2 \times 15 = 30$

Altitude $= 8$

$\text{Area} = \frac{1}{2} \times 30 \times 8 = 120 \text{ cm}^2$

64. (B)



Perimeter $= 4a = 40$

$\Rightarrow a = 10$

Rhombus is also a parallelogram

$\therefore$ Area = base × height

$= 10 \times 5$

$= 50 \text{ m}^2$

65. (A) Parallel sides are 5x, 3x

Area of trapezium $= \frac{1}{2}$ (sum of parallel sides) perpendicular distance

$1440 = \frac{1}{2}(5x + 3x) \times 24$

$\Rightarrow 8x = 120$

$\Rightarrow x = 15$

length of longer parallel side $= 5x = 75$ m

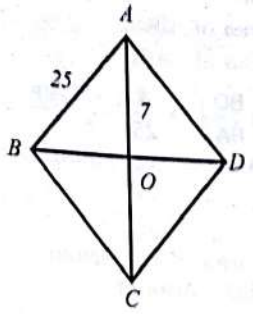
66. (B) Area of Rhombus

$= \frac{1}{2} \times d_1 \times d_2$

$150 = \frac{1}{2} \times 10 \times d_2$

$\Rightarrow d_2 = 30$ cm

67. (C)



Perimeter $4a = 100$

$\Rightarrow a = 25$

$d_1 = AC = 14$

$\therefore AO = 7$

$\therefore BO^2 = 25^2 - 7^2$

$= 24^2$

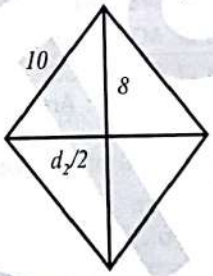
$\Rightarrow BO = 24$

$BD = 2 \times BO = 2 \times 24 = 48$

$\text{Area} = \frac{1}{2} d_1 d_2$

$= \frac{1}{2} \times 14 \times 48 = 336$

68. (C) $a = 10$ $d_1 = 16$



$\frac{d_2}{2} = \sqrt{100 - 64}$

$\frac{d_2}{2} = 6 \Rightarrow d_2 = 12$

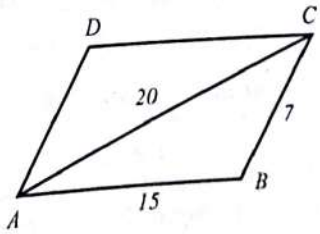
$\text{Area} = \frac{1}{2} \times 16 \times 12$

$= 96 \text{ cm}^2$

69. (A) $450 = \frac{1}{2} \times$ (sum of parallel sides) $\times 15$

$\Rightarrow$ sum of parallel sides $= 60$ cm

70. (C)



Area of parallelogram ABCD = 2 Area of ΔABC

Sides of ΔABC are 15, 7, 20

$S = \frac{15 + 7 + 20}{20} = 21$

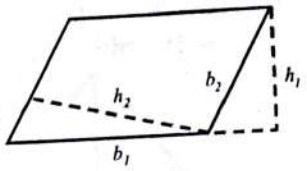
Area of

$\Delta = \sqrt{21 \times (21 - 15)(21 - 7)(21 - 20)}$

$= \sqrt{21 \times 6 \times 14 \times 1} = 42$

$\therefore$ Area of parallelogram ABCD $= 2 \times 42 = 84 \text{ cm}^2$

71. (B)



Area of parallelogram = base × height

$b_1 \times h_1 = b_2 \times h_2$

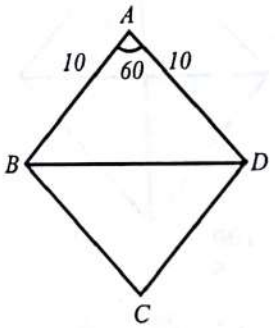
$\frac{b_1}{b_2} = \frac{h_2}{h_1}$

$\frac{5}{4} \times 20 = h_2$

$\Rightarrow$ Altitude of smaller side $= 25$ units

72. (B) Perimeter of Rhombus $4a = 40$

$\Rightarrow a = 10$



Area of Rhombus

$= 2 \Delta ABD$

$= 2 \times \frac{1}{2} \times 10 \times 10 \times \sin 60$

$= 100 \times \frac{\sqrt{3}}{2} = 50\sqrt{3} \text{ cm}^2$

73. (D) Let the parallel sides be 2x, 3x

$480 = \frac{1}{2}(2x + 3x)12$

$\Rightarrow 5x = 80 \Rightarrow x = 16$

Longer side $3x = 3 \times 16 = 48$ cm

74. (D) $l + b + h = 24$

diagonal $= \sqrt{l^2 + b^2 + h^2} = 15$

$\Rightarrow l^2 + b^2 + h^2 = 225$

$(l + b + h)^2 = l^2 + b^2 + h^2 + 2(lb + bh + hl)$

TSA of parallelopiped $= 2(lb + bh + hl)$

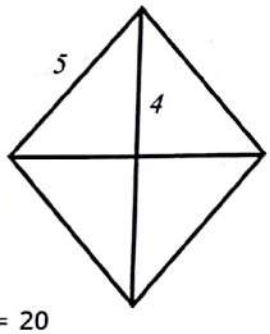
$\Rightarrow$ TSA $= (l + b + h)^2 - (l^2 + b^2 + h^2)$

$= (24)^2 - 225$

$= 576 - 225$

$= 351$ cm^2

75. (D)



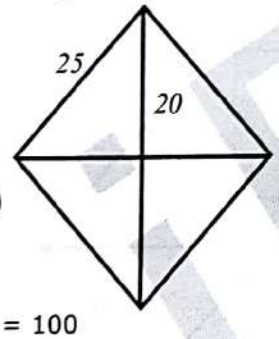
$4a = 20$

$\Rightarrow a = 5$

$\frac{d_2}{2} = \sqrt{5^2 - 4^2} \Rightarrow d_2 = 6$

Area $= \frac{1}{2} \times 6 \times 8 = 24$ cm^2

76. (C)



$4a = 100$

$\Rightarrow a = 25$

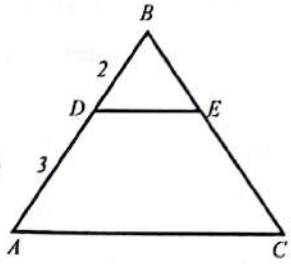
$\frac{d_2}{2} = \sqrt{25^2 - 20^2} = 15$

$\Rightarrow d_2 = 30$

Area

$= \frac{1}{2} \times 40 \times 30 = 600$ cm^2

77. (D)



$\frac{BD}{BA} = \frac{2}{5}$

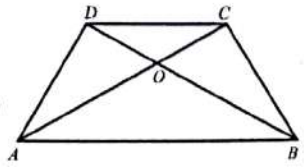
$\frac{\text{Area of } \Delta BDE}{\text{Area of } \Delta ABC} = \left(\frac{BD}{BA}\right)^2 = \frac{4}{25}$

$\therefore$ Area of trapezium $= 1 - \frac{4}{25} = \frac{21}{25}$

$\therefore$ Area of trapezium ACED : Area of $\Delta BED = \frac{21}{25} : \frac{4}{25}$

$= 21 : 4$

78. (C)



ΔAOB and Δ COD are similar

$\angle AOB = \angle COD \Rightarrow$ vertically opposite angles

$\angle OAB = \angle OCD$

$\angle OBA = \angle OCD$

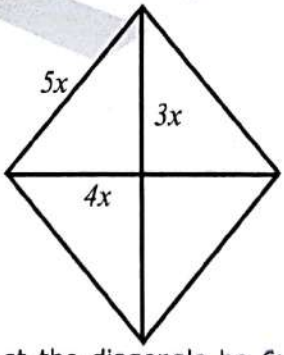
(AB & CD are parallel & AC, BD are transversal)

$\frac{\text{Area of AOB}}{\text{Area of COD}} = \frac{AB^2}{CD^2} = \frac{4}{1}$

$\therefore$ Area of AOB : Area of CDO $= 4 : 1$

79. (D) Diagonal of square $= 40\sqrt{2}$ cm

$\Rightarrow$ side of square = side of rhombus = 40 cm



Let the diagonals be 6x, 8x

$\therefore a = 5x \Rightarrow 40$

$= 5x \Rightarrow x = 8$

$\Rightarrow d_1 = 6x = 6 \times 8 = 48$

$d_2 = 8x = 8 \times 8 = 64$

Area $= \frac{1}{2} \times 48 \times 64$

$= 1536$ cm^2

80. (A) Area of regular hexagon $= 6 \times$ Area of equilateral Δ

$= 6 \times \frac{\sqrt{3}}{4} a^2$

$= 6 \times \frac{\sqrt{3}}{4} (2\sqrt{3})^2$

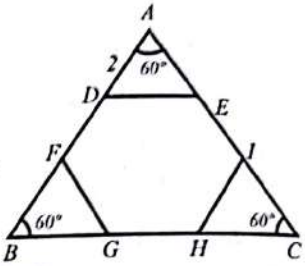
$= 18\sqrt{3}$ cm^3

81. (A) Area of regular hexagon

$= 6 \times \frac{\sqrt{3}}{4} (1)^2$

$= \frac{3\sqrt{3}}{2}$ cm^2

82. (C)



ΔADE, ΔFBG, ΔIHC are equilateral

As it is regular hexagon all sides are equal

$\therefore ED = DF = FG$

$\therefore AD = DF = FB$

$\Rightarrow AD = \frac{6}{3} = 2$cm

$\therefore$ side of hexagon $= AD = DE = 2$cm

$\therefore$ Area of hexagon

$= 6 \times \frac{\sqrt{3}}{4}(2)^2 = 6\sqrt{3}$ cm^2

83. (C) Let side of regular hexagon $= a_1$

Side of equilateral triangle $= a_2$

$6a_1 = 3a_2 \Rightarrow \frac{a_1}{a_2} = \frac{1}{2}$

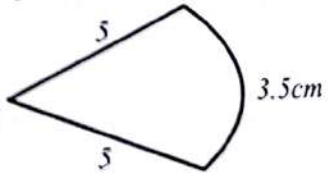
$\Rightarrow \frac{a_1^2}{a_2^2} = \frac{1}{4}$

Area of Hexogon : Area of Equilateral triangle

$\Delta = 6 \times \frac{\sqrt{3}}{4} a_1^2 : \frac{\sqrt{3}}{4} a_2^2$

$= \frac{6a_1^2}{a_2^2} : 1 = 6 \times \frac{1}{4} : 1 = 3 : 2$

84. (B)

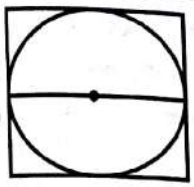


Area of sector $= \frac{1}{2} lr$

$= \frac{1}{2} \times 3.5 \times 5$

$= 8.75$ cm^2

85. (D)



Side of square = Diameter of circle

$28 = 2r$

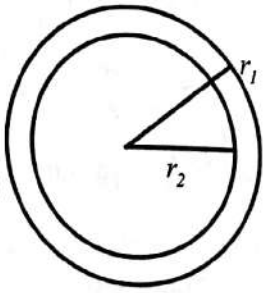
$\Rightarrow r = 14$ cm

$$\text{Area} = \pi r^2 = \frac{22}{7} \times 14 \times 14$$

$= 616$ cm^2

86. (C) Circumference doubles $\Rightarrow$ radius doubles $\Rightarrow$ Area quadruples

87. (B)



$2\pi r_1 = 132$

$\frac{2 \times 22}{7} \times r_1 = 132$

$r_1 = 21$

$2\pi r_2 = 88$

$\frac{2 \times 22}{7} \times r_2 = 88$

$r_2 = 14$

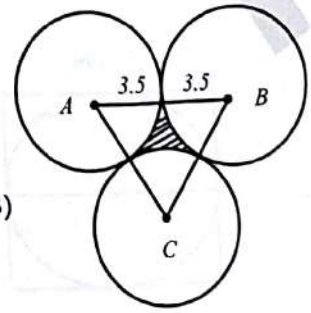
Area of ring

$= \pi r_1^2 - \pi r_2^2 = \pi(r_1^2 - r_2^2)$

$= \frac{22}{7}(21+14)(21-14)$

$= 22 \times 35 = 770$ cm^2

88. (B)



ABC is equilateral triangle with side 7 cm

Area of enclosed portion = Area of triangle ABC – Area of 3arcs

$= \frac{\sqrt{3}}{4}(7)^2 - 3\left[\frac{1}{2} \times \frac{\pi}{3} \times (3.5)^2\right]$

$= \frac{49\sqrt{3}}{4} - \frac{77}{4}$

$= \frac{49\sqrt{3} - 77}{4} = 1.967$ cm^2

89. (A) $\pi r^2 = 2464$

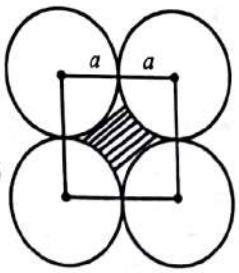
$\frac{22}{7} \times r^2 = 2464$

$r^2 = 7 \times 112$

$r = 28$

$\therefore$ Diameter $= 2 \times 28 = 56$ m

90. (B)



Area enclosed = Area of square – 4 (Area of sectors)

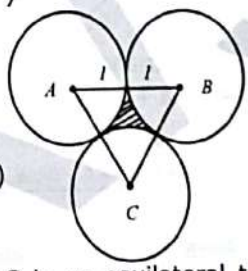
$= (2a)^2 - 4\left(\frac{1}{2} \times \frac{\pi}{2} a^2\right)$

$= 4a^2 - \pi a^2$

$= 4a^2 - \frac{22}{7}a^2$

$= \frac{6a^2}{7}$ square units

91. (B)



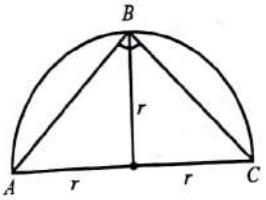
ABC is an equilateral triangle with side 2 cm

Area enclosed = Area of triangle – 3 × Area of sectors

$= \frac{\sqrt{3}}{4}(2)^2 - 3\left[\frac{1}{2} \times \frac{\pi}{3}(1)^2\right]$

$= \left(\sqrt{3} - \frac{\pi}{2}\right)$ cm^2

92. (B)



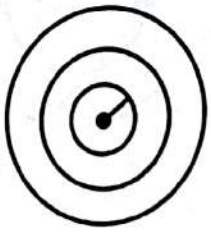
Hypotenuse = diameter = 2r

Area of triangle

$= \frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times 2r \times r = r^2$

93. (A)



Area of larger circle

$= \pi(6)^2 = 36\pi$

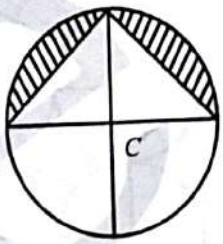
As area is trisected area of smaller circle

$= \frac{36\pi}{3} = 12\pi$

$12\pi = \pi r^2$

$\Rightarrow$ radius $= \sqrt{12} = 2\sqrt{3}$ cm

94. (B)



Radius of circle is a $\Rightarrow$ Area of circle $= \pi a^2$

Area of triangle

$= \frac{1}{2} \times 2a \times a = a^2$

$\therefore$ shaded region

$= \pi a^2 - a^2 = a^2(\pi - 1)$ sq.units

95. (C) $\pi(r+1)^2 - \pi r^2 = 22$

$\pi((r+1+r)(r+1-r)) = 22$

$\frac{22}{7} \times (2r+1) = 22$

$\Rightarrow r = 3$ cm

96 (A) $r_A = 2r_B$

$r_B = 2r_C$

$r_A : r_B : r_C = 4 : 2 : 1$

$A_1 : A_2 : A_3 = 16 : 4 : 1$

97. (A) $2\pi r = 11$

$\Rightarrow r = 11 \times \frac{7}{22} \times \frac{1}{2} = \frac{7}{4}$

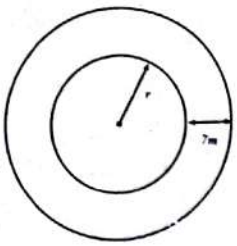
Areae of sector $= \frac{60}{360} \times \pi r^2$

$= \frac{60}{360} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2}$

$\therefore$ Area of sector

$= \frac{77}{48} = 1\frac{29}{48}$ cm^2

98. (A)



$2\pi r = 176$

$r = \frac{176}{2} \times \frac{7}{22}$

$r = 28$ m

$r + 7 = 28 + 7 = 35$

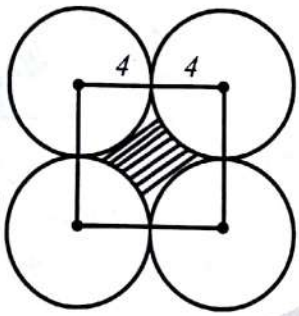
$\therefore$ Area of the road

$= \pi(35)^2 - \pi(28)^2$

$= \frac{22}{7}(35+28)(35-28)$

$= 22 \times 63 = 1386$ m^2

99. (D)



Square has side 8 cm

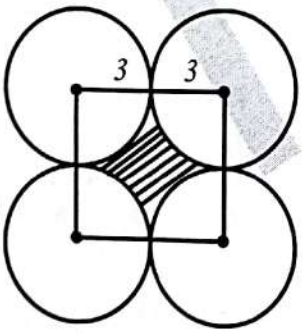
Area of shaded region = Area of square − Area of 4 sectors

$= (8)^2 - 4\left(\frac{1}{2}\frac{\pi}{2}(4)^2\right)$

$= 64 - 16\pi$

$= 16(4 - \pi)$

100. (B)



Square has side 6 cm

Area of shaded region = Area of square − Area of 4 sectors

$= (6)^2 - 4\left[\frac{1}{2} \times \frac{\pi}{2}(3)^2\right]$

$= 36 - 9\pi$

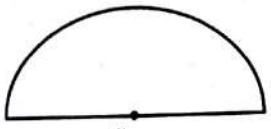
$= 9(4 - \pi)$ cm^2

101. (A) $\pi r^2 = \pi(5)^2 + \pi(12)^2$

$r^2 = 25 + 144$

$\Rightarrow r = \sqrt{169} = 13$ cm

102. (D)



Perimeter $= \pi r + 2r$

$36 = r\left(\frac{22}{7} + 2\right)$

$36 = \frac{36r}{7}$

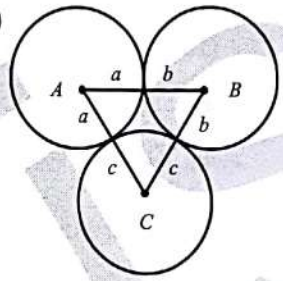
$\Rightarrow r = 7$m

Area $= \frac{\pi r^2}{2} = \frac{1}{2} \times \frac{22}{7} \times 7 \times 7$

$= 77$ m^2

103. (A) If the areas are in the ratio 4 : 7, then their radii will be in the ratio $\sqrt{4} : \sqrt{7} = 2 : \sqrt{7}$

104. (A)



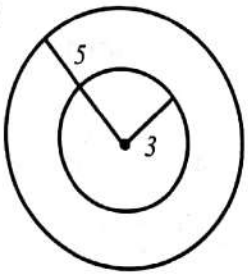
$\therefore$ In triangle ABC

AB = a + b, BC = b + c, CA = c + a

$S = \frac{a+b+b+c+c+a}{2} = a+b+c$

Area $= \sqrt{(a+b+c)\,abc}$

105. (C)



Area of annual zone

$= \pi(5^2 - 3^2) = 16\pi$

Area of annual zone : large circle

$16\pi : 25\pi$

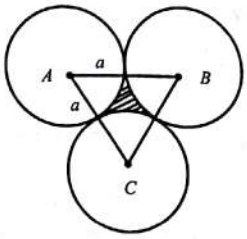
16 : 25

106. (A) Ratio of side & diagonal of square $= 1 : \sqrt{2}$

$R_1 : R_2 = 1 : \sqrt{2}$

If radii in ratio $1 : \sqrt{2}$ then areas are in ratio $1^2 : (\sqrt{2})^2 = 1 : 2$

107. (D) Triangle is equilateral of size 2a



Area of shaded region = Area of triangle − Area of 3 sectors

$= \frac{\sqrt{3}}{4}(2a)^2 - 3\left[\frac{1}{2} \times \frac{\pi}{3} \times a^2\right]$

$= \sqrt{3}a^2 - \frac{\pi a^2}{2}$

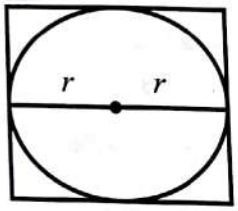
$= \left[\frac{2\sqrt{3} - \pi}{2}\right]a^2$ cm^2

108. (D) $\pi r^2 = \pi(10)^2 + \pi(24)^2$

$r^2 = 100 + 576$

$r^2 = 676 \Rightarrow r = 26$ cm

109. (C)



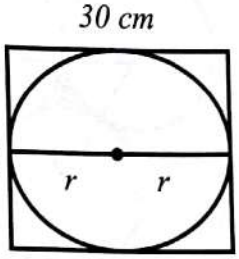
$2r = 21$

$\Rightarrow r = \frac{21}{2}$

Area of circle $= \pi r^2$

$= \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} = 346.5$ cm^2

110. (A)

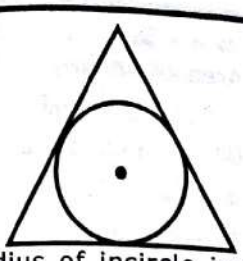


$4a = 120 \Rightarrow a = 30$ cm

$2r = a \Rightarrow r = \frac{a}{2} = 15$ cm

Area $= \pi r^2 = \frac{22}{7} \times (15)^2$

111. (B)



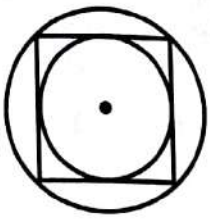
Radius of incircle inside an equilateral triangle

$= \frac{a}{2\sqrt{3}} = \frac{42}{2\sqrt{3}} = 7\sqrt{3}$

$\therefore$ Area

$= \pi r^2 = \frac{22}{7} \times 7\sqrt{3} \times 7\sqrt{3} = 462 \text{ cm}^2$

112. (A)



$a \rightarrow$ side of square in circle

$2r = a \quad \Rightarrow r = a/2$

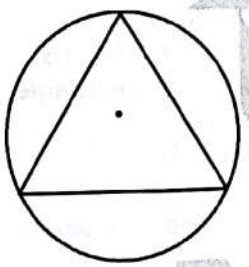
In circumcircle $\sqrt{2}a = 2R$

$\Rightarrow R = \frac{a}{\sqrt{2}}$

$\therefore$ Area of incircle : circum-circle $= \pi r^2 : \pi R^2$

$= \pi\left(\frac{a}{2}\right)^2 : \pi\left(\frac{a}{\sqrt{2}}\right)^2 = 1 : 2$

113. (A)



Let a be side of square

$\frac{\sqrt{3}}{4}a^2 = 4\sqrt{3}$

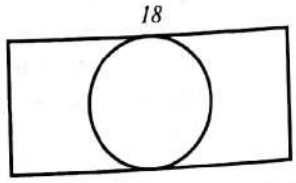
$\Rightarrow a = 4\text{cm}$

Circumradius $R = \frac{a}{\sqrt{3}} = \frac{4}{\sqrt{3}}$

Area of circle

$= \pi R^2 = \pi\left(\frac{4}{\sqrt{3}}\right)^2 = \frac{16\pi}{3}\text{cm}^2$

114. (B)

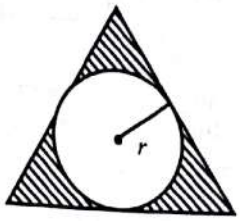


Circle will have diameter of 14 cm

$\therefore$ Area $= \frac{\pi d^2}{4} = \frac{1}{4} \times \frac{22}{7} \times 14 \times 14$

$= 154 \text{ cm}^2$

115. (B)



In radius

$r = \frac{a}{2\sqrt{3}} = \frac{8}{2\sqrt{3}} = \frac{4}{\sqrt{3}}$

Area of shaded region = Area of triangle − Area of circle

$= \frac{\sqrt{3}}{4}(8)^2 - \pi\left(\frac{4}{\sqrt{3}}\right)^2$

$= 16\sqrt{3} - \frac{22}{7} \times \frac{16}{3}$

$= 27.71 - 16.76 = 10.95 \text{ cm}^2$

116. (C) Circum radius $R = \frac{a}{\sqrt{3}}$

In radius $r = \frac{a}{2\sqrt{3}}$

$44 = \pi\left(\frac{a^2}{3} - \frac{a^2}{12}\right)$

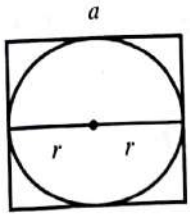
$44 = \frac{22}{7} \times \frac{3a^2}{12}$

$a^2 = 56$

Area of triangle $= \frac{\sqrt{3}}{4}a^2$

$= \frac{\sqrt{3}}{4} \times 56 = 14\sqrt{3}\text{cm}^2$

117. (C)



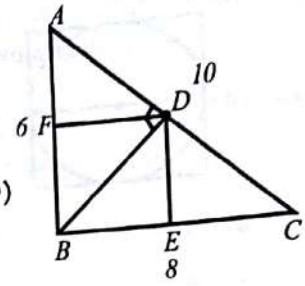
$\pi r^2 = 9\pi$

$\Rightarrow r = 3\text{cm}$

Side of square $a = 2r = 6\text{cm}$

$\therefore$ Area $= (6)^2 = 36 \text{ cm}^2$

118. (D)



BD $\perp$ AC and BD is diagonal of FDEB

$BD = \frac{AB \times BC}{AC} = \frac{6 \times 8}{10} = \frac{24}{5}$

$\therefore$ Area $= \frac{\text{Diagonal}^2}{2} = \frac{1}{2}\left(\frac{24}{5}\right)^2 = \frac{576}{50}$

119. (B)

$a = 8$ cm

Circum radius $R = \frac{a}{\sqrt{3}} = \frac{8}{\sqrt{3}}$

In radius

$r = \frac{a}{2\sqrt{3}} = \frac{8}{2\sqrt{3}} = \frac{4}{\sqrt{3}}$

Shaded region $= \pi\left(R^2 - r^2\right)$

$= \frac{22}{7}\left(\frac{64}{3} - \frac{16}{3}\right)$

$= \frac{22 \times 16}{7} = 50\frac{2}{7} \text{ cm}^2$

120. (C)

$a = 14\sqrt{3}$

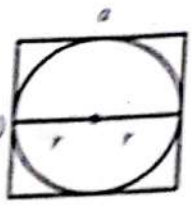
Radius of incircle

$r = \frac{a}{2\sqrt{3}} = \frac{14\sqrt{3}}{2\sqrt{3}} = 7 \text{ cm}$

$\therefore$ Area of incricle $= \pi r^2$

$= \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$

121. (B)



$a^2 = 2 \Rightarrow a = \sqrt{2}$

$a = 2r \Rightarrow r = \frac{a}{2}$

$= \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$

$\therefore$ Area $= \pi r^2 = \pi\left(\frac{1}{\sqrt{2}}\right)^2 = \frac{\pi}{2}\ m^2$

122. (A) Let the length of equilateral triangle = a

Sum of length of perpendiculars from point in interior of an equilateral triangles to its sides $= \frac{\sqrt{3}}{2}a$

$3 + 4 + 5 = \frac{\sqrt{3}}{2}a$

$\Rightarrow a = 8\sqrt{3}$ cm

$\therefore$ Area of triangle

$= \frac{\sqrt{3}}{4}a^2 = \frac{\sqrt{3}}{4} \times 8\sqrt{3} \times 8\sqrt{3}$

$= 48\sqrt{3}\ cm^2$

123. (B) Circum radius : In radius R : r = 2 : 1

As radii are in the ratio 2 : 1 their areas will be in the ratio of $2^2 : 1^2 = 4 : 1$

124. (D) In radius $= \frac{a}{2\sqrt{3}} = \frac{6}{2\sqrt{3}} = \sqrt{3}$

Area $= \pi(\sqrt{3})^2 = 3\pi$

125. (C)

Let side of square be a

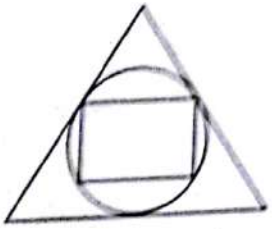
diagonal of square = Diameter of circle

$\sqrt{2}\ a = 16$

$\Rightarrow a = 8\sqrt{2}$ cm

Area $= a^2 = (8\sqrt{2})^2 = 128\ cm^2$

126. (C)



Let side of triangle be a, radius of circle be r, side of square be a'

In radius of triangle $r = \frac{a}{2\sqrt{3}}$

$\Rightarrow a = 2\sqrt{3}r$

Diagonal of square = diameter of circle

$\sqrt{2}a' = 2r \Rightarrow a' = \sqrt{2}r$

$a : a' = 2\sqrt{3}r : \sqrt{2}r$

$a^2 : a'^2 = 12 : 2 = 6 : 1$

Area of triangle : Area of square

$= \frac{\sqrt{3}}{4} \times 6 : 1$

$= 3\sqrt{3} : 2$

127. (C) Circum radius $= \frac{a}{\sqrt{3}}$

Area of triangle : Circum circle

$= \frac{\sqrt{3}}{4}a^2 : \pi\left(\frac{a}{\sqrt{3}}\right)^2$

$= \frac{\sqrt{3}}{4}a^2 : \frac{\pi a^2}{3}$

$= 3\sqrt{3} : 4\pi$

128. (B) Perimeter of square = 44

$\Rightarrow$ side of square $= \frac{44}{4} = 11$

$\therefore$ Area of square $= 11^2 = 121$

Circumference of circle

$2 \times \frac{22}{7} \times r = 44$

$\Rightarrow$ Radius = 7 cm

Area of circle

$= \frac{22}{7} \times 7 \times 7 = 154$

Area of circle is greater by 154–121 = 33 cm^2

129. (B) $\frac{22}{7}r^2 = 3850$

$\Rightarrow r^2 = 3850 \times \frac{7}{22}$

$= \sqrt{1225} = 35$

Perimeter of square = perimeter of circle

$4a = 2 \times \frac{22}{7} \times 35$

$\Rightarrow a = 55$

Area of square

$= 55^2 = 3025\ m^2$

130. (D) $l = a + 5, b = a - 3$

$a^2 = (a + 5)(a - 3)$

$a^2 = a^2 + 2a - 15$

$\Rightarrow a = \frac{15}{2}$

Perimeter of rectangle

$= 2(l + b)$

$= 2\left(\frac{15}{2} + 5 + \frac{15}{2} - 3\right) = 34$ cm

131. (B) $a^2 = 81 \Rightarrow a = 9$ cm

Perimeter of square = circumference of circle

$4 \times 9 = \pi r + 2r$

$36 = r\left(\frac{22}{7} + 2\right)$

$36 = \frac{36}{7}r$

$\Rightarrow r = 7$ cm

Area of semicircle $= \frac{\pi r^2}{2}$

$= \frac{1}{2} \times \frac{22}{7} \times 7 \times 7$

$= 77\ cm^2$

132. (A) Let length be l and breadth be b.

$2(l + b) = 160$

$\Rightarrow l + b = 80$

$l - b = 48$

$\therefore l = 64, b = 16$

Area of rectangle = Area of square

$64 \times 16 = a^2$

$\Rightarrow a = 32$ cm

$\therefore$ Side of square = 32 cm

133. (B) $\frac{1}{2} \times 12 \times$ Altitude $= 12 \times 12$

$\Rightarrow$ altitude = 24 cm

134. (B) Length = 48

Breadth $= \frac{48}{3} = 16$

Perimeter of rectangle = perimeter of square

$2(48 + 16) = 4a$

$\Rightarrow a = 32$ cm

$\therefore$ Area of square $= (32)^2$

$= 1024\ m^2$

135. (D) Side of equilateral triangle = side of square = a

Area of square : Area of triangle

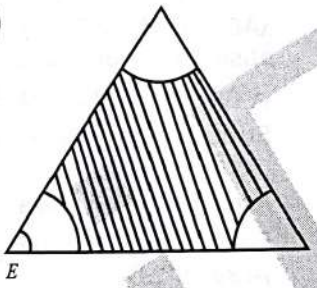
$= a^2 : \frac{\sqrt{3}}{4}a^2 = 4 : \sqrt{3}$

136. (C) $a^2 = 121 \Rightarrow a = 11$
Perimeter of square = circumference of circle
$4(11) = 2 \times \frac{22}{7} \times r$
$\Rightarrow r = 7$ cm
$\therefore$ Area of circle
$= \frac{22}{7} \times 7 \times 7 = 154$ cm^2

137. (C) $\frac{\sqrt{3}}{4}a^2 = 121\sqrt{3} \Rightarrow a = 22$ cm
Perimeter of triangle = circumfernece of circle
$3 \times 22 = 2 \times \frac{22}{7} \times r$
$\Rightarrow r = \frac{21}{2}$ cm
Area $= \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2}$
$= 346.5$ cm^2

138. (D) $a^2 = 81 \Rightarrow a = 9$ cm
Perimeter of square = Perimeter of semi circle
$4 \times 9 = (\pi + 2)r$
$36 = \left(\frac{22}{7} + 2\right)r$
$\Rightarrow r = 7$ cm

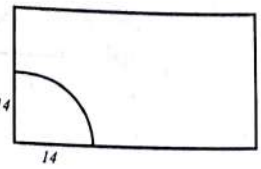
139. (B)



$S = \frac{26+28+30}{2} = 42$
Area of triangle
$= \sqrt{42 \times (42-20)(42-28)(42-30)}$
$= \sqrt{42 \times 16 \times 14 \times 12} = 336$ m^2
Area grazed by cows (As sum of the angles in a triangle is 180°)
$= \frac{180}{360} \times \pi r^2 = \frac{1}{2} \times \frac{22}{7} \times 7 \times 7 = 77$m^2
$\therefore$ Area ungrazed by cows = Area of triangle – Area grazed by cows = 336 – 77 = 259 m^2

140. (A) Let side of square be a and side of triangle be a' side of triangle = diagonal of square
$a' = \sqrt{2}\, a$
$a' : a = \sqrt{2} : 1$
$a'^2 : a^2 = 2 : 1$
Area of triangle : Area of square $= \frac{\sqrt{3}}{4} a'^2 : a^2$
$= \frac{\sqrt{3}}{4} \times 2 : 1$
$= \sqrt{3} : 2$

141. (C)



Area a cow can graze
$= \frac{1}{2} \times \frac{\pi}{2} \times (14)^2$
$= \frac{1}{4} \times \frac{22}{7} \times 14 \times 14$
$= 154$ cm^2

142. (B) Area of square = Area of circle
$a^2 = \pi r^2$
$a = \sqrt{\pi} r$
$\Rightarrow a : r = \sqrt{\pi} : 1$

143. (D) Let length be 2x, breadth be x & side of square be a
perimeter of rectangle = perimeter of square
$2(2x + x) = 4a$
$6x = 4a$
$x : a = 2 : 3$
$x^2 : a^2 = 4 : 9$
Area of rectangle : Area of square
$2x \times x : a^2$
$2x^2 : a^2$
$8 : 9$

144. (C) Perimeter of rectangle = Perimeter of triangle
$2(l + b) = 3a$
$l + b = \frac{3a}{2}$
Given one side of rectangle = side of triangle
$\Rightarrow l = a$
$a + b = \frac{3a}{2} \Rightarrow b = \frac{a}{2}$
Area of triangle
$= a \times \frac{a}{2} : \frac{\sqrt{3}}{4} a^2 = 2 : \sqrt{3}$

145. (B) r = a
Area of circle : Area of square
$= \pi r^2 : a^2$
$= \pi : 1$

146. (C)
$100 \xrightarrow[+25]{25\%\uparrow} 125 \xrightarrow[-25]{20\%\downarrow} 100$
$\therefore$ No change in area

147. (B)
$100 \xrightarrow[-10]{10\%\downarrow} 90 \xrightarrow[+9]{10\%\uparrow} 99$
$\therefore$ Change in area = 100 – 99 = 1%

148. (C)
$100 \xrightarrow[+20]{20\%\uparrow} 120 \xrightarrow[+24]{20\%\uparrow} 144$
$\therefore$ Increase in area = 144 – 100 = 44%

149. (D)
Circumference = $2\pi r$, 2π is constant
$\Rightarrow$ rreduced by 50%
Area = $\pi r^2 \rightarrow$ 2times
$100 \xrightarrow[-50]{50\%\downarrow} 50 \xrightarrow[-25]{50\%\downarrow} 25\%$
$\therefore$ Area reduced by 100 – 25 = 75%

150. (D)
$100 \xrightarrow[+25]{25\%\uparrow} 125 \xrightarrow[+31.25]{25\%\uparrow} 156.25$
$\therefore$ Area increased by 156.25 – 100 = 56.25%

151.(A)
$100 \xrightarrow[+50]{50\%\uparrow} 150 \xrightarrow[+75]{50\%\uparrow} 225$
Area increased by 225 – 100 = 125%

152. (B)
$100 \xrightarrow[+120]{20\%\uparrow} 120 \xrightarrow[-24]{20\%\downarrow} 96$
$\therefore$ Area decreased by 100 – 96 = 4%

153. (B)
$100 \xrightarrow[+50]{50\%\uparrow} 150 \xrightarrow[75]{20\%\uparrow} 225$
$\therefore$ Area increased by 225 – 100 = 125%

154. (C) Altitude increased by $\frac{1}{10}$
As area remains constant, base decreased by
$\frac{1}{10+1} = \frac{1}{11} = \frac{100}{11} = 9\frac{1}{11}\%$

155. (D) Circumference = $2\pi r$, 2π is constant
$\Rightarrow$ radius increased by 50%
$100 \xrightarrow[+50]{50\%\uparrow} 150 \xrightarrow[+75]{50\%\uparrow} 225$
$\therefore$ Area increased by 225 – 100 = 125%

156. (B)
$100 \xrightarrow[+12]{12\%\uparrow} 112 \xrightarrow[16.8]{15\%\uparrow} 128.8$
$\therefore$ Area increased by = 128.8 – 100
$= 28.8\% = 28\frac{4}{5}\%$

157. (B)

$100 \xrightarrow[-40]{40\%\downarrow} 60 \xrightarrow[-24]{40\%\downarrow} 36$

∴ Area diminished by 100 – 36 = 64%

158. (A) Length increased by $60\% = \frac{3}{5}$

Area remains constnat ⇒ breadth decreased by

$$\frac{3}{5+3}\Big) = \frac{3}{8} = 37.5\%$$

159. (B)

$100 \xrightarrow[+10]{10\%\uparrow} 110 \xrightarrow[+11]{10\%\uparrow} 121$

∴ Area increased by 121 – 100 = 21%

160. (B)

$100 \xrightarrow[+5]{5\%\uparrow} 105 \xrightarrow[-10.5]{10\%\downarrow} 94.5$

∴ Area decreased by 100 – 94.5 = 5.5%

161. (D)

$100 \xrightarrow[+1]{1\%\uparrow} 101 \xrightarrow[+1.01]{1\%\uparrow} 102.01$

∴ Area increases by 102.01 – 100 = 2.01%

162. (C)

$100 \xrightarrow[+5]{5\%\uparrow} 105 \xrightarrow[-2.1]{2\%\downarrow} 102.9$

∴ Percentage error in area = 102.9 – 100 = 2.9%

163. (D)

$100 \xrightarrow[+30]{30\%\uparrow} 130 \xrightarrow[+26]{20\%\uparrow} 156$

∴ Area exceeds by 156 – 100 = 56%

164. (D) Surface area = $6a^2$ → 2 times

$100 \xrightarrow[+40]{40\%\uparrow} 140 \xrightarrow[+56]{40\%\uparrow} 196$

∴ Surface area increases by 196 – 100 = 96%

165. (A)

$100 \xrightarrow[+8]{8\%\uparrow} 108 \xrightarrow[1.08\times8=8.64]{8\%\uparrow} 116.64$

∴ Area increases by 116.64 – 100 = 16.64%

166. (A) Onse side increases by 30% $= \frac{3}{10}$

Area remains constant ⇒ other side decreases by

$$\frac{3}{10+3}\Big) = \frac{3}{13}$$

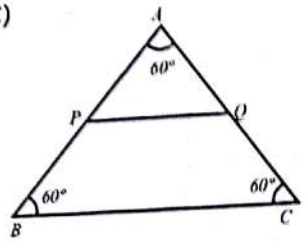
$$= \frac{300}{13} = 23\frac{1}{13}\%$$

167. (C)

$100 \xrightarrow[+100]{100\%\uparrow} 200 \xrightarrow[+200]{100\%\uparrow} 400$

∴ Percentage increase in area = 400 – 100 = 300%

168. (C)



PQ = 5 cm

PQ & BC are parallel and BA & CA as transversals

∠APQ = ∠B = 60°

∠AQP = ∠C = 60°

∴ APQ is equalateral triangle with side = 5 cm

$$\therefore \text{Area} = \frac{\sqrt{3}}{4}(5)^2 = \frac{25\sqrt{3}}{4}\ \text{cm}^2$$

169. (C) Let the side of equilateral triangle be x

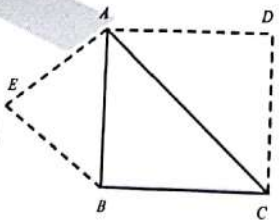
$$b = \frac{\sqrt{3}}{2}x$$

$$a = \frac{\sqrt{3}}{4}x^2$$

$$b^2 = \frac{3}{4}x^2$$

$$\therefore \frac{b^2}{a} = \frac{\frac{3}{4}x^2}{\frac{\sqrt{3}}{4}x^2} = \sqrt{3}$$

170. (C)



Let AB = BC = x

$AC = \sqrt{2}\ x$

$$\frac{\text{Ar.}\Delta ABE}{\text{Ar.}\Delta ACD} = \frac{\frac{\sqrt{3}}{4}x^2}{\frac{\sqrt{3}}{4}(\sqrt{2}x)^2} = 1:2$$

171. (B) $\frac{\text{Area of ABC}}{\text{Area of DEF}} = \frac{AB^2}{DE^2} = \frac{10^2}{8^2}$

$$= \frac{100}{64} = 25:16$$

172. (C) $\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \frac{BC^2}{EF^2}$

Area of

ΔDEF = Area of $\Delta ABC \times \frac{EF^2}{BC^2}$

$= 54 \times \frac{16}{9} = 96\ \text{cm}^2$

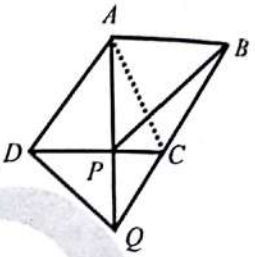
173. (B) $\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \frac{AB^2}{DE^2}$

$\frac{20}{45} = \frac{25}{DE^2}$

$\Rightarrow DE^2 = \frac{25 \times 45}{20}$

$DE = \sqrt{\frac{25 \times 9}{4}} = \frac{5 \times 3}{2} = 7.5\ \text{cm}$

174. (A)



Δ APC & ΔBCP lie on same base between parallel lines so area of ΔAPC = area of ΔBCP

AD || CQ as CQ is extension of BC & AD = CQ so line joining AC & DQ are parallel

∴ ACQD is parallelogram

ΔADC and ΔADQ lie on same base between parallel lines

∴ Area of ΔADC = Area of ΔADQ

Subtracting are of DAP from both

Area of APC = Area of DPQ

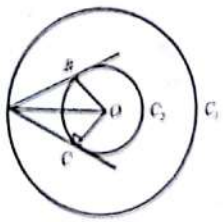
From (1) & (2) Area of ΔBPC = Area of ΔDPQ

175. (D) Area of trapezium $= \frac{1}{2}$ (sum of length of parallel sides) shortest distance

$450 = \frac{1}{2}$ (sum of parallel sides) × 15

⇒ sum of parallel sides $= \frac{450 \times 2}{15} = 60$ cm

176. (C)



Area of ABOC = 2 × Area of ΔABO

ABO is right angled triangle
AO = 12 OB = 3

$\Rightarrow AB = \sqrt{12^2 - 3^2}$

$= \sqrt{144 - 9} = \sqrt{135}$

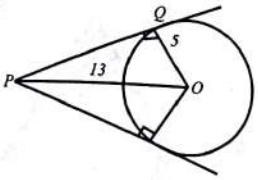
$= 3\sqrt{15}$

Area of ABOC = 2 × Area of ΔABO

$= 2 \times \left[\frac{1}{2} \times OB \times AB\right]$

$= 3 \times 3\sqrt{15} = 9\sqrt{15}$ sq.cm

177. (B)



$\Delta PQO = PQ = \sqrt{PO^2 - OQ^2}$

$= \sqrt{169 - 25} = 12$

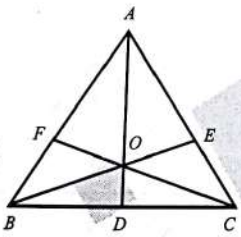
Area of

$\Delta PQO = \frac{1}{2} \times 5 \times 12 = 30$

Area of PQOR = 2 × Area of ΔPQO

$= 2 \times 30 = 60$ cm²

178. (B)



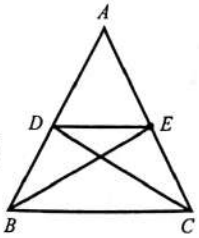
Area of ΔAOE = Area of ΔBDO = Area of

ΔBOF = 15

Area of BDOF = Area of ΔBDO + Area of

ΔBFO = 15 + 15 = 30 cm²

179. (B)



ΔABE = ΔADE + ΔBDE

ΔACD = ΔADE + ΔCDE

Comparing ΔBDE & ΔCDE

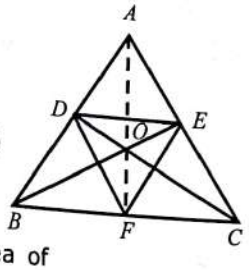
Heights of both triangles are same as both lie between parallel lines and have same base DE

∴ Area of ΔBDE = Area of ΔCDE

∴ Area of ΔABE = Area of ΔACD

∴ Area of ΔACD = 36 cm²

180. (C)



Area of

$\Delta DEF = \frac{1}{4}$ Area of ABC

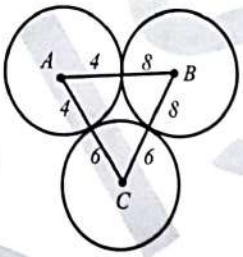
Area of

$\Delta ODE = \frac{1}{3}$ Ar ΔDEF

$\therefore$ Area of ODE $= \frac{1}{3} \times \frac{1}{4}$ Area of ΔABC

Area of ΔODE : Area of ΔABC = 1 : 12

181. (D)



In ΔABC

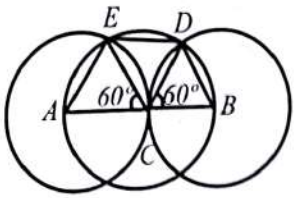
AB = 12 cm, BC = 14 cm, CA = 10 cm

$S = \frac{10 + 12 + 14}{2} = 18$

Area of

$\Delta ABC = \sqrt{18 \times 6 \times 4 \times 8} = 24\sqrt{6}$ cm²

182. (B)



AC = AE = CE ⇒ Radii of circles

∠ECD = 60°

∴ ∠CED = ∠CDE = 60°

⇒ CE = CD = ED

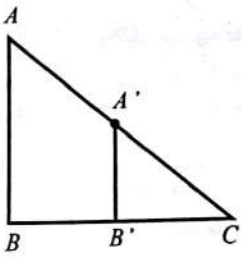
BD = BC = CD = Radii of circles

∴ Area of ABDE = Area of 3 equilateral triangles with side 2 cm

$= 3 \times \frac{\sqrt{3}}{4} (2)^2$

$= 3\sqrt{3}$ cm²

183. (C)



ΔABC ~ ΔA'B'C

as $B'C = \frac{BC}{2}$, $A'C = \frac{AC}{2}$,

∠C is common

$\frac{\text{Area of ABC}}{\text{Area of A'B'C}} = \left(\frac{BC}{B'C}\right)^2 = \frac{1}{4}$

Area of ABC : Area of A'B'C = 1 : 4

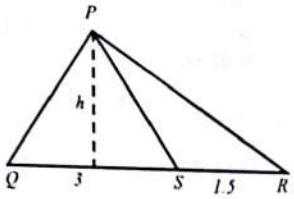
Area of AA'B'B : Area of ABC = (4 − 1) : 4 = 3 : 4

184. (A) ΔABC & ΔPQR are congurnet

⇒ Both areas are equal

∴ Area of ΔPQR = 60 cm²

185. (D)



Altitudes of both triangles PQS & PSR are equal

Area of ΔPQS : Area of ΔPSR

$= \frac{1}{2} \times QS \times h : \frac{1}{2} SR \times h$

= 3 : 1.5

= 2 : 1

186. (B) R − r = 14

$\pi R^2 - \pi r^2 = 1056$

$\frac{22}{7}((R + r)(R - r) = 1056$

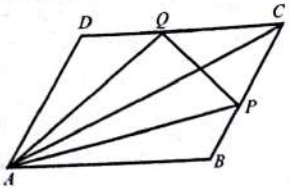
$(R + r)\ 14 = 1056 \times \frac{7}{22}$

$R + r = \frac{336}{14} = 24$

R + r = 24 R − r = 14

∴ r = 5 cm

187. (C)



Area of $APB = \frac{1}{2}$ Area of ABC = 6 cm as AP is median of ABC and Median divides area into 2 parts.

Area of $ADQ = \frac{1}{2}$ Area of ACD = 6 sq.cm.

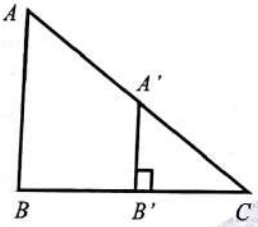
Area of $CQP = \frac{1}{4}$ Area of CDB

$= \frac{1}{4} \times 12 = 3$ sq.cm

(triangle have similar sides in 1 : 2 ratio so areas in 1 : 4 ratio)

$\therefore$ Area of AQB = 24 – (6 + 6 + 3) = 9 Sq.cm.

188. (A)



Line joining midpoints of AC & BC will be parallel to AB and half of it

$A'B' = \frac{AB}{2}$

$\therefore$ Area of

$\Delta A'B'C = \frac{1}{2} B'C \times A'B'$

$= \frac{1}{2} \times \frac{BC}{2} \times \frac{AB}{2}$

$= \frac{1}{4} \times \left(\frac{1}{2} BC \times AB\right)$

$= \frac{1}{4} \times$ Area of ΔABC

189. (B) $44 = 2\pi r$

$\Rightarrow 44 = 2 \times \frac{22}{7} \times r$

$\Rightarrow r = 7$ cm

$44 = 4a$

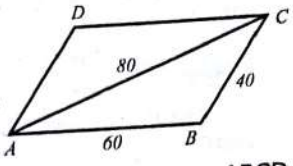
$\Rightarrow a = 11$ cm

Difference in area

$= \frac{22}{7} \times 7 \times 7 - (11)^2$

$= 154 - 121 = 33$ cm^2

190. (B)



Area of parallelogram ABCD = 2 × Area of triangle ABC

$S = \frac{60 + 40 + 80}{2} = 90$

Area of triangle

$= \sqrt{(s(s-a)(s-b)(s-c))}$

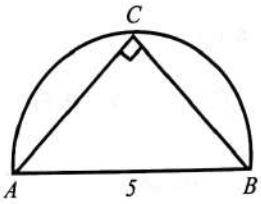
$ABC = \sqrt{90 \times 30 \times 50 \times 10}$

$= 300\sqrt{15}$

$\therefore$ Area of parallelogram

$= 2 \times 300\sqrt{15} = 600\sqrt{15}$

191. (D)



$AC = 3x$ $\quad BC = 4x$

$AC^2 + BC^2 = AB^2$

$9x^2 + 16x^2 = 25$

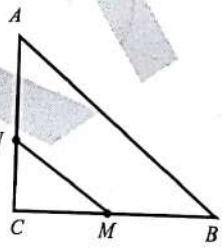
$\Rightarrow x = 1$

$AC = 3$ $\quad BC = 4$

Area of

$\Delta ABC = \frac{1}{2} \times 4 \times 3 = 6$ cm^2

192. (A)



$\Delta NMC \sim \Delta ABC$

as $AC = 2AN$, $\quad MC = 2BC$

and $\angle C$ is common

Area of NMC : Area of ABC = 1 : 4 as sides ratio is 1 : 2

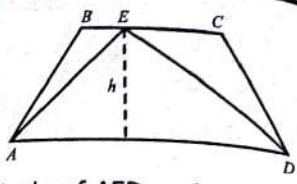
$\therefore$ Area of ABMN : Area of ABC = 3 : 4

$\Rightarrow$ Area of ABMN = Area of ABC $\times \frac{3}{4}$

$= \frac{1}{2} \times 8 \times 6 \times \frac{3}{4}$

$= 18$ cm^2

193. (D)



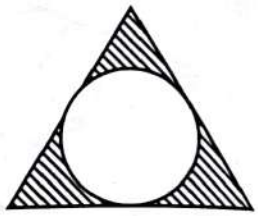
Altitude of AED = shortest distance between AD and BC = h

Area of ABCD : Area of AED

$= \frac{1}{2}(\bar{AD} + \bar{B}\,\bar{C}) \times h : \frac{1}{2} \times \bar{AD} \times h$

$= \overline{AD} + \overline{BC} : \overline{AD}$

194. (A)



In radius

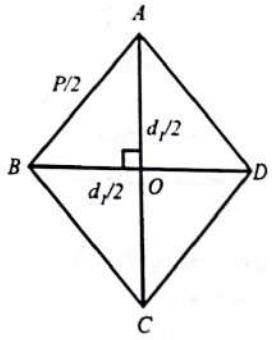
$r = \frac{a}{2\sqrt{3}} = \frac{24}{2\sqrt{3}} = 4\sqrt{3}$

Area of remaining portion = Area of Δ – Area of circle

$= \frac{\sqrt{3}}{4} \times (24)^2 - \frac{22}{7} \times 4\sqrt{3} \times 4\sqrt{3}$

$= 144\sqrt{3} - \frac{22 \times 48}{7} = 98.55$ cm^2

195. (C)



Perimeter of rhombus = 2p

$\Rightarrow$ side $= \frac{2p}{4} = \frac{p}{2}$

Let the diagonals be d_1 & d_2

From ΔABO

$\frac{d_1^2}{4} + \frac{d_2^2}{4} = \frac{p^2}{4}$

$\Rightarrow d_1^2 + d_2^2 = p^2$

$(d_1 + d_2)^2 = m^2$

$d_1^2 + d_2^2 + 2d_1d_2 = m^2$

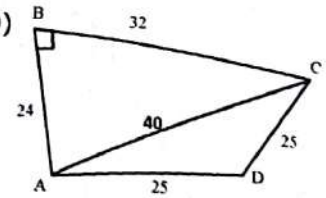
$p^2 + 2d_1d_2 = m^2$

$\Rightarrow d_1d_2 = \frac{m^2 - p^2}{2}$

Area of rhombus

$= \frac{1}{2} d_1d_2 = \frac{1}{4}\left[m^2 - p^2\right]$

196. (D)



$AC^2 = AB^2 + BC^2$

$AC^2 = 24^2 + 32^2 = 8^2 (3^2 + 4^2)$

$AC^2 = (40)^2 \Rightarrow AC = 40$

Area of triangle

$ABC = \frac{1}{2} \times 24 \times 32 = 384 m^2$

$a = 25 \quad b = 40$

Area of triangle ADC of 3 sides 25, 25, 40

$= \frac{b}{4}\sqrt{4a^2 - b^2}$

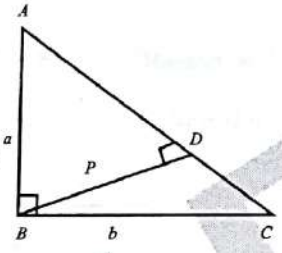
$= 10\sqrt{4 \times 625 - 1600}$

$= 10\sqrt{900} = 300$

$\therefore$ Area of plot

$= 384 + 300 = 684 m^2$

197. (B)



$\Delta ADB \sim \Delta ABC$

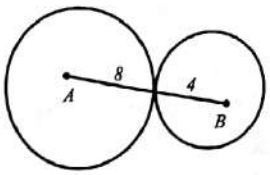
$\frac{BD}{AB} = \frac{BC}{AC}$

$BD = \frac{AB.BC}{AC} = \frac{ab}{\sqrt{a^2 + b^2}}$

$P = \frac{ab}{\sqrt{a^2 + b^2}}$

$P^2 = \frac{a^2b^2}{a^2 + b^2}$

198. (A)



$\therefore AB = 12$

Area of circle

$= \frac{\pi d^2}{4} = \frac{\pi \times (12)^2}{4}$

$= \frac{\pi \times 144}{4} = 36\pi$

199. (D)

$100 \xrightarrow[+10]{10\%\uparrow} 110 \xrightarrow[-11]{10\%\downarrow} 99$

$\therefore$ Area is decreased by $100 - 99 = 1\%$

200. (A) Let the length of side by a

$\frac{\sqrt{3}}{2} a = \frac{\sqrt{3}}{4} a^2$

$a^2 = 2a$

$\Rightarrow a = 2$ units

201. (A) Let length of side of square = a

diameter of circle = 2r

$a = 2r \quad \Rightarrow a^2 = 4r^2$

Area of square : Area of circle

$= a^2 : \pi r^2$

$= 4r^2 : \frac{22}{7} r^2 = 14 : 11$

202. (D) $\frac{\sqrt{3}}{2} a = 6\sqrt{3} \Rightarrow a = 12$ cm

Area of triangle

$\frac{\sqrt{3}}{4} a^2 = \frac{\sqrt{3}}{4} \times 12 \times 12 = 36\sqrt{3} cm^2$

203. (B) $2\pi r = \pi r^2$

$\Rightarrow r = 2$ units

Area $= \pi r^2 = 4\pi$ sq. units

204. (A) $\frac{\sqrt{3}}{4} a^2 = 48$

$a^2 = \frac{16 \times 3 \times 4}{\sqrt{3}}$

$a = 4 \times 2\sqrt{\sqrt{3}} = 8\sqrt[4]{3}$

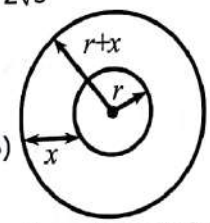
205. (C) Area of hexagon

$= 6 \times \frac{\sqrt{3}}{4} a^2$

$= \frac{3\sqrt{3}}{2} a^2$

$= \frac{9}{2\sqrt{3}} a^2$ sq.units

206. (B)



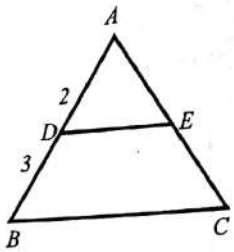
Let the radius of circle be r and width of fencing be x

$2\pi(r + x) - 2\pi r = 33$

$2 \times \frac{22}{7} \times x = 33$

$\Rightarrow x = \frac{21}{4} = 5.25$ m

207. (B)



$\Delta ADE \sim \Delta ABC$

as DE || BC & BA & CA are transversals

$\angle ADE = \angle ABC$ & $\angle AED = \angle ACB$

$\frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC} = \frac{AD^2}{AB^2}$

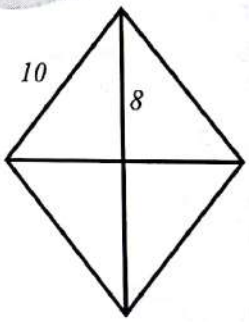
$= \frac{(2)^2}{(5)^2} = \frac{4}{25}$

Area of DECB = Area of ABC − Area of ADE

$= \text{Area of ABC}\left(1 - \frac{4}{25}\right)$

$\therefore \frac{\text{Area of DECB}}{\text{Area of ABC}} = 21 : 25$

208. (A)



Let the diagonal be d_1

$a^2 = \left(\frac{d1}{2}\right)^2 + \left(\frac{d2}{2}\right)^2$

$10^2 = 8^2 + \left(\frac{d_1}{2}\right)^2$

$\Rightarrow d_1 = 12$ cm

$\therefore$ Area of rhombus

$= \frac{1}{2} \times 16 \times 12 = 96 cm^2$

209. (B) Sides = 5 : 6 : 7

18 parts = 54 $\Rightarrow$ 1part = 3

$\therefore$ sides of triangle = 15, 18, 21

$S = \frac{15 + 18 + 21}{2} = 27$

Area $= \sqrt{27 \times 12 \times 9 \times 6}$

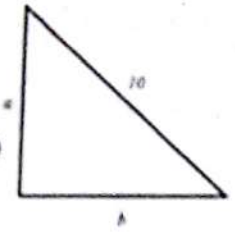
$= 54\sqrt{6} m^2$

210. (A) Area of trapezium

$= \frac{1}{2}(6 + 8)\,4$

$= 28\ cm^2$

211. (B)



$a^2 + b^2 = 10^2$

$\Rightarrow a^2 + b^2 = 100$

Area

$= \frac{1}{2}ab = 20 \Rightarrow ab = 40$

$(a + b)^2 = a^2 + b^2 + 2ab$

$= 100 + 2(40) = 180$

212. (A) $\pi r^2 = 154 \Rightarrow \frac{22}{7} r^2 = 154$

$\Rightarrow$ radius $= 7$ cm

Perimeter of triangle = circumference of circle

$3a = 2 \times \frac{22}{7} \times 7$

$a = \frac{44}{3}$

Area

$\frac{\sqrt{3}}{4}a^2 = \frac{\sqrt{3}}{4} \times \frac{44}{3} \times \frac{44}{3} = 93.14 cm^2$

213. (B) $\frac{h_1}{h_2} = \frac{3}{4}$

$\frac{A_1}{A_2} = \frac{4}{3}$

$\frac{A_1}{A_2} = \frac{\frac{1}{2}b_1 h_1}{\frac{1}{2}b_2 h_2}$

$\frac{4}{3} = \frac{b_1}{b_2} \times \frac{3}{4} \Rightarrow b_1 : b_2 = 16 : 9$

214. (C) $A = (side)^2 = 10^2 = 100$

$B = \frac{(diagonal)^2}{2} = \frac{1}{2}(14)^2 = 98$

$A - B = 100 - 98 = 2$

215. (C) Area of parallelogram = base $\times$ height

$25 \times 10 = 20 \times h$

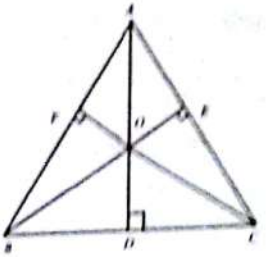
$\Rightarrow$ altitude $= \frac{250}{20} = 12.5$ cm

216. (C) $\frac{\sqrt{3}}{4}\left((a+1)^2 - a^2\right) = \sqrt{3}$

$(2a + 1)\,(1) = 4$

$\Rightarrow a = \frac{3}{2}$ m

217. (A)



$OD = OE = OF = 6$ cm

Area of ABC = Area of OBC + Area of OAB + Area of OCA

$= \frac{1}{2} OD \times BC + \frac{1}{2} \times OF \times AB + \frac{1}{2} \times OE \times AC$

$= \frac{1}{2} \times 6 \times (AB + BC + CA)$

$= 3 \times 50$

$= 150\ cm^2$

Method II :

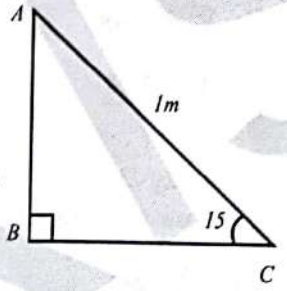
Area of triangle = s $\times$ r

$= 6 \times \left(\frac{50}{2}\right)$

$= 6 \times 25$

$= 150$

218. (C)



$AB = \sin 15$

$BC = \cos 15$

$\text{Area} = \frac{1}{2} \times AB \times BC$

$= \frac{1}{2} \sin 15 \times \cos 15$

$= \frac{1}{2} \times \frac{1}{2}(2 \sin 15 \cos 15)$

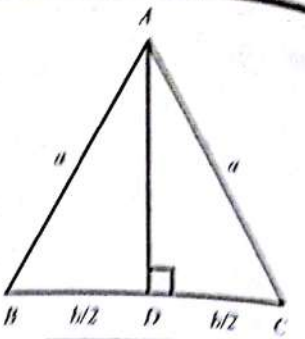
$= \frac{1}{2} \times \frac{1}{2} \sin 30$

$(\sin 2\theta = 2 \sin\theta \cos\theta)$

$= \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}\ m^2$

$= \frac{10000}{8}\ cm^2 = 1250\ cm^2$

219. (C)



$AD = \sqrt{a^2 - (b/2)^2}$

$= \sqrt{a^2 - \frac{b^2}{4}} = \frac{1}{2}\sqrt{4a^2 - b^2}$

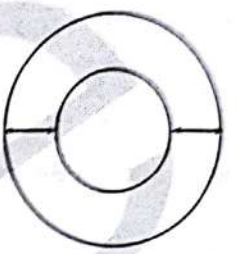
Area of

$\triangle ABC = 2 \times$ Area of ABD

$= 2 \times \frac{1}{2} \times \frac{b}{2} \times \frac{1}{2}\sqrt{4a^2 - b^2}$

$= \frac{b}{4}\sqrt{4a^2 - b^2}$ sq units

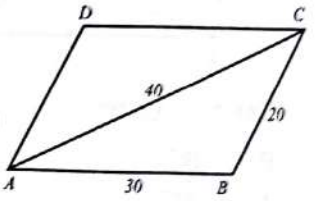
220. (C)



$2 \times$ breadth $= 728 - 700$

$\Rightarrow$ breadth $= \frac{28}{2} = 14$ m

221. (D)



Area of ABCD = 2 $\times$ Area of ABC

$S = \frac{40 + 30 + 20}{2} = 45$

Area of ABCD = 2 $\times$ Area of ABC

$= 2 \times \sqrt{45 \times 5 \times 15 \times 25}$

$= 2 \times \sqrt{9 \times 5 \times 5 \times 25 \times 15}$

$= 2 \times 3 \times 5 \times 5\sqrt{15}$

$= 150\sqrt{15}\ cm^2$

222. (D) Side increased from a to $\frac{3a}{2}$

Areas ratio $= \left(\frac{3a}{2}\right)^2 : a^2$

$= 9 : 4$

223. (A) $\pi r^2 = 324\pi$

$\Rightarrow r = 18$

Length of longest chord = diameter = 2r = 36 cm

224. (A) $d_1 = 2d_2$

$\frac{1}{2} d_1 d_2 = 256$

$\frac{1}{2} \times 2d_2 \times d_2 = 256$

$\Rightarrow d_2 = 16$

$d_1 = 2 \times 16 = 32$

$\therefore$ larger diagonal $d_1 = 32$ cm

225. (C) Diagonal $= \sqrt{2} \times$ side

$\frac{3-x}{\sqrt{2}} = \sqrt{2} \times \frac{1}{2}(x+1)$

$3 - x = 2 \times \frac{1}{2}(x+1)$

$\Rightarrow x = 1$

Side of square

$= \frac{1}{2}(x+1) = \frac{1}{2}(1+1) = 1$ unit

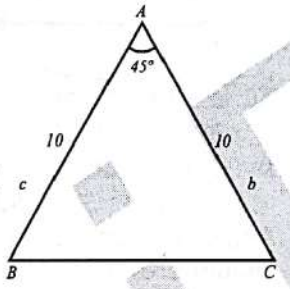
226. (B) $2\pi r = 44$

$2 \times \frac{22}{7} \times r = 44 \Rightarrow r = 7$ cm

Area of triangle $= \frac{1}{2} \times$ perimeter of triangle $\times$ in radius

$= \frac{1}{2} \times 24 \times 7 = 84$ cm^2

227. (C)



Area of triangle $= \frac{1}{2}$ bc sin A

$= \frac{1}{2} \times 10 \times 10 \times \sin 45$

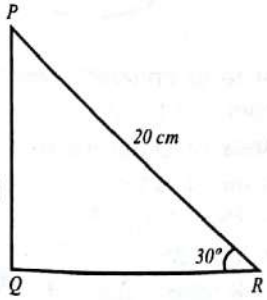
$= \frac{50}{\sqrt{2}} = 25\sqrt{2}$ cm^2

228. (C) Diagonal $= \sqrt{l^2 + b^2}$

$= \sqrt{4^2 + 3^2}$

$= \sqrt{16 + 9} = \sqrt{25} = 5$m

229. (A)



$PQ = 20 \sin 30 = 20 \times \frac{1}{2} = 10$

$QR = 20 \cos 30 = 20 \times \frac{\sqrt{3}}{2} = 10\sqrt{3}$

Area

$= \frac{1}{2} \times PQ \times QR$

$= \frac{1}{2} \times 10 \times 10\sqrt{3}$

$= 50\sqrt{3}$ cm^2

230. (D) $3a = 2\pi r \Rightarrow 9a^2 = 4\pi^2 r^2$

Ratio of areas $= \frac{\sqrt{3}}{4} a^2 : \pi r^2$

$= \frac{\sqrt{3}}{4} \times \frac{4\pi^2}{9} : \pi$

$= 22 : 21\sqrt{3}$

231 (B) Let side of triangle be x

Sum of length of perependicular to side $= \frac{\sqrt{3}}{2} x$

$\frac{2}{\sqrt{3}}(a+b+c) = x$

Area $= \frac{\sqrt{3}}{4} x^2 = \frac{\sqrt{3}}{4} \times \frac{2}{\sqrt{3}} \times \frac{2}{\sqrt{3}}(a+b+c)^2$

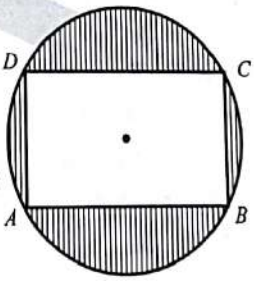
$= \frac{\sqrt{3}}{3}(a+b+c)^2$

232. (C) $\pi r^2 = a^2$

$\frac{a^2}{r^2} = \pi$

$\Rightarrow a : r = \sqrt{\pi} : 1$

233. (D)



Area of portion lying outside

Diameter of circle = Diagonal of square

$2r = \sqrt{2} \times$ side

$\Rightarrow$ side $= \sqrt{2}\, r$

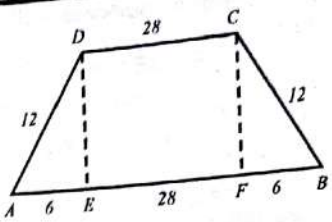
$\therefore$ Area of shaded portion = Area of circle − Area of square

$= \pi r^2 - (\sqrt{2}r)^2$

$= \pi r^2 - 2r^2$

$= r^2(\pi - 2)$ sq. units

234. (C)



AE = FB

AE + FB = 40 − 28 = 12

$2AE = 12 \Rightarrow AE = 6$

In ΔDEA

$(12)^2 = 6^2 + DE^2$

$144 - 36 = DE^2$

$\Rightarrow DE = \sqrt{108} = 6\sqrt{3}$ cm

Area of trapezium

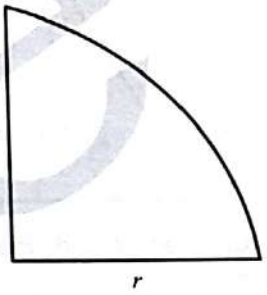
$= \frac{1}{2}(AB + CD)DE$

$= \frac{1}{2}(40 + 28)6\sqrt{3}$

$= 3\sqrt{3}(68)$

$= 204\sqrt{3}$ cm^2

235. (B)



$r + r + \frac{2\pi r}{4} = 75$

$2r + \frac{1}{4} \times 2 \times \frac{22}{7} \times r = 75$

$r\left(2 + \frac{11}{7}\right) = 75$

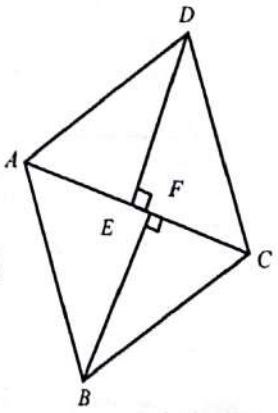
$\Rightarrow r = 75 \times \frac{7}{25} = 21$

Area

$= \frac{\pi r^2}{4} = \frac{1}{4} \times \frac{22}{7} \times 21 \times 21$

$= 346.5$ cm^2

236. (A)



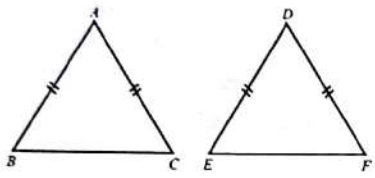
Area of quadrateral

$= \frac{1}{2} AC(DE + BF)$

$= \frac{1}{2} \times 24 \times (8 + 13)$

$= 12 \times 21 = 252 \text{ m}^2$

237. (D)

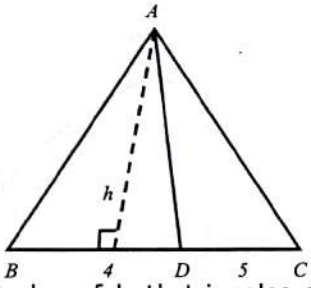


$\angle A = \angle D$ & $\angle B = \angle E$ & $\angle C = \angle F$

$\Rightarrow \Delta ABC \sim \Delta DEF$

$\therefore$ Ratio of altitudes $= \sqrt{\frac{9}{16}} = 3 : 4$

238. (D)



Altitudes of both triangles are equal

$\frac{\text{Ar. } \Delta ABD}{\text{Ar. } \Delta ADC} = \frac{\frac{1}{2} \times BD \times h}{\frac{1}{2} \times DC \times h} = \frac{4}{5}$

$\therefore$ Area of

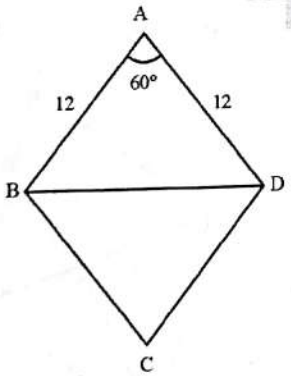
$\Delta ADC = 60 \times \frac{5}{4} = 75 \text{ cm}^2$

239. (B) $A = \pi r^2 \Rightarrow 2A = 2\pi r^2$

$C = 2\pi r \Rightarrow rC = 2\pi r^2$

$\therefore rC = 2A$

240. (D)



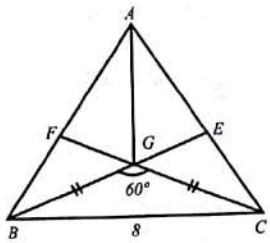
ΔABD is equilateral triangle

As $\angle A = 60^\circ$

$\angle ABD = \angle ADB$ and each are 60°

$\therefore$ BD = 12 cm

241. (C)



BG = CG, $\angle GBC = \angle GCB$

$\angle BGC = 60 \Rightarrow \angle GBC + \angle GCB = 120^\circ$

$\Rightarrow \angle GBC = \angle GCB = 60^\circ$

$\therefore \Delta BCG$ is equilateral triangle

Area of

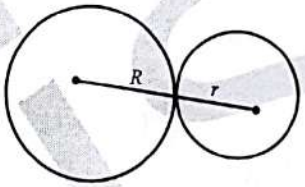
$\Delta BCG = \frac{\sqrt{3}}{4}(8)^2 = 16\sqrt{3}$

Area of $\Delta ABC = 3 \times$ Area of ΔBGC

$= 3 \times 16\sqrt{3}$

$= 48\sqrt{3} \text{ cm}^2$

242. (D)



$\pi R^2 + \pi r^2 = 130\pi$

$\Rightarrow R^2 + r^2 = 130$

$R + r = 14$

$(R + r)^2 = R^2 + r^2 + 2rR = 196$

$\Rightarrow 130 + 2rR = 196$

$\Rightarrow rR = 33$

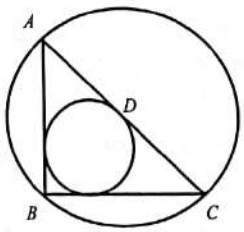
$(R - r)^2 = R^2 + r^2 - 2rR$

$= 130 - 66 = 64$

$\Rightarrow R - r = 8$ & $R + r = 14$

$\therefore r = 3$ cm

243. (B)



Triangle is right angled circum radius $= \frac{1}{2} \times$ hypotensue

R = 5/2

In radius

$r = \frac{\Delta}{S} = \frac{\frac{1}{2} \times 3 \times 4}{\frac{3+4+5}{2}} = \frac{6}{6} = 1 \text{ cm}$

$\frac{\text{Area of } C_1}{\text{Area of } C_2} = \frac{\pi r^2}{\pi R^2} = \frac{(1)^2}{\left(\frac{5}{2}\right)^2} = \frac{4}{25}$

244. (B) $\frac{\sqrt{3}}{2} a = 12\sqrt{3} \Rightarrow a = 24$

Area

$= \frac{\sqrt{3}}{4} a^2 = \frac{\sqrt{3}}{4} \times 24 \times 24$

$= 144\sqrt{3} \text{ cm}^2$

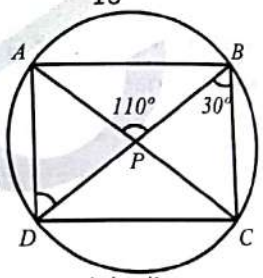
245. (A) $\frac{\text{Area of } \Delta PQR}{\text{Area of } \Delta ABC} = \frac{PR^2}{AC^2}$

$\frac{256}{441} = \frac{(12)^2}{AC^2}$

$\Rightarrow \frac{16}{21} = \frac{12}{AC}$

$\Rightarrow AC = \frac{21 \times 12}{16} = 15.75 \text{ cm}$

246. (B)



AC is straight line

$\therefore \angle BPC = 180 - 110 = 70$

In ΔBDC $\angle BCP$

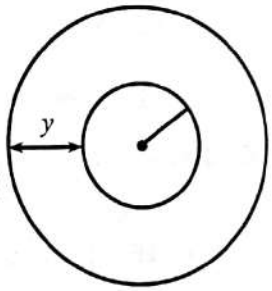
$= 180 - (70 + 30) = 80$

Angle subtended by arcs on circumference are equal

$\therefore$ AB subtends $\angle ACB$ & $\angle ADB$

$\therefore \angle ADB = \angle ACB = 80^\circ$

247. (D)



Area of concrete wall : area of pool = 11 : 25

Area of concrete wall + pool : Area of pool

= 25 + 11 : 25

= 36 : 25

$\therefore$ Radius ratio = 6 : 5

$R = \frac{r+4}{r} = \frac{6}{5}$

$5r + 20 = 6r$

$\therefore r = 20$ cm

248. (B)

$\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \left(\frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta DEF}\right)^2$

$= \left(\frac{4}{1}\right)^2 = 16 : 1$

249. (B) Area of square = side^2

2500 – 750

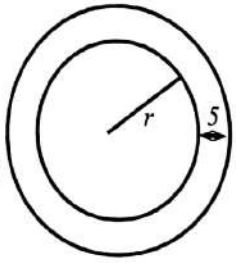
10,000 – ?

$\therefore$ Amount of rice produced

$= \frac{10,000}{2500} \times 750$

$= 3000$ kg

250. (D)



Let the internal radius = r

Time α distance

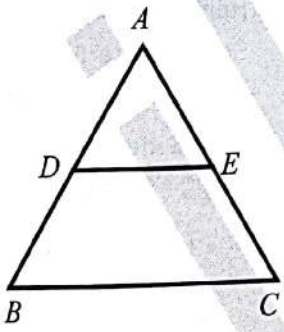
$\frac{2\pi(r+5)}{2\pi r} = \frac{20}{19}$

$19(r+5) = 20r$

$19r + 95 = 20r \Rightarrow r = 95$

Internal diameter = $2r = 2 \times 95 = 190$ m

251. (C)



$\Delta ADE \sim \Delta ABC$

$\angle ADE = \angle ABC$

DE, BC are parallel and AB, AC are transversal

$\angle AED = \angle ACB$

$\angle A = \angle A$

$\therefore \frac{\text{Area of ADE}}{\text{Area of ABC}} = \frac{1}{2}$

$\frac{AD}{AB} = \frac{1}{\sqrt{2}}$

$\frac{DB}{AB} = \frac{AB - AD}{AB} = \frac{\sqrt{2}-1}{\sqrt{2}}$

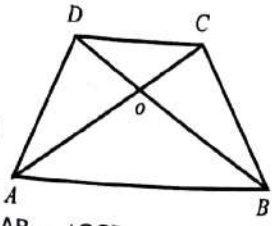
$\therefore DB : AB = \sqrt{2} - 1 : \sqrt{2}$

252. (D) Area of

$\Delta GBC = \frac{1}{3} \times$ Areaof ΔABC

$= \frac{1}{3} \times 60 = 20$ cm^2

253. (B)



$\Delta OAB \sim \Delta OCD$

$\frac{\text{Area of } \Delta AOB}{\text{Area of } \Delta COD} = \left(\frac{AB}{CD}\right)^2$

$\frac{84}{\text{Area of } \Delta COD} = \left(\frac{2}{1}\right)^2$

Area of $\Delta COD = \frac{84}{4} \Rightarrow 21$ cm^2

254. (B) $\frac{A_1}{A_2} = \frac{\frac{1}{2} b_1 h_1}{\frac{1}{2} b_2 h_2} = \frac{3}{2}$

$\frac{4}{5} \times \frac{b_1}{b_2} = \frac{3}{2}$

$\Rightarrow b_1 : b_2 = 15 : 8$

255. (C) Let the parallel sides be 4x, 7x

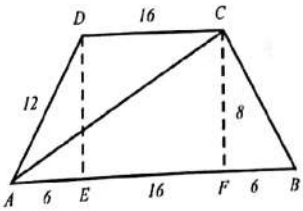
Area of trapezium $= \frac{1}{2}$ (Sum of parallel sides) height

$176 = \frac{1}{2} \times (11x) \times \left(\frac{2}{11} \times 11x\right)$

$x^2 = \frac{176}{11} = 16 \Rightarrow x = 4$

parallel sides are 4x, 7x = 16, 28

$h = \frac{2}{11} \times 11x = 2x = 8$



DC = EF = 16

$\therefore AE = FB = \frac{28-16}{2} = 6$

AF = 6 + 16 = 22 CF = 8

$\therefore$ Diagonal $= \sqrt{22^2 + 8^2}$

$= \sqrt{484 + 64} = \sqrt{548} = 2\sqrt{137}$ cm

256. (D) Area of square = 4

$a^2 = 4 \Rightarrow a = 2$

Radius = Diagonal

$= \sqrt{2}a = 2\sqrt{2}$

$\therefore$ Area

$= \pi r^2 = \pi(2\sqrt{2})^2 = 8\pi$ sq.units

257. (C) l b = 120

$2(l + b) = 46$

$\Rightarrow l + b = 23$

$(l+b)^2 = l^2 + b^2 + 2lb$

$23^2 = l^2 + b^2 + 2 \times 120$

$\Rightarrow l^2 + b^2 = 529 - 240 = 289$

Diagonal

$= \sqrt{l^2 + b^2} = \sqrt{289} = 17$m

258. (A) Volume of plate = Area × width

$= x^2 \times 0.1$ cm^3

$= 0.1\ x^2 \times$ cm^3

8.4 gram $\rightarrow$ 1 cm^3

4725 gram $\rightarrow$?

$\therefore$ Volume $= \frac{4725}{8.4}$

$\Rightarrow 0.1x^2 = \frac{4725}{8.4}$

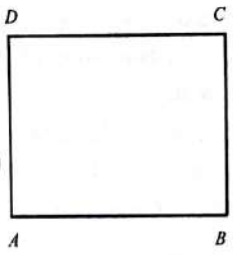
$\Rightarrow x^2 = \frac{4725}{0.84} = 5625$

$\Rightarrow x = 75$ cm

259. (B) $175 = \frac{1}{2}(15 + 20)$ height

$\Rightarrow$ height $= \frac{350}{35} = 10$ cm

260. (A)



Let side of square be a

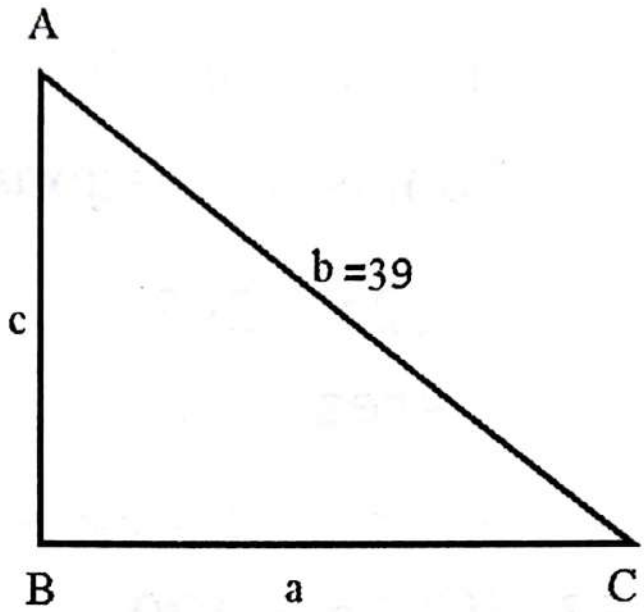
$\Rightarrow$ BC = a

AC = diagonal $= \sqrt{2}$ a

$\frac{\text{Area of } \Delta QBC}{\text{Area of } \Delta PAC} = \frac{BC^2}{AC^2}$

$= \frac{a^2}{2a^2} = \frac{1}{2}$

261. (A)



$b = 39$

$b^2 = a^2 + c^2 = 39^2$

$a - c = 21$

$(a+c)^2 + (a-c)^2 = 2(a^2 + c^2)$

$(a+c)^2 + (21)^2 = 2 \times 39^2$

$(a+c)^2 = 3042 - 441$

$a + c = \sqrt{2601}$

$a + c = 51$

$a - c = 21$

$\Rightarrow a = 36,\ c = 15$

Area

$$= \frac{1}{2} \times ac = \frac{1}{2} \times 36 \times 15 = 270 \text{ cm}^2$$

LEVEL - II

258. A plate on square base made of brass is of length x cm and width 1 mm. The plate weighs 4725 gm. If 1 cubic cm of brass weighs 8.4 gram, then the value of x is:
A) 75 B) 76
C) 72 D) 74

259. The length of two parallel sides of a trapezium are 15 cm and 20 cm. If its area is 175 sq. cm, then its height is:
A) 15 cm B) 10 cm
C) 20 cm D) 25 cm

260. ABCD is a square. Draw a triangle QBC on side BC considering BC as base and draw a triangle PAC on AC as its base such that $\Delta QBC \sim \Delta PAC$. Then $\frac{\text{Area of } \Delta QBC}{\text{Area of } \Delta PAC}$ is equal to
A) $\frac{1}{2}$ B) $\frac{2}{1}$
C) $\frac{1}{3}$ D) $\frac{2}{3}$

261. The hypotenuse of a right-angled triangle is 39 cm and the difference of other two sides is 21 cm. Then, the area of the triangle is
A) 270 sq. cm B) 450 sq. cm
C) 540 sq. cm D) 180 sq. cm

TYPE-II

1. The perimeter of two squares are 24 cm and 32 cm. The perimeter (in cm) of a third square equal in area to the sum of the areas of these squares is:
A) 45 B) 40
C) 32 D) 48

2. The perimeter of two squares are 40 cm and 32 cm. The perimeter of a third square whose area is the difference of the area of the two squares is
A) 24 cm B) 42 cm
C) 40 cm D) 20 cm

3. If the ratio of areas of two squares is 225 : 256, then the ratio of their perimeter is:
A) 225 : 256 B) 256 : 225
C) 15 : 16 D) 16 : 15

4. The perimeter of two squares are 40 cm and 24 cm. The perimeter of a third square, whose area is equal to the difference of the area of these squares, is
A) 34 cm B) 32 cm
C) 38 cm D) 30 cm

5. The length and breadth of a rectangular field are in the ratio of 3 : 2. If the perimeter of the field is 80 m, its breadth (in metres) is:
A) 18 B) 16
C) 10 D) 24

6. The sides of a rectangular plot are in the ratio 5 : 4 and its area is equal to 500sq. m. The perimeter of the plot is:
A) 80m B) 100m
C) 90m D) 95 m.

7. The perimeter of the top of a rectangular table is 28m., whereas its area is 48 m^2. What is the length of its diagonal?
A) 5m. B) 10m.
C) 12m. D) 12.5m.

8. If the length and the perimeter of a rectangle are in the ratio 5 : 16, then its length and breadth will be in the ratio
A) 5 : 11 B) 5 : 8
C) 5 : 4 D) 5 : 3

9. The length and perimeter of a rectangle are in the ratio 5:18. Then length and breadth will be in the ratio
A) 4 : 3 B) 3 : 5
C) 5 : 4 D) 4 : 7

10. If the area of a rectangle be $(x^2+7x+10)$ sq. cm, then one of the possible perimeter of it is
A) $(4x+14)$ cm
B) $(2x+14)$ cm
C) $(x+14)$ cm
D) $(2x+7)$ cm

11. The perimeter of a rectangular plot is 48m and area is 108 m^2. The dimensions of the plot are
A) 36m and 3m
B) 12 m and 9m
C) 27m and 4m
D) 18 m and 6m

12. The sides of a triangle are in the ratio $\frac{1}{2}:\frac{1}{3}:\frac{1}{4}$. If the perimeter of the triangle is 52cm, the length of the smallest side is:
A) 24cm B) 10 cm
C) 12cm D) 9cm

13. The area of an equilateral triangle is $400\sqrt{3}$ sq.m. Its perimeter is:
A) 120m B) 150m
C) 90m D) 135m

22. If the perimeter of a right-angled triangle is 56cm and area of the triangle is 84 sq.cm, then the length of the hypotenuse is (in cm)
A) 25 B) 50
C) 7 D) 24

23. If the length of each median of an equilateral triangle is $6\sqrt{3}$ cm, the perimeter is
A) 24 cm B) 32 cm
C) 36 cm D) 42 cm

24. The area of an equilateral triangle is $4\sqrt{3}$ sq.cm. Its perimeter is
A) 12 cm B) 6 cm
C) 8 cm D) $3\sqrt{3}$ cm

25. The sides of a triangle are in the ratio $\frac{1}{4}:\frac{1}{6}:\frac{1}{8}$ and its perimeter is 91 cm. The differene of the length of longest side and that of shortest side is
A) 19cm B) 20cm
C) 28cm D) 21cm

26. The diagonals of a rhombus are 32cm and 24cm respectively. The perimeter of the rhombus is:
A) 80cm B) 72cm
C) 68cm D) 64cm

27. The diagonals of a rhombus are 24cm and 10cm. The perimeter of the rhombus (in cm) is:
A) 68 B) 65
C) 54 D) 52

28. The perimeter of a rhombus is 40cm. If one of the diagonals be 12cm long, what is the length of the other diagonal?
A) 12cm B) $\sqrt{136}$ cm
C) 16cm D) $\sqrt{44}$ cm

29. The sides of a quadrilateral are in the ratio 3 : 4 : 5 : 6 and its perimeter is 72cm. The length of its greatest side (in cm) is
A) 24 B) 27
C) 30 D) 36

30. The area of a rhombus is 216 cm^2 and the length of its one diagonal is 24cm. The perimeter (in cm) of the rhombus is
A) 52 B) 60
C) 120 D) 100

39. If the difference between the circumference and diameter of a circle is 30 cm, then the radius of the circle must be
A) 6cm B) 7cm
C) 5cm D) 8cm

40. If the perimeter of a semicircular field is 144m, then the diameter of the field is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 55m B) 30m
C) 28m D) 56m

41. The perimeter (in metres) of a semicircle is numerically equal to its area (in square metres). The length of its diameter is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) $6\frac{6}{11}$ metres B) 5metres
C) 6metres D) 6metres

42. The ratio of the numbers giving the measure of the circumferences and the area of a circle of radius 3cm is
A) 1 : 3 B) 2 : 3
C) 2 : 9 D) 3 : 2

43. The ratio of the ratio of the radii of two wheels is 3 : 4. The ratio of their circumference is
A) 4 : 3 B) 3 : 4
C) 2 : 3 D) 3 : 2

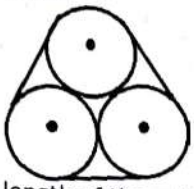
44. The length (in cm) of a chord of a circle of radius 13cm at a distance of 12cm form its centre is
A) 5 B) 8
C) 10 D) 12

45. The diameter of a wheel is 98cm. The number of revolutions in which it will have to cover a distance of 1540 m is
A) 500 B) 600
C) 700 D) 800

46. The wheel of a motor car makes 1000 revolutions in moving 440m. The diameter (in metre) of the wheel is
A) 0.44 B) 0.14
C) 0.24 D) 0.34

47. A bicycle wheel makes 5000 revolutions in moving 11 km. Then the radius of the wheel (in cm) is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 70 B) 35
C) 17.5 D) 140

48. Three circles of diameter 10cm each, Are bound together by a rubber band, as shown in the figure.



The length of the rubber band, (in cm) if it is stretched as shown, is
A) 30 B) $30 + 10\pi$
C) 10π D) $60 + 20\pi$

49. If a chord of length 16 cm is at a distance of 15cm from the centre of the circle, then the length of the chord of the same circle which is at a distance of 8cm from the centre is equal to
A) 10cm B) 20cm
C) 30cm D) 40cm

50. A semicircular shaped window has diameter of 63cm. Its perimeter equals $\left(\pi = \frac{22}{7}\right)$
A) 126cm B) 162cm
C) 198cm D) 251cm

51. A gear 12cm in diameter is turning a gear 18cm in diameter. When the smaller gear has 42 revolutions, how many has the larger one made?
A) 28 B) 20
C) 15 D) 24

52. Then perimeter of a semi-circular area is 18cm, then the radius is: $\left(\text{Using } \pi = \frac{22}{7}\right)$
A) $5\frac{1}{3}$ cm B) $3\frac{1}{2}$ cm
C) 6cm D) 4cm

53. A circular road runs around a circular ground. If the difference between the circumference of the outer circle and the inner circle is 66 metres, the width of the road is: $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 10.5 metres B) 7 metres
C) 5.25 metres D) 21 metres

54. A person observed that he required 30 seconds less time to cross a circular ground along its diameter than to cover it once along the boundary, If his speed was 30m/minute, then the radius of the circular ground is
A) 5.5 m B) 7.5 m
C) 10.5 m D) 13.125 m

55. The difference of perimeter and diameter of a circle is X unit. The diameter of the circle is
A) $\frac{X}{\pi - 1}$ unit B) $\frac{X}{\pi + 1}$ unit
C) $\frac{X}{\pi}$ unit D) $\left(\frac{X}{\pi} - 1\right)$ unit

56. The circumference of a circle is 100cm. The side of a square inscribed in the circle is
A) $\frac{100\sqrt{2}}{\pi}$ cm B) $\frac{50\sqrt{2}}{\pi}$ cm
C) $\frac{100}{\pi}$ cm D) $50\sqrt{2}$ cm

57. A path of uniform width surrounds a circular park. The difference of internal and external circumference of this circular path is 132 metres. Its width is: $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 22m B) 20m
C) 21m D) 24m

58. The ratio of the outer and the inner perimeter of a circular path is 23 : 22. If the path is 5 metres wide, the diameter of the inner circle is:
A) 110m B) 55m
C) 220m D) 230m

59. The radius of the in-circle of a triangle is 2 cm. If the area of the triangle is 6 cm^2, then its perimeter is
A) 2 cm B) 3cm
C) 6cm D) 9cm

60. The area of the circumcircle of an equilateral triangle is 3π sq. cm. The perimeter of the triangle is
A) $3\sqrt{3}$ cm B) 9cm
C) 18cm D) 3cm

61. A wire when bent in the form of a square encloses an area of 484 sq. cm. What will be the enclosed area when the same wire is bent into the form of a circle? $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 62 sq. cm B) 539 sq. cm
C) 616 sq. cm. D) 693 sq. cm

62. Four equal sized maximum circular plates are cut off from a square paper sheet of area 784 sq. cm. The circumference of each plate is

A) 22 cm B) 44 cm
C) 66 cm D) 88 cm

63. If the area of a circle and a square are equal, then the ratio of their perimeter is

A) 1 : 1 B) $2 : \pi$
C) $\pi : 2$ D) $\sqrt{\pi} : 2$

64. A copper wire is bent in the form of square with an area of 121 cm^2. If the same wire is bent in the form of a circle, the radius (in cm) of the circle is $\left(\text{Take } \pi = \frac{22}{7}\right)$

A) 7 B) 10
C) 11 D) 14

65. If the perimeter of a square and a rectangle are the same, then the area P and Q enclosed by them would satisfy the condition

A) $P < Q$ B) $P \leq Q$
C) $P > Q$ D) $P = Q$

66. A circle and a rectangle have the same perimeter. The sides of the rectangle are 18 cm and 26 cm. The area of the circle is $\left(\text{Take } \pi = \frac{22}{7}\right)$

A) 125 cm^2 B) 230 cm^2
C) 550 cm^2 D) 616 cm^2

67. If the sides of an equilateral triangle are increased by 20%, 30% and 50% respectively to form a new triangle, the increase in the perimeter of the equilateral triangle, the increase in the perimeter of the equilateral triangle is

A) 25% B) $33\frac{1}{3}\%$
C) 75% D) 100%

68. A horse is tied to a post by a rope. If the horse moves along a circular path always keeping the rope stretched and describes 88 metres when it has traced out 72° at the centre, the length of the rope is $\left(\text{Take } \pi = \frac{22}{7}\right)$

A) 70m B) 75m
C) 80m D) 65m

69. Three circles of radii 3.5 cm, 4.5 cm and 5.5 cm touch each other externally. Then the perimeter of the triangle formed by joining the centres of the circles, in cm, is

A) 27
B) $\pi\left[(3.5)^2 + (4.5)^2 + (5.5)^2\right]$
C) 27π
D) 13.5

70. ABCD is a parallelogram in which diagonals AC and BD intersect at O. If E, F, G and H are the mid points of AO, DO, CO and BO respectively, then the ratio of the perimeter of the quadrilateral EFGH to the perimeter of parallelogram ABCD is

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

71. A circular wire of diameter 112 cm is cut and bent in the form of a rectangle whose sides are in the ratio 9 ; 7. The smaller side of the rectangle is

A) 77cm B) 97 cm
C) 67 cm D) 87 cm

72. If the perimeter of an equilateral triangle be 18 cm, then the length of each median is

A) $3\sqrt{2}$ cm B) $2\sqrt{3}$ cm
C) $3\sqrt{3}$ cm D) 2

73. Two equal maximum sized circular plates are cut off from a circular paper sheet of circumference 352 cm. Then the circumference of each circular plate is

A) 176 cm B) 150 cm
C) 165 cm D) 180 cm

74. If diagonals of a rhombus are 24cm and 32cm, then perimeter of that rhombus is

A) 80 cm B) 84 cm
C) 76 cm D) 72 cm

75. The inradius of an equilateral triangle is $\sqrt{3}$ cm, then the perimeter of that triangle is

A) 18cm B) 15cm
C) 12cm D) 6cm

76. Length of a side of a square inscribed in a circle is $a\sqrt{2}$ units. The circumference of the circle is

A) $2\pi a$ units B) πa units
C) $4\pi a$ units D) $\frac{2a}{\pi}$ units

A) 108 sq. cm. B) 216 sq. cm.
C) 432 sq. cm. D) 206 sq. cm.

86. The ratio of circumference and diameter of a circle is 22 : 7. If the circumference be $1\frac{4}{7}$m, then the radius of the circle is:
A) $\frac{1}{3}$m B) $\frac{1}{2}$m
C) $\frac{1}{4}$m D) 1m

TYPE-III

1. How many tiles, each 4 decimetre square, will be required to cover the floor of a room 8 m long and 6 m broad?
A) 200 B) 260
C) 2580 D) 300
2. The floor of a corridor is 100m long and 3m wide. Cost of covering the floor with carpet 50 cm wide at the rate of Rs. 15 per m is
A) Rs. 4500 B) Rs. 9000
C) Rs. 7500 D) Rs. 1900
3. Three sides of a triangular field are of length 15m, 20m and 25m long respectively. Find the cost of sowing seeds in the field at the rate of 5 rupees per sq.m.
A) Rs. 300 B) Rs. 600
C) Rs. 750 D) Rs. 150
4. The radius of a circular wheel is 1.75 m. The number of revolutions it will make in travelling 11 km is: $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 800 B) 900
C) 1000 D) 1200
5. The radius of a wheel is 21 cm. How many revolutions will it make in travelling 924 metres? $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 7 B) 11
C) 200 D) 700
6. A playground is in the shape of a rectangle. A sum of Rs. 1000 was spend to make the ground usable at the rate of 25 paise per sq. m. The breadth of the ground is 50 m. If the length of the ground is increased by 20 m, what will be the expenditure (in rupees) at the same rate per sq. m.?
A) 1250 B) 1000
C) 1500 D) 2250
7. If each edge of a square be doubled, then the increase percentage in its area is
A) 200% B) 250%
C) 280% D) 300%
8. If radius of a circle is increased by 5%, then the increase in its area is
A) 10.25% B) 10%
C) 5.75% D) 5%
9. The height of a triangle is increased by 10%. to retain the original area of the triangle, its corresponding base must be decreased by
A) 10% B) $9\frac{1}{7}\%$
C) $9\frac{1}{8}\%$ D) $9\frac{1}{11}\%$
10. The percentage increase in the area of a rectangle, if each of its sides is increased by 20% is equal to
A) 32% B) 34%
C) 42 D) 44%
11. If the radius of a circle is decreased by 10%, then the area of the circle is decreased by
A) 89% B) 18%
C) 19% D) 25%
12. The outer circumference of a circular race-track is 528 metre. The track is everywhere 14 metre wide. Cost of levelling the track at the rate of Rs. 10 per sq. metre is:
A) Rs. 77660 B) Rs. 66760
C) Rs. 76760 D) Rs. 67760

TYPE-IV

1. The edges of a rectangular box are in the ratio 1 : 2 : 3 and its surface area is 88 cm^2. The volume of the box is
A) 24 cm^3 B) 48 cm^3
C) 64 cm^3 D) 120 cm^3
2. A right triangle with sides 3cm, 4cm and 5 cm is rotated about the side 3 cm to form a cone, The volume of the cone so formed is
A) 16 π cm^3 B) 12 π cm^3
C) 15 π cm^3 D) 20 π cm^3
3. If the length of each side of a regular tetrahedron is 12cm, then the volume of the tetrahedron is
A) $144\sqrt{2}$ cu. cm.
B) $72\sqrt{2}$ cu. cm.
C) $8\sqrt{2}$ cu. cm.
D) $12\sqrt{2}$ cu. cm.
4. Two right circular cylinders of equal volume have their heights in the ratio 1: 2. The ratio of their radii is:
A) $\sqrt{2}$: 1 B) 2 : 1
C) 1 : 2 D) 1 : 4
5. The volume of a right circular cylinder whose height is 40 cm. and circumference of its base is 66 cm, is:
A) 55440 cm^3 B) 3465 cm^3
C) 7720 cm^3 D) 13860 cm^3
6. The base radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is:
A) 27 : 20 B) 20 : 27
C) 9 : 4 D) 4 : 9
7. The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3. Find the ratio of its diameter to its height.
A) 7 : 6 B) 6 : 7
C) 3 : 7 D) 7 : 3
8. A hollow cylindrical tube 20 cm long, is made of iron and its external and internal diameters are 8 cm and 6 cm respectively, The volume of iron used in making the tube in $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 1760 cu. cm B) 880 cu. cm.
C) 440 cu. cm. D) 220 cu. cm.
9. A hollow iron pipe is 21 cm long and its exterior diameter is 8 cm. If the thickness of the pipe is 1cm and iron weighs 8g/cm^3, then the weight of the pipe is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 3.696 kg B) 3.6 kg
C) 36 kg D) 36.9 kg
10. The volume of a right circular cylinder, 14 cm in height, is equal to that of a cube whose edge is 11 cm. Taking $\pi = \frac{22}{7}$ the radius of the base of the cylinder is
A) 5.2 cm. B) 5.5 cm.
C) 11.0 cm. D) 22.0 cm.

169.(C)	170.(C)	171.(B)	172.(C)
173.(B)	174.(A)	175.(D)	176.(C)
177.(B)	178.(B)	179.(B)	180.(C)
181.(D)	182.(B)	183.(C)	184.(A)
185.(D)	186.(B)	187.(C)	188.(A)
189.(B)	190.(B)	191.(D)	192.(A)
193.(D)	194.(A)	195.(C)	196.(D)
197.(B)	198.(A)	199.(D)	200.(A)
201.(A)	202.(D)	203.(B)	204.(A)
205.(C)	206.(B)	207.(B)	208.(A)
209.(B)	210.(A)	211.(B)	212.(A)
213.(B)	214.(C)	215.(C)	216.(C)
217.(A)	218.(C)	219.(C)	220.(C)
221.(D)	222.(D)	223.(A)	224.(A)
225.(C)	226.(B)	227.(C)	228.(C)
229.(A)	230.(D)	231.(B)	232.(C)
233.(D)	234.(C)	235.(B)	236.(A)
237.(D)	238.(D)	239.(B)	240.(D)
241.(C)	242.(D)	243.(B)	244.(B)
245.(A)	246.(B)	247.(D)	248.(B)
249.(B)	250.(D)	251.(C)	252.(D)
253(B)	254.(B)	255.(C)	256.(D)
257.(C)	258.(A)	259.(B)	260.(A)
261.(A)			

Type – II

1.(B)	2.(A)	3.(C)	4.(B)
5.(B)	6.(C)	7.(B)	8.(D)
9.(C)	10.(A)	11.(D)	12.(C)
13.(A)	14.(C)	15.(C)	16.(D)
17.(C)	18.(A)	19.(C)	20.(C)
21.(A)	22.(A)	23.(C)	24.(A)
25.(D)	26.(A)	27.(D)	28.(C)
29.(A)	30.(B)	31.(A)	32.(B)
33.(C)	34.(B)	35.(B)	36.(A)
37.(A)	38.(A)	39.(B)	40.(D)
41.(A)	42.(B)	43.(B)	44.(C)
45.(A)	46.(B)	47.(B)	48.(B)
49.(C)	50.(B)	51.(A)	52.(B)
53.(A)	54.(D)	55.(A)	56.(B)
57.(C)	58.(C)	59.(C)	60.(B)
61.(C)	62.(B)	63.(D)	64.(A)
65.(C)	66.(D)	67.(B)	68.(A)
69.(A)	70.(C)	71.(A)	72.(C)
73.(A)	74.(A)	75.(A)	76.(A)
77.(B)	78.(B)	79.(B)	80.(B)
81.(B)	82.(A)	83.(C)	84.(A)
85.(B)	86.(C)		

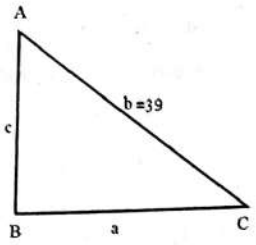
Type – III

1.(D)	2.(B)	3.(C)	4.(C)
5.(D)	6.(A)	7.(D)	8.(A)
9.(D)	10.(D)	11.(C)	12.(D)

Type – IV

1.(B)	2.(A)	3.(A)	4.(A)
5.(D)	6.(B)	7.(D)	8.(C)
9.(A)	10.(B)	11.(B)	12.(C)
13.(A)	14.(B)	15.(A)	16.(A)
17.(D)	18.(D)	19.(A)	20.(A)
21.(C)	22.(A)	23.(B)	24.(D)
25.(D)	26.(D)	27.(A)	28.(A)
29.(C)	30.(C)	31.(B)	32.(A)
33.(A)	34.(D)	35.(A)	36.(D)
37.(D)	38.(B)	39.(C)	40.(B)
41.(C)	42.(D)	43.(A)	44.(A)
45.(B)	46.(D)	47.(D)	48.(D)
49.(B)	50.(C)	51.(A)	52.(D)
53.(A)	54.(C)	55.(B)	56.(A)
57.(B)	58.(C)	59.(B)	60.(C)
61.(B)	62.(B)	63.(C)	64.(B)
65.(D)	66.(D)	67.(B)	68.(D)
69.(C)	70.(D)	71.(A)	72.(A)
73.(C)	74.(C)	75.(C)	76.(C)
77.(C)	78.(B)	79.(D)	80.(C)
81.(A)	82.(C)	83.(B)	84.(B)
85.(B)	86.(B)	87.(A)	88.(A)
89.(A)	90.(C)	91.(A)	92.(A)
93.(B)	94.(D)	95.(C)	96.(B)
97.(C)	98.(C)	99.(C)	100.(B)
101.(B)	102.(C)	103.(D)	104.(B)
105.(A)	106.(C)	107.(A)	108.(D)
109.(D)	110.(D)	111.(B)	112.(D)
113.(C)	114.(A)	115.(A)	116.(B)
117.(A)	118.(D)	119.(B)	120.(A)
121.(C)	122.(B)	123.(A)	124.(D)
125.(D)	126.(C)	127.(B)	128.(A)

261. (A)



$b = 39$

$b^2 = a^2 + c^2 = 39^2$

$a - c = 21$

$(a+c)^2 + (a-c)^2 = 2(a^2 + c^2)$

$(a+c)^2 + (21)^2 = 2 \times 39^2$

$(a+c)^2 = 3042 - 441$

$a + c = \sqrt{2601}$

$a + c = 51$

$a - c = 21$

$\Rightarrow a = 36, c = 15$

Area

$= \frac{1}{2} \times ac = \frac{1}{2} \times 36 \times 15 = 270 \text{ cm}^2$

LEVEL - II

1. (B) Sum of areas

$= \left(\frac{24}{4}\right)^2 + \left(\frac{32}{4}\right)^2$

$6^2 + 8^2 = 10^2$

$\therefore$ Area of third square $= 10^2$

$\therefore$ side $= \sqrt{10^2} = 10$ cm

$\therefore$ Perimeter $= 4 \times 10 = 40$ cm

2. (A) Difference in areas

$= \left(\frac{40}{4}\right)^2 - \left(\frac{32}{4}\right)^2$

$10^2 - 8^2 = 6^2$

Area of third square = side^2 $= 6^2$

$\Rightarrow$ side = 6 cm

$\therefore$ Perimeter $= 4 \times 6 = 24$ cm

3. (C) Let the sides of squares be a_1 & a_2

$a_1^2 : a_2^2 = 225 : 256$

$\Rightarrow a_1 : a_2 = 15 : 16$

Ratio of perimeters $= 4a_1 : 4a_2$

$= a_1 : a_2 = 15 : 16$

4. (B) Difference of areas

$= \left(\frac{40}{4}\right)^2 - \left(\frac{24}{4}\right)^2$

$= 10^2 - 6^2 = 8^2$

Area of 3rd square = side^2 = 8^2

$\Rightarrow$ side = 8 cm

Perimeter of 3rd square

$= 4 \times 8 = 32$ cm

5. (B) Let length = 3x breadth = 2x

$2(3x + 2x) = 80$

$5x = 40 \Rightarrow x = 8$

breadth $= 2x = 2 \times 8 = 16$m

6. (C) Length = 5x breadth = 4x

Area $= 5x \times 4x = 500$

$\Rightarrow x^2 = 25$

$x = 5$

Perimeter $= 2(5x + 4x) = 18x$

$= 18 \times 5 = 90$ m

7. (B) Perimeter $2(\ell + b) = 28$

$\Rightarrow \ell + b = 14$

Area $= \ell b = 48$

$(\ell + b)^2 = \ell^2 + b^2 + 2\ell b$

$(14)^2 = \ell^2 + b^2 + 2(48)$

$196 = \ell^2 + b^2 + 96$

$\Rightarrow \ell^2 + b^2 = 100$

$\therefore$ Diagonal

$= \sqrt{\ell^2 + b^2} = \sqrt{100} = 10$m

8. (D) $\frac{\ell}{2(\ell + b)} = \frac{5}{16}$

$\Rightarrow \frac{\ell}{\ell + b} = \frac{5}{8}$

$8\ell = 5\ell + 5b$

$3\ell = 5b$

$\Rightarrow \ell : b = 5 : 3$

9. (C) $\frac{\ell}{2(\ell + b)} = \frac{5}{18}$

$\frac{\ell}{\ell + b} = \frac{5}{9}$

$9\ell = 5\ell + 5b$

$4\ell = 5b$

$\Rightarrow \ell : b = 5 : 4$

10. (A) Area $= x^2 + 7x + 10$

$\ell b = (x + 5)(x + 2)$

$\Rightarrow \ell = x + 5, b = x + 2$

Possible Perimeter $= 2(\ell + b)$

$= 2(x + 5 + x + 2)$

$= (4x + 14)$ cm

11. (D) $2(\ell + b) = 48 \Rightarrow \ell + b = 24$

Area $\ell b = 108$

$(\ell + b)^2 - (\ell - b)^2 = 4\ell b$

$(24)^2 - (\ell - b)^2 = 4 \times 108$

$\Rightarrow (\ell - b)^2 = 576 - 432 = 144$

$\Rightarrow \ell - b = 12$ & $\ell + b = 24$

$\therefore \ell = 18$m & $b = 6$m

12. (C) Sides ratio $= \frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

$= 6 : 4 : 3$

13 parts = 52 $\Rightarrow$ 1 part = 4

Length of smallest side = 3 parts

$= 3 \times 4 = 12$ cm

13. (A) $\frac{\sqrt{3}}{4}a^2 = 400\sqrt{3}$

$\Rightarrow a^2 = 1600$

$\Rightarrow a = 40$

Perimeter

$= 3a = 3 \times 40 = 120$m

14. (C) Sum of length of perpendicular $= \frac{\sqrt{3}}{2}a$

$\sqrt{3} + 2\sqrt{3} + 5\sqrt{3} = \frac{\sqrt{3}}{2}a$

$8\sqrt{3} = \frac{\sqrt{3}}{2}a$

$\Rightarrow a = 16$ cm

Perimeter = 3a = 48 cm

15. (C) Largest side = 13 cm

So other sides can be 5, 12

Perimeter = 5 + 12 + 13 = 30

Area $= \frac{1}{2} \times 5 \times 12 = 30$

Hence satisfied

So sides are 5, 12, 13

Smallest side = 5 cm

16. (D) Sides 3x, 4x, 5x $\Rightarrow$ Right angled triangle

$\frac{1}{2} \times 3x \times 4x = 216$

$\Rightarrow x^2 = 36$

$\Rightarrow x = 6$

Perimeter = 3x + 4x + 5x = 12x = 72cm

17. (C) Sides 30, 72, 78

$= 6 \times 5, 6 \times 12, 6 \times 13$

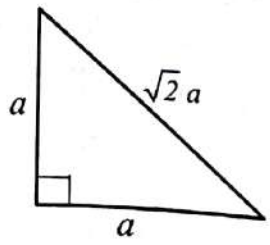
So right angled

Area $= \frac{1}{2} \times 30 \times 72 = 1080$

$1080 = \frac{1}{2} \times 72 \times h$

$\therefore h = 30$m

18. (A) Let the equal side be a



perimeter $= a + a + \sqrt{2}a$

$= 2a + \sqrt{2}a$

$2a + \sqrt{2}a = 4 + 4\sqrt{2}$

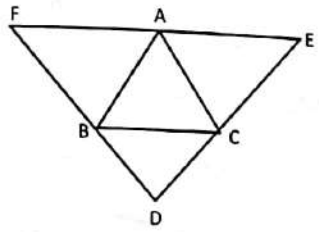
$a(2 + \sqrt{2}) = 2\sqrt{2}(2 + \sqrt{2})$

$\Rightarrow a = 2\sqrt{2}$

Hypotenuse

$= \sqrt{2}a = \sqrt{2} \times 2\sqrt{2} = 4$ cm

19. (C)



BCAF is parallelogram as BC || AF & BF ||AC

$\therefore$ BC = AF

BCEA is parallelogram as BC || AE & AB || EC

$\therefore$ BC = AE

$\therefore$ 2BC = AF + AE $\Rightarrow$ 2BC = EF

Similarly 2AB = DE & 2CA = DF

$$\frac{\text{Perimter of DEF}}{\text{Perimeter of ABC}} = \frac{DE + EF + FD}{AB + BC + CA}$$

$$= \frac{2(AB + BC + CA)}{AB + BC + CA} = 2 : 1$$

20. (C) Sides $= \frac{1}{3} : \frac{1}{4} : \frac{1}{5} = 20 : 15 : 12$

47 parts = 94 $\Rightarrow$ 1 part = 2

$\therefore$ smallest side

= 12parts = $12 \times 2 = 24$ cm

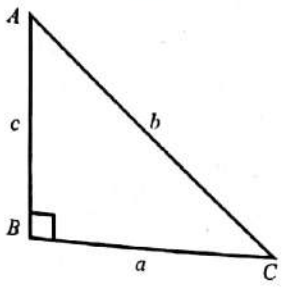
21. (A) Possible sides are

a) 15, 15, 22 $\Rightarrow$ Perimeter = 52

b) 15, 22, 22 $\Rightarrow$ Perimeter = 59

$\therefore$ Perimeter = 52 or 59

22. (A) Perimeter a + b + c = 56



Area $\frac{1}{2}ac = 84 \Rightarrow ac = 168$

$b^2 = a^2 + c^2$

$b^2 = (a + c)^2 - 2ac$

$b^2 = (56 - b)^2 - 2 \times 168$

$b^2 = b^2 + 56^2 - 112b - 336$

$112b = 56^2 - 336$

$112b = 56(56 - 6)$

$2b = 50$

$\Rightarrow$ b = hypotenuse = 25 cm

23. (C) $\frac{\sqrt{3}}{2}a = 6\sqrt{3}$

$\Rightarrow a = 12$

Perimeter

$= 3a = 3 \times 12 = 36$ cm

24. (A) $\frac{\sqrt{3}}{4}a^2 = 4\sqrt{3}$

$a^2 = 16 \Rightarrow a = 4$

Perimeter $= 3a = 3 \times 4 = 12$ cm

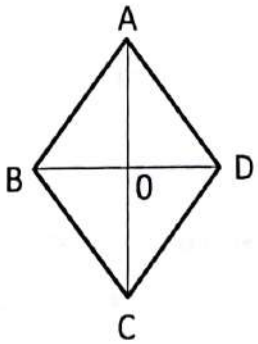
25. (D) Sides $\frac{1}{4} : \frac{1}{6} : \frac{1}{8} = 6 : 4 : 3$

13 parts = 91 $\Rightarrow$ 1part = 7

Difference of longest & shortest = 6parts − 3parts

= 3parts = $3 \times 7 = 21$ cm

26. (A) Let AC = d_1 & BD = d_2



AB = a

$AO = \frac{d_1}{2} = \frac{32}{2} = 16$

$BO = \frac{d_2}{2} = \frac{24}{2} = 12$

In ΔABO

$a^2 = 16^2 + 12^2$

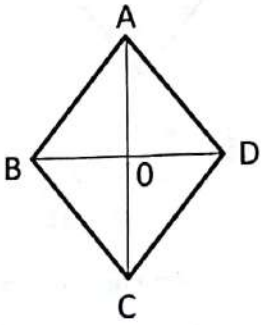
$a^2 = 20^2$

$\Rightarrow a = 20$

$\therefore$ Perimeter

$= 4a = 4 \times 20 = 80$ cm

27. (D)



$AO = \frac{24}{2} = 12$

$BO = \frac{10}{2} = 5$

$AB^2 = AO^2 + OB^2$

$= 12^2 + 5^2 = 13^2$

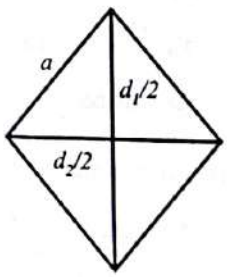
$\therefore$ AB = 13 cm

Perimeter = 4AB

$= 4 \times 13 = 52$ cm

28. (C) $4a = 40$

$\Rightarrow a = 10$ cm, $d_1 = 12$



$a^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2$

$(10)^2 = (6)^2 + \left(\frac{d_2}{2}\right)^2$

$\Rightarrow \left(\frac{d_2}{2}\right)^2 = 8^2$

$\Rightarrow d_2 = 2 \times 8 = 16$ cm

29. (A) Sides in the ratio 3 : 4 : 5 : 6

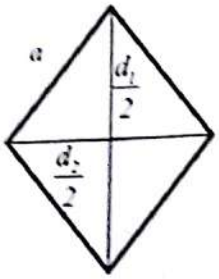
18 parts = 72 $\Rightarrow$ 1 part = 4

Length of greatest side = 6 parts = 24 cm

30. (B) $\frac{1}{2}d_1d_2 = 216$

$\frac{1}{2} \times 24 \times d_2 = 216$

$\Rightarrow d_2 = 18$



$a^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2$

$= 12^2 + 9^2 = 15^2$

$\Rightarrow a = 15$

$\therefore$ Perimeter $= 4 \times 15 = 60$ cm

31. (A) $\frac{22}{7} \times r^2 = 38.5$

$\Rightarrow r^2 = 38.5 \times \frac{7}{22}$

$\Rightarrow r = 3.5$

Circumference

$= 2\pi r = 2 \times \frac{22}{7} \times 3.5 = 22$ cm

32. (B) Diameter = 14 cm

$\Rightarrow r = 7$ cm

Distance travelled in one revolution

= circumference $= 2\pi r$

$= 2 \times \frac{22}{7} \times 7 = 44$

$\therefore$ Distance in 15 revolutions

$= 15 \times 44 = 660$ cm

33. (C) 8 rounds in 40 minutes

$\Rightarrow$ 1 round in $\frac{40}{8} = 5$ min

Diameter increased 10 times

$\Rightarrow$ Circumference also increases 10 times

As speed is constant

Distance also increases 10 times

$\Rightarrow$ Time also increases 10 times

$\therefore$ Time taken $= 5 \times 10 = 50$ min

34. (B) Circumference $= \pi d = 3\pi$

In 1 minute wheel revolves 28 times

$\Rightarrow 3\pi \times 28 = 3 \times \frac{22}{7} \times 28$

= 264 metres

= 264 m $\rightarrow$ 1 min

5280 $\rightarrow$?

$\therefore$ Time taken $= \frac{5280}{264} = 20$ min

35. (B) 113 revolution $\rightarrow$ 2260 m

$\Rightarrow$ 1 revolution $= \frac{2260}{113} = 20$ m

$\pi d = 20$

$\therefore$ Diameter

$= 20 \times \frac{7}{22} = \frac{70}{11} = 6\frac{4}{11}$ m

36. (A) radius = 1.75 m

circumference =

$= 2 \times \frac{22}{7} \times 1.75 = 11$m

11 m $\rightarrow$ 1 revolution

11000m $\rightarrow$?

$\therefore$ No of revolutions

$= \frac{11000}{11} = 1000$

37. (A) Let the sides of rectangle be 6x, 5x

Circumference of circle = Perimeter of rectangle

$= 2 \times \frac{22}{7} \times 42 = 2(6x + 5x)$

$264 = 22x$

$\Rightarrow x = 12$

$\therefore$ Smaller side

$= 5x = 5 \times 12 = 60$ cm

38. (A)

Circumference $= \pi d = \frac{22}{7} \times 40$

$= \frac{880}{7}$ cm $= \frac{8.8}{7}$ m

$\frac{8.8}{7}$ m $\rightarrow$ 1 revolution

176 m $\rightarrow$?

$\therefore$ Number of revolutions

$= \frac{176}{8.8} \times 7 = 140$

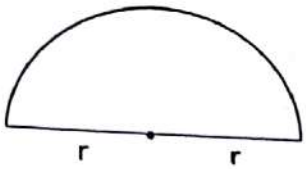
39. (B) $\pi d - d = 30$

$d\left(\frac{22}{7} - 1\right) = 30$

$\Rightarrow d = 30 \times \frac{7}{15} = 14$

$\therefore$ Radius $= \frac{14}{2} = 7$ cm

40. (D) $\pi r + 2r = 144$



$r\left(\frac{22}{7} + 2\right) = 144$

$\Rightarrow r = 144 \times \frac{7}{36} = 28$ m

$\therefore$ Diameter $= 2r = 56$m

41. (A) $\pi r + 2r = \frac{\pi r^2}{2}$

$\Rightarrow \pi + 2 = \frac{\pi r}{2}$

$\Rightarrow r = \frac{2}{\pi}(\pi + 2) = 2\left(1 + \frac{2}{\pi}\right)$

$= 2\left(1 + \frac{2 \times 7}{22}\right)$

$= 2\left(1 + \frac{7}{11}\right) = \frac{36}{11}$

$\therefore$ Diameter

$= 2r = \frac{2 \times 36}{11} = \frac{72}{11} = 6\frac{6}{11}$m

42. (B) $2\pi r : \pi r^2$

$= 2 : r$

$= 2 : 3$ (As r = 3 cm)

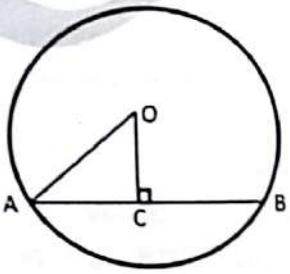
43. (B) Ratio of radii and circumference of circles are same

$\therefore$ ratio = 3 : 4

44. (C) r = OA = 13

OC = 12

$\therefore AC^2 = OA^2 - OC^2$



$= 13^2 - 12^2 = 5^2$

$\Rightarrow$ AC = 5 cm

$\therefore$ Length of chord

AB = 2AC = 10 cm

45. (A) Circumference

$= \pi d = \frac{22}{7} \times 98 = 308$ cm

= 3.08 m

3.08 m $\rightarrow$ 1 revolution

1540 m $\rightarrow$?

$\therefore$ No. of revolutions

$= \frac{1540}{3.08} = 500$

46. (B) 1 revolution =

circumference $= \pi d = \frac{22}{7} d$

1000 revolutions = 440

$1000 \times \frac{22}{7} d = 440$

$\Rightarrow$ diameter

$= \frac{440 \times 7}{22 \times 1000} = 0.14$ m

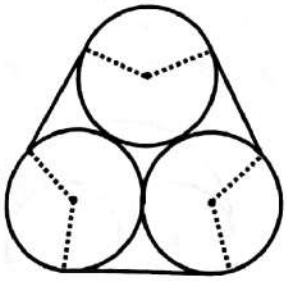
47. (B) 1 revolution = circumference $= 2\pi r = \frac{44}{7}r$

5000 revolutions $= 11000 \times 100$ cm

$5000 \times \frac{44}{7}r = 11000\,00$ cm

$\Rightarrow r = 1100000 \times \frac{7}{44} \times \frac{1}{5000} = 35$ cm

48. (B)



diameter = 10 cm

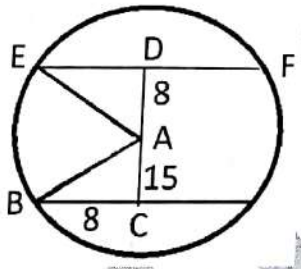
Rubber band covers $= 3 \times 120° = 360°$

$= 2\pi r = 10\pi$

and distance of 3 diameters $= 3 \times 10 = 30$

so length of rubber band $= 30 + 10\pi$ cm

49. (C)



Radius of circle $= \sqrt{15^2 + 8^2}$

$= \sqrt{225 + 64} = 17$

$ED = \sqrt{17^2 - 8^2} = 15$

$\therefore$ length of chord EF = 2ED

$= 2 \times 15 = 30$ cm

50. (B) radius $= \frac{63}{2}$ cm

Perimeter $= \pi r + 2r$

$= r\left(\frac{22}{7} + 2\right)$

$= \frac{36}{7}r = \frac{36}{7} \times \frac{63}{2}$ cm

$= 162$ cm

51. (A) Distance rotated by both gears are same

$\Rightarrow$ Circumference $\times$ Number of rotations are same.

$\pi \times 12 \times 42 = \pi \times 18 \times$ revolutions

$\therefore$ Number of revolutions

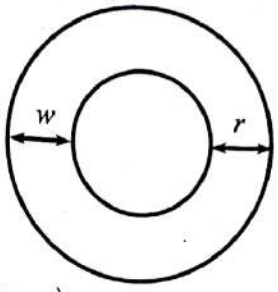
$= \frac{12 \times 42}{18} = 28$

52. (B) $\pi r + 2r = 18$

$\frac{36}{7}r = 18$

$\Rightarrow r = \frac{7}{2} = 3\frac{1}{2}$ cm

53. (A)



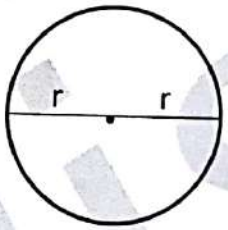
$2\pi(r + w) - 2\pi r = 66$

$\Rightarrow 2\pi w = 66$

$\Rightarrow$ Width of road

$w = \frac{66}{2 \times 22} \times 7 = 10.5$ m

54. (D) Difference in distance by two paths $= \pi r - 2r$



$\frac{\text{Distance}}{\text{Speed}} = \text{Time}$

$\frac{r(\pi - 2)}{30} = 0.5$

$r\left(\frac{22}{7} - 2\right) = 15$

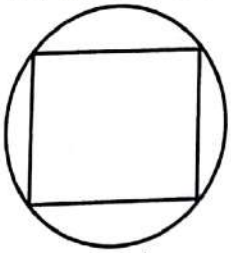
$r = 15 \times \frac{7}{8} = 13.125$ m

55. (A) $\pi d - d = X$

$\Rightarrow d(\pi - 1) = X$

$\Rightarrow$ Diameter $= \frac{X}{\pi - 1}$ units

56. (B) $\pi d = 100$ cm



$\Rightarrow d = 100/\pi$ cm

Diameter of circle = diagonal of square

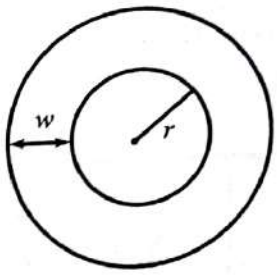
$100/\pi = \sqrt{2} \times$ side

$\Rightarrow$ Side of square

$= \frac{100}{\sqrt{2}\pi} = \frac{50\sqrt{2}}{\pi}$ cm

57. (C) Radius of inner circle = r

Radius of outer circle = r + w



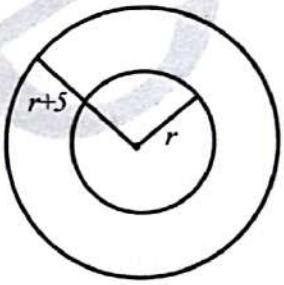
$2\pi(r + w) - 2\pi r = 132$

$\Rightarrow 2\pi w = 132$

$\Rightarrow$ Width $= \frac{132}{2 \times \frac{22}{7}} = \frac{132 \times 7}{44} = 21$ m

58. (C) Let inner radius = r

outer radius = r + 5



$\frac{2\pi(r + 5)}{2\pi r} = \frac{23}{22}$

$22(r + 5) = 23r$

$\Rightarrow r = 110$

$\therefore$ Diameter of inner circle = 2r

= 220m

59. (C) Area of triangle

$= \frac{1}{2}$ Perimeter $\times$ Inradius

$6 = \frac{1}{2}$ Perimeter $\times 2$

$\Rightarrow$ Perimeter of triangle = 6cm

60. (B) Radius of circumcircle $= \frac{a}{\sqrt{3}}$

Area of circumcircle $= 3\pi$

$\pi \times \left(\frac{a}{\sqrt{3}}\right)^2 = 3\pi$

$a^2 = 9$

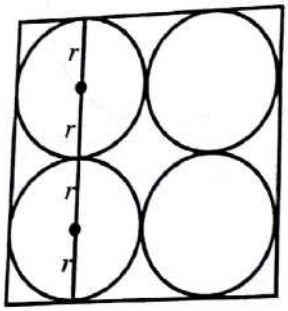
$\Rightarrow a = 3$ cm

$\therefore$ Perimeter of triangle

$= 3a = 3 \times 3 = 9$ cm

61. (C) Area of square $a^2 = 484$
$\Rightarrow a = 22$ cm
Perimeter of square = Perimeter of circle
$= 4 \times 22 = 2 \times \frac{22}{7} \times r$
$\Rightarrow r = 14$ cm
$\therefore$ Area
$= \pi r^2 = \frac{22}{7} \times 14 \times 14 = 616\ cm^2$

62. (B) Let radius of each circle be r



4r = side of square
$side^2 = 784$
$\Rightarrow$ side of square = 28
$4r = 28 \Rightarrow r = 7$ cm
$\therefore$ Circumference of circle
$= 2\pi r = 2 \times \frac{22}{7} \times 7 = 44$ cm

63. (D) $\pi r^2 = a^2$
$\sqrt{\pi}\, r = a$
$\therefore$ Ratio of perimeters
$= 2\pi r : 4a$
$= 2\pi r : 4\sqrt{\pi}\, r$
$= \sqrt{\pi} : 2$

64. (A) Side of square = a
$a^2 = 121 \Rightarrow a = 11$ cm
Perimeter of square = Circumference of circle
$= 4 \times 11 = 2 \times \frac{22}{7} \times r$
$\Rightarrow$ Radius of circle = 7 cm

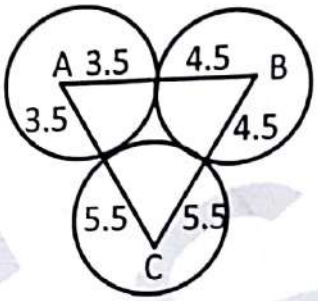
65. (C) $4a = 2(\ell + b)$
$\Rightarrow 2a = \ell + b$
Area of square $P = a^2$
$\ell + b = 2a \Rightarrow \ell b$ will be max $= a^2$
Only when $\ell = b$ but $\ell \neq b$
$\Rightarrow$ Area of rectangle $= a^2$
$Q < P$

66. (D) $2\pi r = 2(\ell + b)$
$r = \frac{7}{22}(18 + 26)$
$\Rightarrow r = 14$ cm
Area of circle $= \pi r^2$
$= \pi \times 14 \times 14 = 616\ cm^2$

67. (B) Let the side of triangle be a
$\Rightarrow$ Perimeter = 3a
New triangle sides are 1.2a, 1.3a, 1.5a
$\Rightarrow$ Perimeter = 4a
$\therefore$ Increase in perimeter
$= \frac{4a - 3a}{3a} \times 100 = 33\frac{1}{3}\%$

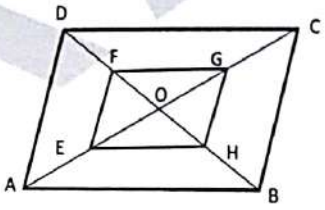
68. (A) 72° – 88
360 – ?
$\frac{360}{72} \times 88 = 440$ m
$2\pi r = 440$ m
$\Rightarrow r = 440 \times \frac{1}{2} \times \frac{7}{22} = 70$ m

69. (A)



AB = 3.5 + 4. 5 = 8
BC = 4.5 + 5.5 = 10
CA = 5.5 + 3.5 = 9
$\therefore$ Perimeter of triangle ABC = AB + BC + CA = 8 + 9 + 10 = 27

70. (C)

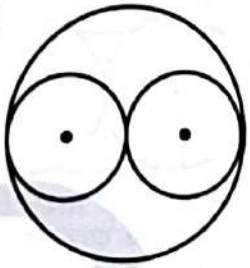


In Δ OAB E & H are mid points of 2 sides of triangle.
So $EH = \frac{1}{2}AB$ In same manner
$HG = \frac{1}{2}BC$, $GF = \frac{1}{2}CD$, $FE = \frac{1}{2}AD$
$\therefore \frac{\text{Perimeter of EFGH}}{\text{Perimeter of ABCD}}$
$= \frac{\frac{1}{2}(AB + BC + CD + DA)}{AB + BC + CD + DA} = 1 : 2$

71. (A) Let sides of rectangle be 9x, 7x
Circumference of circle = Perimeter of rectangle.
$\frac{22}{7} \times 112 = 2(9x + 7x)$
$352 = 32x$
$\Rightarrow x = 11$
$\therefore$ Smaller side of rectangle $= 7x = 7 \times 11 = 77$ cm

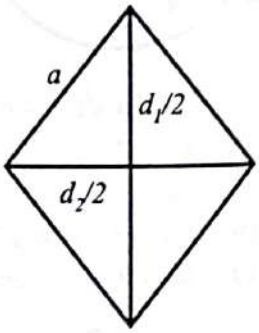
72. (C) $3a = 18 \Rightarrow a = 6$ cm
Length of median
$= \frac{\sqrt{3}}{2}a = \frac{\sqrt{3}}{2} \times 6 = 3\sqrt{3}$ cm

73. (A) Let the radius of large circle be r



So radius of smaller circle will be r/2
$2\pi r = 352$
$\therefore 2\pi\left(\frac{r}{2}\right) = \frac{352}{2} = 176$ cm
$\therefore$ Circumference of an each smaller circular plate = 176 cm

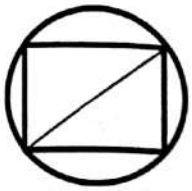
74. (A) $\frac{d_1}{2} = \frac{24}{2} = 12$
$\frac{d_2}{2} = \frac{32}{2} = 16$



$a^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2$
$a^2 = 12^2 + 16^2 = 20^2$
$\therefore$ Side of rhombus = a = 20 cm
$\therefore$ Perimeter of rhombus = 4a = 80 cm

75. (A) Inradius $r = \frac{a}{2\sqrt{3}} = \sqrt{3}$
$\Rightarrow a = 6$ cm
Perimeter of triangle = 3a
$= 3 \times 6 = 18$ cm

76. (A)



Diagonal of square = Diameter of circle

$\sqrt{2}\left(a\sqrt{2}\right) = d$

$\Rightarrow d = 2a$

Circumference

$= \pi d = 2\pi a$ units

77. (B) $2(\ell + b) = 40$

$2(12 + b) = 40$

$\Rightarrow b = 8$ m

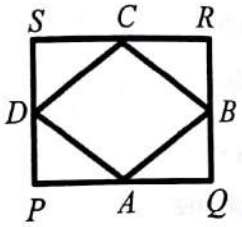
78. (B) $2\pi r - 2r = 150$

$r\left(\frac{22}{7} - 1\right) = 75$

$r = 75 \times \frac{7}{15}$

r = 35 metres

79. (B)



$AQ = \frac{10}{2} = 5$

$QB = \frac{10}{2} = 5$

In ΔABQ

$AB^2 = AQ^2 + QB^2$

$= 25 + 25 = 50$

$\Rightarrow AB = 5\sqrt{2}$

$\therefore$ Perimeter of ABCD

$= 4 \times 5\sqrt{2} = 20\sqrt{2}$ cm

80. (B) Perimeter of square = Circumference of circle

$4a = 2 \times \frac{22}{7} \times 84$

$a = \frac{1}{4} \times 2 \times \frac{22}{7} \times 84$

= 132 cm

$\therefore$ Side of square = 132 cm

81. (B) If 2 triangles are similar, ratio of perimeter & corresponding sides are equal

$\frac{30}{20} = \frac{9}{\text{side}}$

$\therefore$ Corresponding side

$= \frac{20 \times 9}{30} = 6$ cm

82. (A) Sides are 3x, 4x, 5x $\Rightarrow$ Right angled triangle

$\frac{1}{2} \times 3x \times 4x = 7776$

$6x^2 = 7776$

$x^2 = 1296$

$\Rightarrow x = 36$

Perimeter of triangle

$= 3x + 4x + 5x = 12x$

$= 12 \times 36 = 432$ cm

83. (C) 1 revolution = circumference

$= \pi d = \frac{22}{7} \times 70 = 220$ cm

400 revolutions

$= 400 \times 220 = 8800$ cm

= 880 m

1 minute $\rightarrow$ 880 m

1 hour $\rightarrow$?

Car travels

$60 \times 880 = 52800$ m / hr

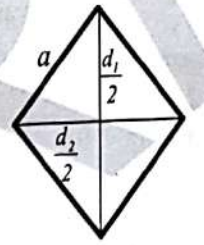
= 52.8 km/hr

84. (A) AB + CD = BC + DA

7 + 9.2 = 8.5 + DA

$\Rightarrow$ DA = 7.7 cm

85. (B) 4a = 60



$\Rightarrow a = 15$

$\frac{d_1}{2} = \frac{24}{2} = 12$

$a^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2$

$15^2 = 12^2 + \left(d_2/2\right)^2$

$\Rightarrow \left(\frac{d_2}{2}\right)^2 = 9^2$

$d_2 / 2 = 9 \qquad \Rightarrow d_2 = 18$

Area of rhombus $= \frac{1}{2} d_1 d_2$

$\Rightarrow \frac{1}{2} \times 24 \times 18 = 216$ cm^2

(or) **Method :**

4a = 60

a = 15

$4a^2 = d_1^2 + d_2^2$

$4(225) = 24^2 + d_2^2$

$d_2^2 = 324$

$d_2 = 18$

$\frac{1}{2} \times 24 \times 18 = 216$

86. (C) $2\pi r = \frac{11}{7}$

$2 \times \frac{22}{7} \times r = \frac{11}{7}$

$\Rightarrow r = 1/4$ m

LEVEL – III

1. (D) No.of tiles

$= \frac{\text{Area of floor in m}^2}{\text{Area of each tile in m}^2}$

$= \frac{8 \times 6}{0.4 \times 0.4} = 300$

2. (B) Area of corridor

$= 100 \times 3 = 300$

Carpet required

$= \frac{300}{1/2} = 600$

Cost of covering floor with carpet

$= 600 \times 15 = 9000/-$

3. (C) Sides of triangle 15, 20, 25 $\Rightarrow$ Right angled triangle

Area $= \frac{1}{2} \times 15 \times 20 = 150$ m^2

$\therefore$ cost of sowing seeds

$= 150 \times 5 =$ Rs. 750 / –

4. (C) $2 \times \frac{22}{7} r \times N = 11 \times 1000$

$N = \frac{7 \times 250}{1.75}$

= 1000

5. (D) 1 revolution = circumference

$= 2\pi r = 2 \times \frac{22}{7} \times 21 = 132$ cm

132 cm – 1 revolution

924 m – ?

No.of revolutions

$= \frac{924}{132} \times 100 = 700$

6. (A) 25 paise per sq.m

Area $= \frac{1000}{1/4} = 4000$ sq.m

Increased area = 4000 + 50 × 20 = 5000 sq.m

$\therefore$ Expenditure

$= 5000 \times \frac{1}{4} = 1250$ / –

7. (D)

$100 \xrightarrow[+100]{100\%\uparrow} 200 \xrightarrow[+200]{100\%\uparrow} 400$

$\therefore$ percentage increase = 400 − 100 = 300%

8. (A) Area = πr^2

$100 \xrightarrow[+5]{5\%\uparrow} 105 \xrightarrow[+5.25]{5\%\uparrow} 110.25$

$\therefore$ Increase in area = 110.25 − 100 = 10.25%

9. (D) Height increased by $\frac{1}{10}$

As area is constant, base decreases by

$\frac{1}{10+1} = \frac{1}{11}$

$\therefore$ Base decreases by

$\frac{100}{11} = 9\frac{1}{11}\%$

10. (D)

$100 \xrightarrow[+20]{20\%\uparrow} 120 \xrightarrow[+24]{20\%\uparrow} 144$

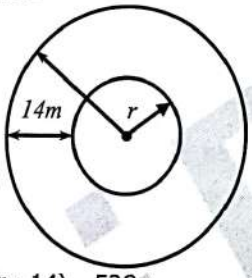
$\therefore$ Increase in area = 144 − 100 = 44%

11. (C)

$100 \xrightarrow[-10]{10\%\downarrow} 90 \xrightarrow[-9]{10\%\downarrow} 81$

$\therefore$ Area decreased by 100 − 81 = 19%

12. (D)



$2\pi(r+14) = 528$

$r + 14 = 528 \times \frac{1}{2} \times \frac{7}{22}$

$r + 14 = 84$

$\Rightarrow r = 70$ m

$\therefore$ Area of track

$= \pi(84^2 - 70^2)$

$= \frac{22}{7} \times (84+70)(84-70)$

$= 6776$ m^2

$\therefore$ Cost of levelling track

$= 6776 \times 10 = 67760/-$

LEVEL – IV

1. (B) Let $l = x$, $b = 2x$, $h = 3x$

Surface area = 88

$2(lb + bh + hl) = 88$

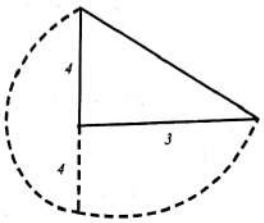
$2(x(2x) + 2x(3x) + 3x(x)) = 88$

$22x^2 = 88$

$\Rightarrow x^2 = 4 \Rightarrow x = 2$

Volume of box = $lbh = x \times 2x \times 3x = 6x^3 = 6(2)^3 = 48$ cm^3

2. (A)



Rotating along side 3 cm

Height = 3 cm

Radius = 4 cm

$\therefore$ Volume

$= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times 16 \times 3$

$= 16\pi$ cm^3

3. (A) Volume of tetra hedron

$= \frac{a^3}{6\sqrt{2}} = \frac{12 \times 12 \times 12}{6\sqrt{2}} = 144\sqrt{2}$ cm^2

4. (A) $\pi r_1^2 h_1 = \pi r_2^2 h_2$

$\frac{r_1^2}{r_2^2} = \frac{h_2}{h_1}$

$\frac{r_1^2}{r_2^2} = \frac{2}{1}$

$\Rightarrow r_1 : r_2 = \sqrt{2} : 1$

5. (D) $2\pi r = 66$

$2 \times \frac{22}{7} \times r = 66 \Rightarrow r = \frac{21}{2}$

$\therefore$ Volume

$= \pi r^2 h = \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times 40$

$= 13860$ cm^3

6. (B) $\frac{r_1}{r_2} = \frac{2}{3} \Rightarrow \frac{r_1^2}{r_2^2} = \frac{4}{9}$

$\frac{h_1}{h_2} = \frac{5}{3}$

$\therefore \frac{V_1}{V_2} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{4}{9} \times \frac{5}{3} = 20 : 27$

7. (D) $\frac{\pi r^2 h}{2\pi r h} = \frac{924}{264}$

$\frac{r}{2} = \frac{7}{2} \Rightarrow r = 7$ m

diameter = $2r = 14$

$2\pi rh = 264$

$h = \frac{264}{2 \times 22 \times 7} = 6$

d : h = 14 : 6 = 7 : 3

8. (C) Volume of iron used

$= \pi r_1^2 h - \pi r_2^2 h$

$= \pi h(r_1^2 - r_2^2)$

$= \frac{22}{7} \times 20\,(4^2 - 3^2)$

$= \frac{22}{7} \times 20 \times 7$

$= 440$ cm^3

9. (A) External radius = 4 cm,

Internal radius = 4 − 1 = 3 cm

Volume = $\pi(r_1^2 - r_2^2)h$

$= \frac{22}{7} \times 21\,(4^2 - 3^2) = 462$ cm^3

Weight of pipe = 462 × 8 = 3696 g = 3.696 kg

10. (B) $\pi r^2 h = a^3$

$\frac{22}{7} \times r^2 \times 14 = (11)^3$

$\Rightarrow r^2 = \frac{11 \times 11 \times 11 \times 7}{22 \times 14} = \frac{121}{4}$

$\therefore r = \sqrt{\frac{121}{4}} = \frac{11}{2} = 5.5$ cm

11. (B) $\pi r^2 h = 9\pi h$

$\Rightarrow r^2 = 9$

$\Rightarrow r = 3$mtrs

$\therefore$ Diameter = $2r = 6$ mtrs

12. (C) Rectangular foil covers cylinder

$16 \times 22 = 2 \times \frac{22}{7} \times r \times 16$

$\Rightarrow r = \frac{7}{2}$

Volume

$= \pi r^2 h = \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 16$

$= 616$ cm^3

13. (A) Let the thickness be t

$\pi(9^2 - (9-t)^2) \times 14 = 748$

$9^2 - (9-t)^2 = \frac{748}{14} \times \frac{7}{22}$

$81 - (9-t)^2 = 17$

$(9-t)^2 = 64$

$\Rightarrow 9 - t = 8$

$\Rightarrow$ thickness = 1 cm

14. (B) Volume of spheres = Volume of water raised

$2 \times \frac{4}{3}\pi(3)^3 = \pi(6)^2 \times h$

$h = \frac{2 \times 4 \times 3^3}{3 \times 6^2} = 2$ cm

$\therefore$ Water in the vessel will be raised by 2 cm

15. (A) $\pi r_1^2 h_1 = 3\pi r_2^2 h_2$

$\left(\frac{r_1}{r_2}\right)^2 = 3\frac{h_2}{h_1}$

$\left(\frac{3}{2}\right)^2 = 3 \times \frac{1}{n_1}$

7. If each edge of a square be doubled, then the increase percentage in its area is
A) 200% B) 250%
C) 280% D) 300%

8. If radius of a circle is increased by 5%, then the increase in its area is
A) 10.25% B) 10%
C) 5.75% D) 5%

9. The height of a triangle is increased by 10%. to retain the original area of the triangle, its corresponding base must be decreased by
A) 10% B) $9\frac{1}{7}\%$
C) $9\frac{1}{8}\%$ D) $9\frac{1}{11}\%$

10. The percentage increase in the area of a rectangle, if each of its sides is increased by 20% is equal to
A) 32% B) 34%
C) 42 D) 44%

11. If the radius of a circle is decreased by 10%, then the area of the circle is decreased by
A) 89% B) 18%
C) 19% D) 25%

12. The outer circumference of a circular race-track is 528 metre. The track is everywhere 14 metre wide. Cost of leveling the track at the rate of Rs. 10 per sq. metre is:
A) Rs. 77660 B) Rs. 66760
C) Rs. 76760 D) Rs. 67760

TYPE-IV

1. The edges of a rectangular box are in the ratio 1 : 2 : 3 and its surface area is 88 cm^2. The volume of the box is
A) 24 cm^3 B) 48 cm^3
C) 64 cm^3 D) 120 cm^3

2. A right triangle with sides 3cm, 4cm and 5 cm is rotated about the side 3 cm to form a cone, The volume of the cone so formed is
A) 16 π cm^3 B) 12 π cm^3
C) 15 π cm^3 D) 20 π cm^3

3. If the length of each side of a regular tetrahedron is 12cm, then the volume of the tetrahedron is
A) $144\sqrt{2}$ cu. cm.
B) $72\sqrt{2}$ cu. cm.
C) $8\sqrt{2}$ cu. cm.
D) $12\sqrt{2}$ cu. cm.

4. Two right circular cylinders of equal volume have their heights in the ratio 1: 2. The ratio of their radii is:
A) $\sqrt{2}:1$ B) 2 : 1
C) 1 : 2 D) 1 : 4

5. The volume of a right circular cylinder whose height is 40 cm. and circumference of its base is 66 cm, is:
A) 55440 cm^3 B) 3465 cm^3
C) 7720 cm^3 D) 13860 cm^3

6. The base radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is:
A) 27 : 20 B) 20 : 27
C) 9 : 4 D) 4 : 9

7. The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3. Find the ratio of its diameter to its height.
A) 7 : 6 B) 6 : 7
C) 3 : 7 D) 7 : 3

8. A hollow cylindrical tube 20 cm long, is made of iron and its external and internal diameters are 8 cm and 6 cm respectively, The volume of iron used in making the tube in $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 1760 cu. cm B) 880 cu. cm.
C) 440 cu. cm. D) 220 cu. cm.

9. A hollow iron pipe is 21 cm long and its exterior diameter is 8 cm. If the thickness of the pipe is 1cm and iron weighs 8g/cm^3, then the weight of the pipe is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 3.696 kg B) 3.6 kg
C) 36 kg D) 36.9 kg

10. The volume of a right circular cylinder, 14 cm in height, is equal to that of a cube whose edge is 11 cm. Taking $\pi = \frac{22}{7}$ the radius of the base of the cylinder is
A) 5.2 cm. B) 5.5 cm.
C) 11.0 cm. D) 22.0 cm.

11. If the volume of a right circular cylinder is $9\pi h m^3$, where h is its height (in metres) then the diameter of the base of the cylinder is equal to
A) 3m B) 6m
C) 9m D) 12m

12. A right circular cylinder of height 16 cm is covered by a rectangular tin foil of size 16 cm × 22 cm. The volume of the cylinder is
A) 352 cm^3 B) 308 cm^3
C) 616 cm^3 D) 176 cm^3

13. The volume of the metal of a cylindrical pipe is 748 cm^3. The length of the pipe is 14cm and its external radius is 9 cm. Its thickness is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 1 cm B) 5.2 cm
C) 2.3 cm D) 3.7 cm

14. Two iron sheets each of diameter 6 cm are immersed in the water contained in a cylindrical vessel of radius 6 cm. The level of the water in the vessel will be raised by
A) 1cm B) 2cm
C) 3cm D) 6cm

15. The radii of the base of two cylinders A and B are in the ratio 3 : 2 and their height in the ratio n : 1. If the volume of cylinder is 3 times that of cylinder b, the value of n is
A) $\frac{4}{3}$ B) $\frac{2}{3}$
C) $\frac{3}{4}$ D) $\frac{3}{2}$

16. Water is being pumped out through a circular pipe whose internal diameter is 7 cm. If the flow of water is 12 cm per second, how many litres of water is being pumped out in one hour?
A) 1663.2 B) 1500
C) 1747.6 D) 2000

17. The lateral surface area of a cylinder is 1056 cm^2 and its height is 16cm. Find its volume.
A) 4545 cm^3 B) 4455 cm^3
C) 5445 cm^3 D) 5544 cm^3

18. A cylinder has 'r' as the radius of the base and 'h' as the height. The radius of a base of another cylinder, having double the volume but the same height as that of the first cylinder must be equal to
A) $\frac{r}{\sqrt{2}}$ B) 2r
C) $r\sqrt{2}$ D) $\sqrt{2}r$

19. The diameter of two cylinders, whose volumes are equal, are in the ratio 3 ; 2. Their heights will be in the ratio.
A) 4 : 9 B) 5 : 6
C) 5 : 8 D) 8 : 9

20. From a solid cylinder of height 10 cm and radius of the base 6 cm, a cone of same height and same base is removed. The volume of the remaining solid is:
A) 240 π cu.cm
B) 5280 cu.cm
C) 620 π cu.cm
D) 360 π cu.cm

21. From a solid cylinder whose height is 12 cm and diameter 10 cm, a conical cavity of same height and same diameter of the base is hollowed out. The volume of the remaining solid is approximately $\left(\pi = \frac{22}{7}\right)$
A) 942.86 cm^3 B) 314.29 cm^3
C) 628.57 cm^3 D) 450.76 cm^3

22. The radius of a cylinder is 10 cm and height is 4 cm. The number of centimetres that may be added either to the radius or to the height to get the same increase in the volume of the cylinder is
A) 5 cm B) 4 cm
C) 25 cm D) 16 cm

23. The radii of the base of a cylinder and a cone are in the ratio $\sqrt{3} : \sqrt{2}$ and their heights are in the ratio $\sqrt{2} : \sqrt{3}$. Their volumes are in the ratio of
A) $\sqrt{3} : \sqrt{2}$ B) $3\sqrt{3} : \sqrt{2}$
C) $\sqrt{3} : \sqrt[3]{2}$ D) $\sqrt{2} : \sqrt{6}$

24. The curved surface area and the total surface area of a cylinder are in the ratio 1 : 2. If the total surface area of the right cylinder is 616 cm^2, then its volume is:
A) 1232 cm^3 B) 1848 cm^3
C) 1632 cm^3 D) 1078 cm^3

25. The perimeter of the base of a right circular cylinder is 'a' unit. If the volume of the cylinder is V cubic unit, then the height of the cylinder is
A) $\frac{4a^2V}{\pi}$ B) $\frac{4\pi a^2}{V}$
C) $\frac{\pi a^2 V}{4}$ D) $\frac{4\pi V}{a^2}$

26. What is the height of a cylinder that has the same volume and radius as a sphere of diameter 12 cm?
A) 7cm B) 10cm
C) 9cm D) 8cm

27. If diagonal of a cube is $\sqrt{12}$ cm, then its volume in cubic cm is:
A) 8 B) 12
C) 24 D) $\sqrt[3]{2}$

28. If the volume of two cubes are in the ratio 27 ; 1, the ratio of their edge is:
A) 3 : 1 B) 27 : 1
C) 1 : 3 D) 1 : 27

29. The edges of a cuboid are in the ratio 1 : 2 : 3 and its surface area is 88 cm^2. The volume of the cuboid is:
A) 120 cm^3 B) 64 cm^3
C) 48 cm^3 D) 24 cm^3

30. What is the volume of a cube (in cubic cm) whose diagonal measures $4\sqrt{3}$ cm?
A) 16 B) 27
C) 64 D) 8

31. A cuboid water tank has 216 litres of water. Its depth is $\frac{1}{3}$ of its length and breadth is $\frac{1}{2}$ of $\frac{1}{3}$ of the difference of length and height. The length of the tank is
A) 72dm B) 18dm
C) 6dm D) 2dm

32. A wooden box measures 20 cm by 12 cm by 10 cm. Thickness of wood is 1 cm. Volume of wood to make the box (in cubic cm) is
A) 960 B) 519
C) 2400 D) 1120

33. The area of three adjacent faces of a cuboid are x, y, z square units respectively. If the volume of the cuboid be v cubic units, then the correct relation between v, x, y, z is
A) $v^3 = xyz$ B) $v^3 = xyz$
C) $v^3 = x^3y^3z^3$ D) $v^3 = x^2y^2z^2$

34. Water flows into a tank which is 200m long and 150m wide, through a pipe of cross-sec-

tion 0.3m×0.2m at 20km/hour. Then the time (in hours) for the water level in the tank to reach 8m is
A) 50 B) 120
C) 150 D) 200

35. A rectangular sheet of metal is 40cm by 15cm. Equal squares of side 4cm are cut off at the corners and the remainder is folded up to form an open rectangular box. The volume of the box is
A) 896 cm^3 B) 986 cm^3
C) 600 cm^3 D) 916 cm^3

36. The area of three consecutive faces of a cuboid are 12 cm^2, 20 and 15, then the volume (in) of the cuboid is
A) 3600 B) 100
C) 80 D) 60

37. Surface areas of three adjacent faces of cuboid are p, q r, its volume is
A) $\sqrt{pq^2+qr^2+rp^2}$
B) $\left(\sqrt{pq}+\sqrt{qr}+\sqrt{rp}\right)\left(p^2+q^2+r^2\right)$
C) $\sqrt{\left(p^2+q^2+r^2\right)\left(p+q+r\right)}$
D) $\sqrt{pqr}$

38. A godown is 15m long and 12m broad. The sum of the area of the floor and the ceiling is equal to the sum of areas of the four walls. The volume (in m^3) of the godown is:
A) 900 B) 1200
C) 1800 D) 720

39. If the total surface area of a cube is 96 cm^2, its volume is
A) 54 cm^3 B) 16 cm^3
C) 64 cm^3 D) 36 cm^3

40. The ratio of the volume of two cones is 2 : 3 and the ratio of radii of their base is 1 : 2. The ratio of their height is
A) 3 : 8 B) 8 : 3
C) 4 : 3 D) 3 : 4

41. If the height of a given cone be doubled and radius of the base remains the same, the ratio of the volume of the given cone to that of the second cone will be
A) 2 : 1 B) 1 : 8
C) 1 : 2 D) 8 : 1

42. If the radius of the base of a cone be doubled and height is left unchanged, then ratio of the volume of new cone to that of the original cone will be:
A) 1 : 4 B) 2 : 1
C) 1 : 2 D) 4 : 1

43. Each of the measure of the radius of base of a cone and that of a sphere is 8cm. Also, the volume of these two solids are equal. The slant height of the cone is
A) $8\sqrt{17}$ cm B) $4\sqrt{17}$ cm
C) $34\sqrt{2}$ cm D) 34cm

44. A cone of height 15cm and base diameter 30cm is carved out of a wooden sphere of radius 15cm. The percentage of wasted wood is:
A) 75% B) 50%
C) 40% D) 25%

45. In a right circular cone, the radius of its base is 7cm and its height 24cm. A cross-section is made through the midpoint of the height parallel to the base. The volume of the upper portion is
A) 169 cm^3 B) 154 cm^3
C) 1078 cm^3 D) 800 cm^3

46. If the area of the base of a cone is 770 cm^2 and the area of the curved surface is 814 cm^2 , then its volume (in cm^3) is:
A) $213\sqrt{5}$ B) $392\sqrt{5}$
C) $550\sqrt{5}$ D) $616\sqrt{5}$

47. Volume of two cones are in the ratio 1 : 4 and their diameters are in the ratio 4 : 5. The ratio of their height is
A) 1 : 5 B) 5 : 4
C) 5 : 16 D) 25 : 64

48. The height of the cone is 30cm. A small cone is cut off at the top by a plane parallel to its base. If its volume is $\frac{1}{27}$ of the volume of the cone, at what height, above the base, is the section made?
A) 6cm B) 8cm
C) 10cm D) 20cm

49. The radius of the base and height of a right circular cone are in the ratio 5 : 12. If the volume of the cone is $314\frac{2}{7}cm^3$, the slant height (in cm) of the cone will be
A) 12 B) 13
C) 15 D) 17

50. Two solid right cones of equal height and of radii r_1 and r_2 are melted and made to form a solid sphere of radius R. Then the height of the cone is
A) $\frac{4R^2}{r_1^2+r_2^2}$ B) $\frac{4R}{r_1+r_2}$
C) $\frac{4R^3}{r_1^2+r_2^2}$ D) $\frac{R^2}{r_1^2+r_2^2}$

51. The ratio of radii of two cone is 3 : 4 and the ratio of their height is 4 : 3. Then the ratio of their volume will be
A) 3 : 4 B) 4 : 3
C) 9 : 16 D) 16 : 9

52. If a right circular cone is separated into solids of volumes V_1 : V_2 : V_3 by two planes parallel to the base, which also trisect the altitude, then V_1 : V_2 : V_3 is
A) 1 : 2 : 3 B) 1 : 4 : 6
C) 1 : 6: 9 D) 1 : 7 : 19

53. If the radii of the circular ends of a truncated conical bucket which is 45cm high be 28cm and 7cm, then the capacity of the bucket in cubic centimeter is $\left(\text{Use } \pi=\frac{22}{7}\right)$
A) 48510 B) 45810
C) 48150 D) 48051

54. The ratio of height and the diameter of a right circular cone is 3 : 2 and its volume is 1078 cc, then $\left(\text{Take } \pi=\frac{22}{7}\right)$ its height is:
A) 7cm B) 14cm
C) 21cm D) 28cm

55. The radius of the base of a right circular cone is doubled keeping its height fixed. The volume of the cone will be:
A) three times of the previous volume
B) Four times of the previous volume
C) $\sqrt{2}$ times of the previous volume
D) double of the previous volume

56. The heights of two cones are in the ratio 1 : 3 and the diameters of their base are in the ratio 3 : 5. The ratio of their volume is
A) 3 : 25 B) 4 : 25
C) 6 : 25 D) 7 : 25

57. The base of a right circular cone has the same radius a as that of a sphere. Both the sphere and the cone have the same volume. Height of the cone is
A) 3a B) 4a
C) $\frac{7}{4}a$ D) $\frac{7}{3}a$

58. The circumference of the base of a 16cm height solid cone is 33cm. What is the volume of the cone is cm^3?
A) 1028 B) 616
C) 462 D) 828

59. The perimeter of the base of a right circular cone is 8cm. If the height of the cone is 21cm, then its volume is:
A) $108\pi\ cm^3$ B) $\frac{112}{\pi}\ cm^3$
C) $112\pi\ cm^3$ D) $\frac{108}{\pi}\ cm^3$

60. If the volume of two right circular cones are in the ratio 4 : 1 and their diameter are in the ratio 5 : 4, then the ratio of their height is:
A) 25 : 16 B) 25 : 64
C) 64 : 25 D) 16 : 25

61. The volume of a conical tent is 1232 cu.m and the area of its base is 154 sq. m. Find the length of the canvas required to build the tent, if the canvas is 2m in width. $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 270 m B) 272 m
C) 276 m D) 275 m

62. If the ratio of the diameters of two right circular cones of equal height be 3 : 4, then the ratio of their volume will be
A) 3 : 4 B) 9 : 16
C) 16 : 9 D) 27 : 64

63. A hollow spherical metallic ball has an external diameter 6cm and is $\frac{1}{2}$ cm thick, The volume of the ball (in cm^3) is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) $41\frac{2}{3}$ B) $37\frac{2}{3}$
C) $47\frac{2}{3}$ D) $40\frac{2}{3}$

64. The sum of radii of two spheres is 10cm and the sum of their volume is 880 cm^3. What will be the product of their radii?
A) 21 B) $26\frac{1}{3}$
C) $33\frac{1}{3}$ D) 70

65. If the radius of a sphere is doubled, its volume becomes
A) double B) four times
C) six times D) eight times

66. The radii of two spheres are in the ratio 3 : 2. Their volume will be in the ratio:
A) 9 : 4 B) 3 : 2
C) 8 : 27 D) 27 : 8

67. The total surface area of a solid hemisphere is $108\pi\ cm^2$. The volume of the hemisphere is
A) $72\pi\ cm^3$ B) $144\pi\ cm^3$
C) $108\sqrt{6}\ cm^3$ D) $54\sqrt{6}\ cm^3$

68. The largest sphere is carved out of a cube of side 7cm. The volume of the sphere (in cm^3) will be
A) 718.66 B) 543.72
C) 481.34 D) 179.67

69. The surface areas of two spheres are in the ratio 4 : 9. Their volumes will be in the ratio
A) 2 : 3 B) 4 : 9
C) 8 : 27 D) 64 : 729

70. A sphere and a hemisphere have the same volume. The ratio of their radii is
A) 1 : 2 B) 1 : 8
C) $1 : \sqrt{2}$ D) $1 : \sqrt[3]{2}$

71. A solid sphere of 6 cm diameter is melted and recast into 8 solid spheres of equal volume. The radius (in cm) of each small sphere is
A) 1.5 B) 3
C) 2 D) 2.5

72. The total surface area of a sphere is 8π square unit. The volume of the sphere is
A) $\frac{8\sqrt{2}}{3}\pi$ cubic unit
B) $\frac{8}{3}\pi$ cubic unit
C) $8\sqrt{3}\ \pi$ cubic unit
D) $\frac{8\sqrt{3}}{5}\ \pi$ cubic unit

73. Area of the base of a pyramid is 57 sq. cm. and height is 10cm, then its volume (in cm^3). is
A) 570 B) 390
C) 190 D) 590

74. There is pyramid on a base which is a regular hexagon of side 2a is a regular hexagon of side 2a cm. If every slant edge of this pyramid is of length $\frac{5a}{2}$ cm, then the volume of this pyramid is
A) $3\ a^3\ cm^3$ B) $3\sqrt{2}a^3\ cm^3$
C) $3\sqrt{3}a^3\ cm^3$ D) $6a^3\ cm^3$

75. The base of a right pyramid is a square of side 40cm long, if the volume of the pyramid is 8000 cm^3, then its height is
A) 5 cm B) 10 cm
C) 15 cm D) 20 cm

76. The base of a right prism is a trapezium. The length of the parallel sides are 8 cm and 14cm and the distance between the parallel sides is 8cm. If the volume of the prism is 1056 cm^3, then the height of the prism is
A) 44 cm B) 16.5 cm
C) 12 cm D) 10.56 cm

77. The height of a right prism with a square base is 15cm. If the area of the total surface of the prism is 608 sq. cm. its volume is
A) 910 cm^3 B) 920 cm^3
C) 960 cm^3 D) 980 cm^3

78. The base of a right prism is an equilateral triangle of side 8cm and height of the prism is 10cm. Then the volume of the prism is
A) $320\sqrt{3}$ cubic cm
B) $160\sqrt{3}$ cubic cm
C) $150\sqrt{3}$ cubic cm
D) $300\sqrt{3}$ cubic cm

79. The base of right prism is a triangle whose perimeter is 28cm and the in-radius of the triangle is 4cm. If the volume of the prism is 366cc, then its height is
A) 6 cm
B) 8 cm
C) 4 cm
D) None of these

80. If the base of a right pyramid is triangle of sides 5cm, 12cm, 13cm and its volume is 330 cm^3, then its height (in cm) will be
A) 33 B) 32
C) 11 D) 22

81. The diameter of the moon is as summed to be one fourth of the diameter of the earth. Then the ratio of the volume of the earth to that of the moon is
A) 64 : 1 B) 1 : 64
C) 60 : 7 D) 7 : 60

82. A conical vessel whose internal radius is 12cm and height 50cm is full of liquid. The contents are emptied into a cylindrical vessel with radius (internal) 10 cm. The height to which the liquid rises in the cylindrical vessel is:
A) 25 cm B) 20 cm
C) 24 cm D) 22 cm

83. The volume of a right circular cylinder is equal to the volume of that right circular cone whose height is 108 cm and diameter of base is 30cm. If the height of the cylinder is 9cm, the diameter of its base is
A) 30 cm B) 60 cm
C) 50 cm D) 40 cm

84. The total surface area of a cube and a sphere are equal. What will be the ratio between their volume?
A) $\pi : 6$ B) $\sqrt{\pi} : \sqrt{6}$
C) $\sqrt{6} : \sqrt{\pi}$ D) $6 : \pi$

85. A rectangular paper sheet of dimensions 22 cm ×12 cm is folded in the form of a cylinder along its length. What will be the volume of this cylinder? $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 460 cm^3 B) 462 cm^3
C) 624 cm^3 D) 400 cm^3

86. The ratio of the volume of a cube to that of a sphere, which will fit exactly inside the cube, is
A) $\pi : 6$ B) $6 : \pi$
C) $3 : \pi$ D) $\pi : 3$

87. The volume of a sphere and a right circular cylinder having the same radius are equal. The ratio of the diameter of the sphere to the height of the cylinder is
A) 3 : 2 B) 2 : 3
C) 1 : 2 D) 2 : 1

88. The size of a rectangular piece of paper is 100cm × 44cm. A cylinder is formed by rolling the paper along its length. The volume of the cylinder is $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 4400 cm^3 B) 15400 cm^3
C) 35000 cm^3 D) 144 cm^3

89. A cone, a hemisphere and a cylinder stand on equal bases and have the same height. The ratio of their respective volume is
A) 1 : 2 : 3 B) 2 : 1 : 3
C) 1 : 3 : 2 D) 3 : 1 : 2

90. The height of a cylinder and that of a cone are in the ratio 2 : 3 and the radii of their bases in the ratio 3 : 4. The ratio of their volume will be
A) 1 : 9 B) 2 : 9
C) 9 : 8 D) 3 : 8

91. Water is flowing at the rate of 5km/h through a pipe of diameter 14 cm into a rectangular tank which is 50 m long, 44 m wide. The time taken (in hours) for the rise in the level of water in the tank to be 7 cm is
A) 2 B) $1\frac{1}{2}$
C) 3 D) $2\frac{1}{2}$

92. The total surface area of a solid right circular cylinder is twice that of a solid sphere. If they have the same radii, the ratio of the volume of the cylinder to that of the sphere is given by
A) 9 : 4 B) 2 : 1
C) 3 : 1 D) 4 : 9

93. In a cylindrical vessel of diameter 24 cm filled up with sufficient quantity of water, a solid spherical ball of radius 6 cm is completely immersed. Then the increase in height of water level is
A) 1.5 cm B) 2 cm
C) 3 cm D) 4.2 cm

94. A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of the wooden toy (nearly).
A) 104 cm^3 B) 162 cm^3
C) 427 cm^3 D) 266 cm^3

95. The respective height and volume of a hemisphere and a right circular cylinder are equal, then the ratio of their radii is
A) $\sqrt{2} : \sqrt{3}$ B) $\sqrt{3} : 1$
C) $\sqrt{3} : \sqrt{2}$ D) $2 : \sqrt{3}$

96. The ratio of the volume of a cube and of a solid sphere is 363 : 49. The ratio of an edge of the cube and the radius of the sphere is $\left(\text{Taking } \pi = \frac{22}{7}\right)$
A) 7 : 11 B) 22 : 7
C) 11 : 7 D) 7 : 22

97. From a right circular cylinder of a radius 10cm and height 21cm, a right circular cone of same base radius is removed. If the volume of the remaining portion is 4400 cm^3, then the height of the removed cone $\left(\text{Taking } \pi = \frac{22}{7}\right)$
A) 15cm B) 18cm
C) 21cm D) 24cm

98. If a solid cone of volume 27 π cm^3 is kept inside a hollow cylinder whose radius and height are that of the cone, then the volume of water needed to fill the empty space is
A) 3 π cm^3 B) 18 π cm^3
C) 54 π cm^3 D) 81 π cm^3

99. A cylindrical can whose base is horizontal and is of internal radius 3.5cm contains sufficient water so that when a solid sphere is placed inside, water just covers the sphere. The sphere fits in the can exactly. The depth of water in the can before the sphere was put, is
A) $\frac{35}{3}$ cm B) $\frac{17}{3}$ cm
C) $\frac{7}{3}$ cm D) $\frac{14}{3}$ cm

100. If A denotes the volume of a right circular cylinder of same height as its diameter and B is the volume of a sphere of same radius, then $\frac{A}{B}$ is;
A) $\frac{4}{3}$ B) $\frac{3}{2}$
C) $\frac{2}{3}$ D) $\frac{3}{4}$

101. The base of a right circular cone has the same radius a as that of a sphere. Both the sphere and the cone have the same volume. Height of the cone is

A) 3a B) 4a
C) $\frac{7}{4}a$ D) $\frac{7}{3}a$

102. A semicircular sheet of metal of diameter 28cm is bent into an open conical cup. The capacity of the cup $\left(\text{Taking } \pi = \frac{22}{7}\right)$ is
A) 624.26 cm^3 B) 622.38 cm^3
C) 622.36 cm^3 D) 623.20 cm^3

103. A conical flask is full of water. The flask has base radius r and height h. This water is poured into a cylidrical flask of base radius m. The height of water in the cylindrical flask is
A) $\frac{m}{2h}$ B) $\frac{h}{2}m^2$
C) $\frac{2h}{m}$ D) $\frac{h}{3m^2}$

104. The volume of a cylinder and a cone are in the ratio 3 :1. Find their diameters and then compare them when their heights are equal.
A) Diameter of cylinder = 2 times of diameter of cone
B) Diameter of cylinder = Diameter of cone
C) Diameter of cylinder > Diameter of cone
D) Diameter of cylinder < Diameter of cone

105. A cone of height 7 cm and base radius 1 cm is carved from a cuboid block of wood 10 cm × 5 cm × 2 cm. $\left[\text{Assuming } \pi = \frac{22}{7}\right]$. The percentage wood wasted in the process is:
A) $92\frac{2}{3}\%$ B) $46\frac{1}{3}\%$
C) $53\frac{2}{3}\%$ D) $7\frac{1}{3}\%$

106. If the radius of a cylinder is decreased by 50% and the height is increased by 50% to form a new cylinder, the volume will be decreased by
A) 0% B) 25%
C) 62.5% D) 75%

107. Each of the height and base-radius of a cone is increased by 100%. The percentage increase in the volume of the cone is
A) 700% B) 400%
C) 300% D) 100%

108. If both the radius and height of a right circular cone are increased by 20%, its volume will be increased by
A) 20% B) 40%
C) 60% D) 72.8%

109. If the height of a right circular cone is increased by 200% and the radius of the base is reduced by 50%, the volume of the cone
A) increases by 25%
B) increases by 50%
C) remains unaltered
D) decreases by 25%

110. If the height and the radius of the base of a cone are each increased by 100%, then the volume of the cone becomes
A) double that of the original
B) three times that of the original
C) six times that of the original
D) eight times that of the original

111. If the radius of a right circular cylinder is decreased by 50% and its height is increased by 60%, its volume will be decreased by
A) 10% B) 60%
C) 40% D) 20%

112. The length, breadth and height of a cuboid are in the ratio 1 : 2 : 3. If they are increased by 100%, 200% and 200% respectively, then compared to the original volume the increase in the volume of the cuboid will be
A) 5 times B) 18 times
C) 12 times D) 17 times

113. Each of the radius of the base and the height of a right circular cylinder is increased by 10%. The volume of the cylinder is increased by
A) 3.31% B) 14.5%
C) 33.1% D) 19.5%

114. If the height of a cone is increased by 100% then its volume is increased by:
A) 100% B) 200%
C) 300% D) 400%

115. A hemispherical cup of radius 4cm is filled to the brim with coffee. The coffee is then poured into a vertical cone of radius 8cm and height 16cm. The percentage of the volume of the cone that remains empty is:
A) 87.5% B) 80.5%
C) 81.6% D) 88.2%

116. The volume (in m^3) of rain water that can be collected from 1.5 hectares of ground in rainfall of 5 cm is
A) 75 B) 750
C) 7500 D) 75000

117. Each edge of a regular tetrahedron is 3 cm, then its volume is
A) $\frac{9\sqrt{2}}{4}$ c.c. B) $27\sqrt{3}$ c.c.
C) $\frac{4\sqrt{2}}{9}$ c.c. D) $9\sqrt{3}$ c.c.

118. The perimeter of triangular base of right prism is 15 cm and radius of the incircle of the triangular base is 3 cm. If the volume of the prism be 270 cm^3, then the height of the prism is
A) 6 cm B) 7.5 cm
C) 10 cm D) 12 cm

119. A prism has as the base a right angled triangle whose sides adjacent to the right angles are 10 cm and 12 cm long. The height of the prism is 20 cm. The density of the material of the prism is 6 gm/cubic cm. The weight of the prism is
A) 6.4 kg B) 7.2 kg
C) 3.4 kg D) 4.8 kg

120. A copper rod of 1 cm diameter and 8 cm length is drawn into a wire of uniform diameter and 18 m length. The radius (in cm) of the wire is
A) $\frac{1}{15}$ B) $\frac{1}{30}$
C) $\frac{2}{15}$ D) 15

121. A well 20 m in diameter is dug 14 m deep and the earth taken out is spread all around it to a width of 5 m to form an embankment. The height of the embankment is:
A) 10 m B) 11 m
C) 11.2m D) 11.5m

122. Two solid cylinders of radii 4 cm and 5 cm and length 6 cm and 4 cm respectively are recast into cylindrical disc of thickness 1 cm. The radius of the disc is:
A) 7 cm B) 14 cm
C) 21 cm D) 28 cm

123. A metallic hemisphere is melted and recast in the shape of a cone with the same base radius (R) as that of the hemisphere. If H is the height of the cone, then :

A) $H = 2R$ B) $H = \frac{2}{3}R$

C) $H = \sqrt{3R}$ D) $B = 3R$

124. Three solid metallic spheres of diameter 6 cm, 8 cm and 10 cm are melted and recast into a new solid sphere. The diameter of the new sphere is :
A) 4 cm B) 6 cm
C) 8 cm D) 12 cm

125. Three solid spheres of a metal whose radii are 1 cm, 6 cm and 8 cm are melted to form an other solid sphere. The radius of this new sphere is
A) 10.5 cm B) 9.5 cm
C) 10 cm D) 9 cm

126. A sphere of radius 2 cm is put into water contained in a cylinder of base-radius 4 cm. If the sphere is completely immersed in the water, the water level in the cylinder rises by
A) $\frac{1}{3}$cm B) $\frac{1}{2}$cm
C) $\frac{2}{3}$cm D) 2 cm

127. 12 spheres of the same size are made by melting a solid cylinder of 16 cm diameter and 2 cm height. The diameter of each sphere is
A) 2 cm B) 4 cm
C) 3 cm D) $\sqrt{3}$ cm

128. By melting a solid lead sphere of diameter 12 cm, three small spheres are made whose diameters are in the ratio 3 : 4 : 5. The radius (in cm) of the smallest sphere is
A) 3 B) 6
C) 1.5 D) 4

129. A solid metallic sphere of radius 3 decimeters is melted to form a circular sheet of 1 millimeter thickness. The diameter of the sheet so formed is
A) 26 metres B) 24 metres
C) 12 metres D) 6 metres

130. A copper wire of length 36 m and diameter 2 mm is melted to form a sphere. The radius of the sphere (in cm) is
A) 2.5 B) 3
C) 3.5 D) 4

131. A child reshapes a cone made up of clay of height 24cm and radius 6cm into a sphere. The radius (in cm) of the sphere is
A) 6 B) 12
C) 24 D) 48

132. A solid metallic spherical ball of diameter 6 cm is melted and recasted into a cone with diameter of the base as 12 cm. The height of the cone is
A) 6 cm B) 2 cm
C) 4 cm D) 3 cm

133. The diameter of the iron ball used for the shot-put game is 14 cm. It is melted and then a solid cylinder of height $2\frac{1}{3}$ cm is made. What will be the diameter of the base of the cylinder?
A) 14 cm B) 28 cm
C) $\frac{14}{3}$ cm D) $\frac{28}{3}$ cm

134. The radius of the base and height of a metallic solid cylinder are r cm and 6 cm respectively. It is melted and recast into a solid cone of the same radius of base, The height of the cone is :
A) 54 cm B) 27 cm
C) 18 cm D) 9 cm

135. A solid metallic cone is melted and recast into a solid cylinder of the same base as that of the cone. If the height of the cylinder is 7cm, the height of the cone was
A) 20 cm B) 21 cm
C) 28 cm D) 24 cm

136. A solid spherical copper ball, whose diameter is 14 cm, is melted and converted into a wire having diameter equal to 14 cm. The length of the wire is
A) 27 cm B) $\frac{16}{3}$ cm
C) 15 cm D) $\frac{28}{3}$ cm

137. A solid sphere is melted and recast into a right circular cone with a base radius equal to the radius of sphere. What is the ratio of the height and radius of the cone so formed?
A) 4 : 3 B) 2 : 3
C) 3 : 4 D) 4 : 1

138. A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is just completely submerged in water, then the rise of water level in the cylindrical vessel is
A) 2 cm B) 1 cm
C) 3 cm D) 4 cm

139. A copper sphere of diameter 18 cm is drawn into a wire of diameter 4 mm. The length of the wire, in metre, is:
A) 2.43 B) 243
C) 2430 D) 24.3

140. A rectangular block of metal has dimensions 21 cm, 77 cm and 24 cm. The block has been melted into a sphere. The radius of the sphere is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 21 cm B) 7 cm
C) 14 cm D) 28 cm

141. The radius of cross-section of a solid cylindrical rod of iron is 50 cm. The cylinder is melted down and formed into 6 solid spherical balls of the same radius as that of the cylinder. The length of the rod (in metres) is
A) 0.8 B) 2
C) 3 D) 4

142. Two right circular cones of equal height of radii of base 3 cm and 4 cm are melted together and made to a solid sphere of radius 5 cm. The height of a cone is
A) 10 cm B) 20 cm
C) 30 cm D) 40 cm

143. A tank 40 m long, 30 m broad and 12 m deep is dug in a field 1000 m long and 30 m wide. By how much will the level of the field rise if the earth dug out of the tank is evenly spread over the field?
A) 2 metre B) 1.2 metre
C) 0.5 metre D) 5 metre

144. A right pyramid 6 m height has a square base of which the diagonal is $\sqrt{1152}$ m. Volume of the pyramid is
A) 144 m^3 B) 288 m^3
C) 576 m^3 D) 1152 m^3

145. If the ratio of volumes of two cones is 2 : 3 and the ratio of the radii of their bases is 1 : 2, then the ratio of their heights will be
A) 8 : 3 B) 3 : 8
C) 4 : 3 D) 3 : 4

146. Two cubes have their volumes in the ratio 27 : 64. The ratio of their surface areas is
A) 9 : 25 B) 16 : 25
C) 9 : 16 D) 4 : 9

147. The radius of the base and the height of a right circular cone are doubled. The volume of the cone will be
A) 8 times of the previous volume
B) three times of the previous volume
C) $3\sqrt{2}$ times of the previous volume
D) 6 times of the previous volume

148. The ratio of weights of two spheres of different materials is 8 : 17 and the ratio of weights per 1 cc of materials of each is 289 : 64. The ratio of radii of the two spheres is
A) 8 : 17 B) 4 : 17
C) 17 : 4 D) 17 : 8

149. Three cubes of sides 6 cm, 8 cm and 1 cm are melted to form a new cube. The surface area of the new cube is
A) 486 cm^2 B) 496 cm^2
C) 586 cm^2 D) 658 cm^2

150. A sphere is cut into two hemispheres. One of them is used as bowl. It takes 8 bowlfuls of this to fill a conical vessel of height 12 cm and radius 6 cm. The radius of the sphere (in centimeter) will be
A) 3 B) 2
C) 4 D) 6

151. The volumes of a right circular cylinder and a sphere are equal. The radius of the cylinder and the diameter of the sphere are equal. The ratio of height and radius of the cylinder is
A) 3 : 1 B) 1 : 3
C) 6 : 1 D) 1 : 6

152. Some bricks arranged in an area measuring 20 cu. m. If the length, breadth and height of each brick is 25 cm. 12.5 cm and 8 cm respectively, then in that pile the number of bricks are (suppose there is no gap in between two bricks)
A) 6,000 B) 8,000
C) 4,000 D) 10,000

153. The height of the right pyramid whose area of the base is 30 m^2 and volume is 500 m^3, is
A) 50 m B) 60 m
C) 40 m D) 20 m

154. The base of a right prism is an equilateral triangle. If the lateral surface area and volume is 120 cm^2, $40\sqrt{3}$ cm^3 respectively then the side of base of the prism is
A) 4 cm B) 5 cm
C) 7 cm D) 40 cm

155. A ball of lead 4 cm in diameter is covered with gold. If the volume of the gold and lead are equal. Then the thickness of gold [given $\sqrt[3]{2} = 1.259$] is approximately
A) 5.038 cm B) 5.190 cm
C) 1.038 cm D) 0.518 cm

156. A large solid sphere is melted and moulded to form identical right circular cones with base radius and height same as the radius of the sphere. One of these cones is melted and moulded to form a smaller solid sphere. Then the ratio of the surface area of the smaller to the surface area of the larger sphere is
A) $1 : 3^{\frac{4}{3}}$ B) $1 : 2^{\frac{3}{2}}$
C) $1 : 3^{\frac{2}{3}}$ D) $1 : 2^{\frac{4}{3}}$

157. A conical cup is filled with ice-cream. The ice-cream forms a hemispherical shape on its open top. The height of the hemispherical part is 7 cm. The radius of the hemispherical part equals the height of the cone. Then the volume of the ice-cream is $\left[\pi = \frac{22}{7}\right]$
A) 1078 cubic cm
B) 1708 cubic cm
C) 7108 cubic cm
D) 7180 cubic cm

158. A hollow sphere of internal and external diameters 6cm and 10 cm respectively is melted into a right circular cone of diameter 8 cm. The height of the cone is
A) 22.5 cm B) 23.5 cm
C) 24.5 cm D) 25.5 cm

159. Each edge of a regular tetrahedron is 4 cm. Its volume (in cubic cm) is
A) $\frac{16\sqrt{3}}{3}$ B) $16\sqrt{3}$
C) $\frac{16\sqrt{2}}{3}$ D) $16\sqrt{2}$

160. A flask in the shape of a right circular cone of height 24 cm is filled with water. The water is poured in right circular cylindrical flask whose radius is $\frac{1}{3}$rd of radius of the base of the circular cone. Then the height of the water in the cylindrical flask is
A) 32 cm B) 24 cm
C) 48 cm D) 72 cm

161. The whole surface of a cube is 150 sq. cm. Then the volume of the cube is
A) 125 cm^3 B) 216 cm^3
C) 343 cm^3 D) 512 cm^3

162. A solid metallic spherical ball of diameter 6 cm is melted and recast into a cone with diameter of the base as 12 cm. The height of the cone is
A) 2 cm B) 3 cm
C) 4 cm D) 6 cm

163. A hemispherical bowl of internal radius 15 cm contains a liquid. The liquid is to be filled into cylindrical shaped bottles of diameter 5 cm and height 6 cm. The number of bottles required to empty the bowl is
A) 30 B) 40
C) 50 D) 60

164. If V_1, V_2 and V_3 be the volumes of a right circular cone, a sphere and a right circular cylinder having the same radius and same height, then
A) $V_1 = \frac{V_2}{4} = \frac{V_3}{3}$
B) $\frac{V_1}{2} = \frac{V_2}{3} = V_3$
C) $\frac{V_1}{3} = \frac{V_2}{2} = V_3$
D) $\frac{V_1}{3} = V_2 = \frac{V_3}{2}$

165. If the radius of a sphere be doubled, then the percentage increase in volume is
A) 500% B) 700%
C) 600% D) 800%

166. If 64 buckets of water are removed from a cubical shaped water tank completely filled with water, $\frac{1}{3}$ of the tank remains filled with water. The length of each side of the tank is 1.2m. Assuming that all buckets are of the same measure, then the volume (in liters) of water contained by each bucket is

A) 12 B) 16
C) 15 D) 18

167. A wooden box of dimensions 8 metre × 7metre × 6metre is to carry rectangular boxes of dimen-sions 8 cm × 7 cm × 6 cm. The maximum number of boxes that can be carried in 1 wooden box is
A) 7500000 B) 9800000
C) 1200000 D) 1000000

168. Two circular cylinders of equal volume have their heights in the ratio 1 : 2. Ratio of their radii is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 1 : 4 B) $1 : \sqrt{2}$
C) $\sqrt{2} : 1$ D) 1 : 2

169. A rectangular piece of paper of dimensions 22 cm by 12 cm is rolled along its length to form a cylinder. The volume (in cu. cm.) of the cylinder so formed is $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 562 B) 412
C) 462 D) 362

170. A sphere is placed inside a right circular cylinder so as to touch the top, base and the lateral surface of the cylinder. If the radius of the sphere is R, the volume of the cylinder is
A) $2\pi R^3$ B) $4\pi R^3$
C) $8\pi R^3$ D) $\frac{8}{3}\pi R^3$

171. The base of a right pyramid is an equilateral triangle of side 4 cm each. Each slant edge is 5 cm long. The volume of the pyramid is
A) $\frac{4\sqrt{8}}{3}$ cm^3 B) $\frac{4\sqrt{60}}{3}$ cm^3
C) $\frac{4\sqrt{59}}{3}$ cm^3 D) $\frac{4\sqrt{61}}{3}$ cm^3

172. If the radius of the base of a cone be 7 cm and its curved surface area be 550sq. cm, then the volume of the cone is
A) 1232 cu. cm
B) 1024 cu. cm
C) 1132 cu. cm
D) 1324 cu. cm

173. A hemisphere of iron is melted and recast in the shape of a right circular cylinder of diameter 18 cm and height 162 cm. The radius of the hemisphere is
A) 27 cm B) 9 cm
C) 6 cm D) 12 cm

174. An iron sphere of radius 27 cm is melted to form a wire of length 729 cm. The radius of wire is
A) 6 cm B) 9 cm
C) 18 cm D) 36 cm

175. A right circular cylinder is circumscribed about a hemisphere so that they share the same base. The ratio of the volumes of cylinder and hemisphere is
A) 4 : 3 B) 3 : 1
C) 3 : 4 D) 3 : 2

176. The ratio of volumes of two cubes is 8 : 125. The ratio of their sur-face areas is
A) 4 : 25 B) 2 : 75
C) 2 : 15 D) 4 : 15

177. A spherical ball of radius 1 cm is dropped into a conical vessel of radius 3 cm and slant height 6 cm. The volume of water (in cm^3), that can just immerse the ball, is
A) $\frac{5\pi}{3}$ B) $\frac{\pi}{3}$
C) 3π D) $\frac{4\pi}{3}$

178. Assume that a drop of water is spherical and its diameter is one-tenth of a cm. A conical glass has a height equal to the diameter of its rim. If 32000 drops of water fill the glass completely, then the height of the glass (in cm.) is
A) 3 B) 1
C) 4 D) 2

179. If the height of a cylinder is 4 times its circumference, the volume of the cylinder in terms of its circumference *c*, is
A) $\frac{2c^3}{\pi}$ B) $4\pi c^3$
C) $\frac{c^3}{\pi}$ D) $2\pi c^3$

180. Base of a right pyramid is a square whose area is 324 sq metre. If the volume of the pyramid is 1296 cu. metre, then the area (in sq. metre) of the slant surface is
A) 432 B) 540
C) 1080 D) 360

181. If the surface areas of two spheres are in the ratio 9 : 16, the ratio of their volumes is
A) 16 : 9 B) 27 : 64
C) 64 : 27 D) 9 : 16

182. The volume of a right circular cone is equal to the volume of a right circular cylinder. The height and the radius of the cylinder are 9 cm and 20 cm respectively. If the height of the cone is 108 cm, then its radius, (in cm) is
A) 12 B) 14
C) 20 D) 10

183. A right circular cone and a right circular cylinder have the same base and their heights are in the ratio 2 :3. The ratio of their volumes will be
A) 1 : 9 B) 4 : 9
C) 5 : 9 D) 2 : 9

184. A cone, a cylinder and a hemisphere stand on equal bases and have equal heights. The ratio of their volumes is
A) 2 : 3 : 1 B) 2 : 1 : 3
C) 1 : 3 : 2 D) 1 : 2 : 3

185. The diameters of the internal and external surfaces of a hollow spherical shell are 6 cm and 10 cm respectively. If it is melted and a solid cylinder of length $\frac{8}{3}$ cm is made, then the diameter (in cm) of the cylinder is
A) 10 B) 14
C) 16 D) 7

186. The volume of a metallic cylindrical pipe is 748 cm^3 . Its length is 14 cm and external radius is 9cm. Its thickness is $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 1 cm B) 7 cm
C) 17 cm D) 11cm

187. A cylindrical vessel of diameter 24 cm contains some water. If two spheres of radii 6 cm each are lowered into the water until they are completely immersed then the water level (in cm) in the vessel will rise by
A) 12 B) 6
C) 4 D) 9

188. The perimeter of one face of a cube is 20 cm. Its volume will be
A) 625 cm^3 B) 100 cm^3
C) 125 cm^3 D) 400 cm^3

189. If the volume of a sphere is numerically equal to its surface area then its diameter is
A) 6 cm B) 47 cm
C) 2 cm D) 3 cm

190. A conical iron plate having diameter 28 cm and height 30 cm is totally immersed into the water of a cylindrical vessel, resulting in the rise of water level by 6.4 cm. The diameter, in cm, of the vessel is:
A) 3.5 B) $\frac{35}{2}$
C) 32 D) 35

191. A solid right prism made of iron has cross section of a triangle of sides 5cm, 10cm, 13cm and of height 10cm. If one cubic cm of iron weights 7g, then the weight of the prism is (approximately)
A) 1570.8 gram
B) 1371.32 gram
C) 1470.8 gram
D) 1100.68 gram

192. A right circular cone of height 20 cm and base radius 15 cm is melted and cast into smaller cones of equal sizes of height 5cm and base radius 1.5 cm. The number of cones cast are
A) 300 B)150
C) 400 D)100

193. A right prism has a triangular base whose sides are 13 cm, 20 cm and 21 cm. If the altitude of the prism is 9 cm, then its volume is
A) 1314 cm^3 B) 1134 cm^3
C) 1413 cm^3 D) 1143 cm^3

194. The portion of a ditch 48m long, 16.5 m wide and 4 m deep that can be filled with stones and earth available during excavation of a tunnel, cylindrical in shape, of diameter 4 m and length 56 m is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) $\frac{1}{4}$ Part B) $\frac{1}{2}$ Part
C) $\frac{2}{9}$ Part D) $\frac{1}{9}$ Part

195. If a hemisphere is melted and four spheres of equal volume are made, the radius of each sphere will be equal to
A) $\frac{1}{4}$ th of the radius of the hemisphere
B) radius of the hemisphere
C) $\frac{1}{2}$ of the radius of the hemisphere
D) $\frac{1}{6}$ th of the radius of the hemisphere

196. A cylinder with base radius 8 cm and height 2 cm is melted to form a cone of height 6 cm. The radius of the cone will be
A) 6 cm B) 8 cm
C) 4 cm D) 5 cm

197. A plane divides a right circular cone into two parts of equal volume. If the plane is parallel to the base, then the ratio, in which the height of the cone is divided, is
A) $1:\sqrt[3]{2}$ B) $1:\sqrt{2}$
C) $1:\sqrt[3]{2}+1$ D) $1:\sqrt[3]{2}-1$

198. The radii of two solid iron spheres are 1 cm and 6 cm respectively. A hollow sphere is made by melting the two spheres. If the external radius of the hollow sphere is 9 cm, then its thickness (in cm) is
A) 2 B) 1.5
C) 0.5 D) 1

199. The base of a right prism is a trapezium whose lengths of two parallel sides are 10 cm and 6 cm and distance between them is 5 cm. If the height of the prism is 8 cm, its volume is
A) 320 cm^3 B) 300.5 cm^3
C) 310 cm^3 D) 300 cm^3

200. The radius of a hemispherical bowl is 6 cm. The capacity of the bowl is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 345.53 cm^3 B) 452 cm^3
C) 495.51 cm^3 D) 452.57 cm^3

201. Length of each edge of a regular tetrahedron is 1 cm. Its volume is :
A) $\frac{\sqrt{3}}{12}$ cu.cm.
B) $\frac{1}{4}\sqrt{3}$ cu.cm.
C) $\frac{\sqrt{2}}{6}$ cu.cm.
D) $\frac{1}{12}\sqrt{2}$ cu.cm.

202. The volume of a right circular cone which is obtained from a wooden cube of edge 4.2 dm wasting minimum amount of wood is:
A) 9404 cu.dm
B) 194.04 cu.dm
C) 19.404 cu.dm
D)1940.4 cu.dm

203. Base of a right prism is a rectangle, the ratio of whose length and breadth is 3 : 2. If the height of the prism is 12 cm and total surface area is 288 sq.cm, the volume of the prism is:
A) 291 cm^3 B) 288 cm^3
C) 290 cm^3 D) 286 cm^3

204. A right triangle with sides 9 cm, 12 cm and 15 cm is rotated about the side of 9 cm to form a cone, The volume of the cone so formed is:
A) 327 π cm^3 B) 330 π cm^3
C) 334 π cm^3 D) 324 π cm^3

205. Volume of a right circular cylinder of height 21 cm and base radius 5 cm is :
A) 1255 cm^3 B) 1050 cm^3
C) 1175 cm^3 D) 1650 cm^3

206. The volume of the largest right circular cone that can be cut out of a cube of edge 7 cm ? $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 121 cm^3 B) 89.8 cm^3
C) 13.6 cm^3 D) 147.68 cm^3

207. By melting two solid metallic spheres of radii 1 cm and 6 cm, a hollow sphere of thickness 1 cm is made. The external radius of the hollow sphere will be
A) 9 cm B) 6 cm
C) 7 cm D) 8 cm

208. Height of a prism-shaped part of a machine is 8 cm and its base is an isosceles triangle, whose each of the equal sides is 5 cm and remaining side is 6 cm. The volume of the part is
A) 96 cu. cm B) 120 cu. cm
C) 86 cu. cm D) 90 cu. cm

209. A cuboidal shaped water tank, 2.1 m long and 1.5 m broad is half filled with water. If 630 litres more water is poured into that tank, the water level will rise
A) 0.15 m B) 0.20 m
C) 0.18 m D) 2 m

7. (D)

$100 \xrightarrow[+100]{100\%\uparrow} 200 \xrightarrow[+200]{100\%\uparrow} 400$

$\therefore$ percentage increase = 400 − 100 = 300%

8. (A) Area = πr^2

$100 \xrightarrow[+5]{5\%\uparrow} 105 \xrightarrow[+5.25]{5\%\uparrow} 110.25$

$\therefore$ Increase in area = 110.25 − 100 = 10.25%

9. (D) Height increased by $\frac{1}{10}$

As area is constant, base decreases by

$\frac{1}{10+1} = \frac{1}{11}$

$\therefore$ Base decreases by

$\frac{100}{11} = 9\frac{1}{11}\%$

10. (D)

$100 \xrightarrow[+20]{20\%\uparrow} 120 \xrightarrow[+24]{20\%\uparrow} 144$

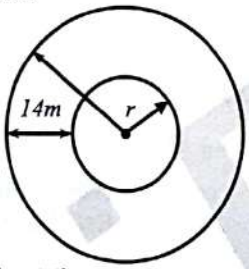
$\therefore$ Increase in area = 144 − 100 = 44%

11. (C)

$100 \xrightarrow[-10]{10\%\downarrow} 90 \xrightarrow[-9]{10\%\downarrow} 81$

$\therefore$ Area decreased by 100 − 81 = 19%

12. (D)



$2\pi(r+14) = 528$

$r + 14 = 528 \times \frac{1}{2} \times \frac{7}{22}$

$r + 14 = 84$

$\Rightarrow r = 70$ m

$\therefore$ Area of track

$= \pi(84^2 - 70^2)$

$= \frac{22}{7} \times (84+70)(84-70)$

$= 6776$ m^2

$\therefore$ Cost of levelling track

$= 6776 \times 10 = 67760/-$

LEVEL – IV

1. (B) Let $l = x$, $b = 2x$, $h = 3x$

Surface area = 88

$2(lb + bh + hl) = 88$

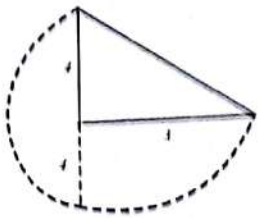
$2(x(2x) + 2x(3x) + 3x(x)) = 88$

$22x^2 = 88$

$\Rightarrow x^2 = 4 \Rightarrow x = 2$

Volume of box = $lbh = x \times 2x \times 3x = 6x^3 = 6(2)^3 = 48$ cm^3

2. (A)



Rotating along side 3 cm

Height = 3 cm

Radius = 4 cm

$\therefore$ Volume

$= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times 16 \times 3$

$= 16\pi$ cm^3

3. (A) Volume of tetra hedron

$= \frac{a^3}{6\sqrt{2}} = \frac{12 \times 12 \times 12}{6\sqrt{2}} = 144\sqrt{2}$ cm^2

4. (A) $\pi r_1^2 h_1 = \pi r_2^2 h_2$

$\frac{r_1^2}{r_2^2} = \frac{h_2}{h_1}$

$\frac{r_1^2}{r_2^2} = \frac{2}{1}$

$\Rightarrow r_1 : r_2 = \sqrt{2} : 1$

5. (D) $2\pi r = 66$

$2 \times \frac{22}{7} \times r = 66 \Rightarrow r = \frac{21}{2}$

$\therefore$ Volume

$= \pi r^2 h = \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times 40$

$= 13860$ cm^3

6. (B) $\frac{r_1}{r_2} = \frac{2}{3} \Rightarrow \frac{r_1^2}{r_2^2} = \frac{4}{9}$

$\frac{h_1}{h_2} = \frac{5}{3}$

$\therefore \frac{V_1}{V_2} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{4}{9} \times \frac{5}{3} = 20 : 27$

7. (D) $\frac{\pi r^2 h}{2\pi r h} = \frac{924}{264}$

$\frac{r}{2} = \frac{7}{2} \Rightarrow r = 7$ m

diameter = $2r = 14$

$2\pi rh = 264$

$h = \frac{264}{2 \times 22 \times 7} = 6$

$d : h = 14 : 6 = 7 : 3$

8. (C) Volume of iron used

$= \pi r_1^2 h - \pi r_2^2 h$

$= \pi h(r_1^2 - r_2^2)$

$= \frac{22}{7} \times 20\,(4^2 - 3^2)$

$= \frac{22}{7} \times 20 \times 7$

$= 440$ cm^3

9. (A) External radius = 4 cm,

Internal radius = 4 − 1 = 3 cm

Volume = $\pi(r_1^2 - r_2^2)h$

$= \frac{22}{7} \times 21\,(4^2 - 3^2) = 462$ cm^3

Weight of pipe = 462 × 8 = 3696 g = 3.696 kg

10. (B) $\pi r^2 h = a^3$

$\frac{22}{7} \times r^2 \times 14 = (11)^3$

$\Rightarrow r^2 = \frac{11 \times 11 \times 11 \times 7}{22 \times 14} = \frac{121}{4}$

$\therefore r = \sqrt{\frac{121}{4}} = \frac{11}{2} = 5.5$ cm

11. (B) $\pi r^2 h = 9\pi h$

$\Rightarrow r^2 = 9$

$\Rightarrow r = 3$mtrs

$\therefore$ Diameter = $2r = 6$ mtrs

12. (C) Rectangular foil covers cylinder

$16 \times 22 = 2 \times \frac{22}{7} \times r \times 16$

$\Rightarrow r = \frac{7}{2}$

Volume

$= \pi r^2 h = \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 16$

$= 616$ cm^3

13. (A) Let the thickness be t

$\pi(9^2 - (9-t)^2) \times 14 = 748$

$9^2 - (9-t)^2 = \frac{748}{14} \times \frac{7}{22}$

$81 - (9-t)^2 = 17$

$(9-t)^2 = 64$

$\Rightarrow 9 - t = 8$

$\Rightarrow$ thickness = 1 cm

14. (B) Volume of spheres = Volume of water raised

$2 \times \frac{4}{3}\pi(3)^3 = \pi(6)^2 \times h$

$h = \frac{2 \times 4 \times 3^3}{3 \times 6^2} = 2$ cm

$\therefore$ Water in the vessel will be raised by 2 cm

15. (A) $\pi r_1^2 h_1 = 3\pi r_2^2 h_2$

$\left(\frac{r_1}{r_2}\right)^2 = 3\frac{h_2}{h_1}$

$\left(\frac{3}{2}\right)^2 = 3 \times \frac{1}{n_1}$

$n_1 = 3 \times \frac{4}{9} = \frac{4}{3}$

16. (A) Area of circular pipe
$= \frac{\pi d^2}{4} = \frac{22}{7} \times \frac{1}{4} \times 7 \times 7 = \frac{77}{2}$
$\therefore$ Volume of water through pipe = Area × speed of water
$= \frac{77}{2} \times 12$ sec
$= 462$ cm^3
1 sec $\rightarrow$ 462 cm^3
3600 sec $\rightarrow$?
Volume of water = 3600×462
$= 1663200$ cm^3
$= 1663.2$ litres

17. (D) $2\pi r \times 16 = 1056$
$\Rightarrow r = 1056 \times \frac{7}{22} \times \frac{1}{2} \times \frac{1}{16} = \frac{21}{2}$ cm
Volume
$= \pi r^2 h = \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times 16$
$= 5544$ cm^3

18. (D) $2\pi r^2 h = \pi r'^2 h$
$\Rightarrow r' = \sqrt{2}.r$

19. (A) Diameter and radius ratio's will be same
$\pi r_1^2 h_1 = \pi r_2^2 h_2$
$\frac{r_1^2}{r_2^2} = \frac{h_2}{h_1}$
$\left(\frac{3}{2}\right)^2 = \frac{h_2}{h_1}$
$h_1 : h_2 = 4 : 9$

20. (A) Volume of remaining solid
$= \pi r^2 h - \frac{1}{3}\pi r^2 h$
$= \frac{2}{3}\pi r^2 h$
$= \frac{2}{3}\pi \times 6 \times 6 \times 10$
$= 240\pi$ cm^3

21. (C) Volume of remaining solid
$= \pi r^2 h - \frac{1}{3}\pi r^2 h$
$= \frac{2}{3}\pi r^2 h$
$= \frac{2}{3} \times \frac{22}{7} \times (5)^2 \times 12$
$= 628.57$ cm^3

22. (A) Let x cm be added either to radius or to height
$\pi(10+x)^2 4 = \pi(10)^2(4+x)$
$4(100 + x^2 + 20x) = 100\,(4+x)$
$400 + 4x^2 + 80x = 400 + 100x$
$4x^2 - 20x = 0$
$x^2 - 5x = 0$
$\Rightarrow x = 5$ as $x \neq 0$

23. (B) $r_{cy} : r_{co} = \sqrt{3} : \sqrt{2}$
$h_{cy} : h_{co} = \sqrt{2} : \sqrt{3}$
$V_{cy} : V_{co} = \pi r^2_{cy} h_{cy} : \frac{1}{3}\pi r^2_{co} h_{co}$
$= 3\left(\frac{r_{cy}}{r_{co}}\right)^2 \cdot \frac{h_{cy}}{h_{co}} : 1$
$= 3\left(\frac{\sqrt{3}}{\sqrt{2}}\right)^2 \frac{\sqrt{2}}{\sqrt{3}} : 1$
$= 3 \times \frac{3}{2} \times \frac{\sqrt{2}}{\sqrt{3}} : 1$
$= 3\sqrt{3} : \sqrt{2}$

24. (D) $2\pi rh : 2\pi rh + 2\pi r^2 = 1 : 2$
$2(2\pi rh) = 2\pi rh + 2\pi r^2$
$\Rightarrow 2\pi rh = 2\pi r^2$
$\Rightarrow h = r$
$2\pi rh = \frac{616}{2}$
$\Rightarrow 2 \times \frac{22}{7} r^2 = \frac{616}{2}$
$\Rightarrow r^2 = \frac{616}{2 \times 2} \times \frac{7}{22}$
$r^2 = 49 \Rightarrow r = 7$
Volume
$= \pi r^2 h = \frac{22}{7} \times 7 \times 7 \times 7 = 1078$ cm^3

25. (D) $2\pi r = a \Rightarrow r = \frac{a}{2\pi}$
$V = \pi r^2 h$
$\Rightarrow V = \pi . \frac{a^2}{4\pi^2} . h$
$\Rightarrow h = \frac{4\pi V}{a^2}$ units

26. (D) Diameter = 12
$\Rightarrow$ Radius = 6
$\pi r^2 h = \frac{4}{3}\pi r^3$
$h = \frac{4}{3}r = \frac{4}{3} \times 6 = 8$ cm

27. (A) $\sqrt{3}\,a = \sqrt{12}$
$\sqrt{3}\,a = 2\sqrt{3}$
$\Rightarrow a = 2$ cm
Volume of cube
$= a^3 = (2)^3 = 8$ cm^3

28. (A) If volumes of cubes in ratio 27 : 1 then their, edges will be in ratio $(27)^{1/3} : 1^{1/13} = 3 : 1$

29. (C) $l : b : h = 1 : 2 : 3$
$S.A = 2\left(2x^2 + 6x^2 + 3x^2\right)$
$= 22x^2 = 88$
$x = 2$
$v = lbh$
$= 2 \times 4 \times 6$
$= 48$

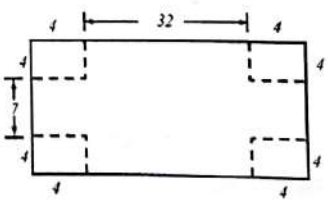
30. (C) $\sqrt{3}\,a = 4\sqrt{3}$
$\Rightarrow a = 4$
Volume of cube
$= 4^3 = 64$ cm^3

31. (B) $h = l/3$
$b = \frac{1}{2} \times \frac{1}{3}(l - h)$
$b = \frac{1}{6} \times \left(l - \frac{l}{3}\right)$
$b = \frac{1}{6} \times \frac{2}{3} l$
$b = \frac{l}{9}$
Volume $lbh = 216$
$\Rightarrow l \times \frac{l}{9} \times \frac{l}{3} = 216$
$l^3 = 216 \times 27$
$\Rightarrow l = 18$ dm

32. (A) External dimensions are $20 \times 12 \times 10$
Internal dimensions are $(20 - 2) \times (12 - 2) \times (10 - 2)$
$\therefore$ External volume
$= 20 \times 12 \times 10 = 2400$
Internal volume = $18 \times 10 \times 8$
$= 1440$
$\therefore$ Volume of wood required
$= 2400 - 1440$
$= 960$ cm^3

33. (A) lb = x, bh = y hl= z
xyz = $l^2b^2h^2$ as v = $l$bh
$xyz = v^2$

34. (D) Volume through pipe = $0.3 \times 0.2 \times 20{,}000$ m^3/hr
$= 1200$ m^3/hr
Volume of water to be filled in tank = $200 \times 150 \times 8$
$= 240000$
$\therefore$ Time taken
$= \frac{240000}{1200} = 200$ hours

35. (A)


Length = 32
Breadth = 7
Height = 4
$\therefore$ Volume = $32 \times 7 \times 4$
$= 896$ cm^3

36 (D) $lb = 12$, $bh = 20$, $hl = 15$

$l^2 b^2 h^2 = 12 \times 20 \times 15$

Volume

$= lbh = \sqrt{12 \times 20 \times 15} = 60\ cm^3$

37. (D) $p = lb$, $q = bh$, $r = hl$

$pqr = l^2b^2h^2$

Volume $= lbh = \sqrt{pqr}$

38. (B) $2lb = 2(lh + bh)$

$\Rightarrow h = \frac{lb}{l+b} = \frac{15\times12}{15+12}$

$= \frac{15\times12}{27} = \frac{20}{3}$

$\therefore$ Volume lbh

$= 15 \times 12 \times \frac{20}{3} = 1200\ cm^3$

39. (C) $6a^2 = 96$

$a^2 = 16 \quad \Rightarrow a = 4$

$\therefore$ Volume of cube

$= a^3 = 64\ cm^3$

40. (B) $\frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \frac{2}{3}$

$\left(\frac{r_1}{r_2}\right)^2 \cdot \frac{h_1}{h_2} = \frac{2}{3}$

$\left(\frac{1}{2}\right)^2 \frac{h_1}{h_2} = \frac{2}{3}$

$\Rightarrow h_1 : h_2 = 8 : 3$

41. (C) If height of cone doubles then volume of cone also doubles $\therefore V_1 : V_2 = 1 : 2$

42. (D) If radius of cone doubles then volume of cone quadraples

So, $V_1 : V_2 = 4 : 1$

43. (A) $\frac{1}{3}\pi r^2 h = \frac{4}{3}\pi r^3$

$h = 4r$

$= 4 \times 8 = 32$ cm

Slant height

$l = \sqrt{r^2 + h^2} = \sqrt{8^2 + 32^2}$

$= 8\sqrt{1+4^2} = 8\sqrt{17}$ cm

44. (A) Volume of sphere $= \frac{4}{3}\pi(15)^3$

Volume of cone

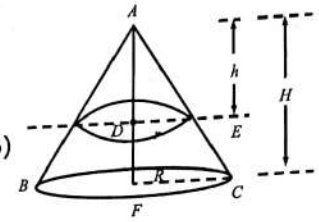
$= \frac{1}{3}\pi(15)^2 .15 = \frac{1}{3}\pi(15)^3$

Volume of cone : Volume of sphere = 1 : 4

$\Rightarrow$ 3 parts out of 4 are wasted

$= \frac{3}{4} = 75\%$

45. (B)



$h = \frac{H}{2} = \frac{24}{2} = 12$

$\frac{h}{H} = \frac{1}{2}$

As ΔADE and ΔAFC are similar

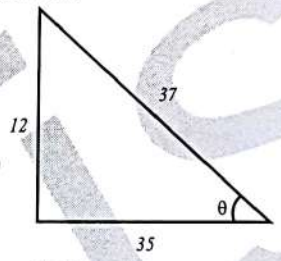
$\frac{h}{H} = \frac{r}{R} \Rightarrow r = \frac{R}{2} = \frac{7}{2}$

Volume of upper portion

$= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 12$

$= 154\ cm^3$

46. (D)



$\pi r^2 = 770$

$\Rightarrow r^2 = 770 \times \frac{7}{22} = 245$

$r = 7\sqrt{5}$

$\frac{\pi r l}{\pi r^2} = \frac{814}{770} = \frac{37}{35}$

$\frac{l}{r} = \frac{37}{35}$

$\Rightarrow \frac{h}{r} = \frac{12}{35} \Rightarrow h = \frac{12}{35} \times 7\sqrt{5} = \frac{12}{\sqrt{5}}$

Volume $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times$ Area $\times h$

$= \frac{1}{3} \times 770 \times \frac{12}{\sqrt{5}}$

$= 616\sqrt{5}$

47. (D) $\frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \frac{1}{4}$

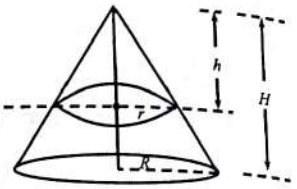
Diameter ratio = radius ratio

$\left(\frac{r_1}{r_2}\right)^2 \cdot \frac{h_1}{h_2} = \frac{1}{4}$

$\left(\frac{4}{5}\right)^2 \times \frac{h_1}{h_2} = \frac{1}{4}$

$h_1 : h_2 = 25 : 64$

48. (D)



$H = 30$ cm

$\frac{r}{R} = \frac{h}{H}$

$\frac{\frac{1}{3}\pi r^2 h}{\frac{1}{3}\pi R^2 H} = \frac{1}{27}$

$\left(\frac{h}{H}\right)^3 = \frac{1}{27} \Rightarrow \frac{h}{H} = \frac{1}{3}$

$\Rightarrow h = \frac{H}{3} = \frac{30}{3} = 10$ cm

$\therefore$ The height above the base $= 30 - 10$

$= 20$ cms

49. (B) Let radius $= 5x$, height $= 12x$

$\therefore$ slant height $= 13x$

Volume

$\frac{1}{3} \times \frac{22}{7} \times 5x \times 5x \times 12x = \frac{2200}{7}$

$\Rightarrow x = 1$

$\therefore$ Slant height $= 13$ cm

50. (C) $\frac{1}{3}\pi r_1^2 h + \frac{1}{3}\pi r_2^2 h = \frac{4}{3}\pi R^3$

$h\left(r_1^2 + r_2^2\right) = 4R^3$

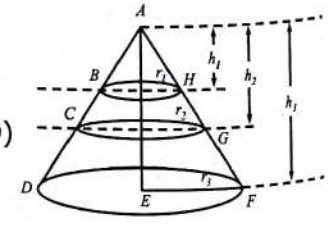
$\Rightarrow h = \frac{4R^3}{r_1^2 + r_2^2}$

51. (A) $\frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \left(\frac{r_1}{r_2}\right)^2 \cdot \frac{h_1}{h_2}$

$= \left(\frac{3}{4}\right)^2 \times \frac{4}{3} = \frac{3}{4}$

$\therefore V_1 : V_2 = 3 : 4$

52. (D)



Let the height of cone be 3

units

$h_1 = 1$ $h_2 = 2$

$h_3 = 3$

$\frac{r_1}{h_1} = \frac{r_2}{h_2} = \frac{r_3}{h_3}$

$V_1 : V_1 + V_2 : V_1 + V_2 + V_3$

$= \frac{1}{3}\pi r_1^2 h_1 : \frac{1}{3}\pi r_2^2 h_2 : \frac{1}{3}\pi r_3^2 h_3$

$= r_1^2 h_1 : r_2^2 h_2 = r_3^2 h_3$

$= h_1^3 : h_2^3 : h_3^3$

$= 1 : 8 : 27$

$V_1 : V_2 : V_3 = 1 : 8 - 1 : 27 - 8$

$= 1 : 7 : 19$

53. (A) Volume

$= \frac{1}{3}\pi h(r^2 + R^2 + rR)$

$= \frac{1}{3} \times \frac{22}{7} \times 45\,(28^2 + 7^2 + 28 \times 7)$

$= 48510\ cm^3$

54. (C) Height diameter = 3 : 2

$\Rightarrow$ height : radius = 3 : 1

$\frac{h}{r} = \frac{3}{1} \Rightarrow r = \frac{h}{3}$

$\frac{1}{3}\pi r^2 h = 1078$

$\frac{1}{3}\pi\left(\frac{h}{3}\right)^2 h = 1078$

$h^3 = 1078 \times 22 \times \frac{7}{22}$

$\Rightarrow h^3 = 7^3 \times 3^3$

$\Rightarrow h = 21\ cm$

55. (B) If radius of cone double then volume quadraples so volume of cone becomes four times the previous volume

56. (A) $\frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \left(\frac{r_1}{r_2}\right)^2 \cdot \frac{h_1}{h_2}$

$= \left(\frac{3}{5}\right)^2 \times \frac{1}{3} = \frac{3}{25}$

$\therefore V_1 : V_2 = 3 : 25$

57. (B) $\frac{1}{3}\pi a^2 h = \frac{4}{3}\pi a^3$

$\Rightarrow h = 4a$

58. (C) $2\pi r = 33$

$2 \times \frac{22}{7} \times r = 33$

$\Rightarrow r = \frac{21}{4}$

Volume

$= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times \frac{21}{4} \times \frac{21}{4} \times 16 = 462\ cm^3$

59. (B) $2\pi r = 8 \Rightarrow r = 4/\pi$

Volume $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \pi \times \frac{4}{\pi} \times \frac{4}{\pi} \times 21 = \frac{112}{\pi}\ cm^3$

60. (C) $\frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{4}{1}$

$\left(\frac{r_1}{r_2}\right)^2 \frac{h_1}{h_2} = \frac{4}{1}$

$\left(\frac{5}{4}\right)^2 \frac{h_1}{h_2} = \frac{4}{1}$

$\therefore h_1 : h_2 = 64 : 25$

61. (B) Volume $= \frac{1}{3}\pi r^2 h$

$1232 = \frac{1}{3} \times 154 \times h$

$\Rightarrow h = 24\ m$

$\pi r^2 = 154$

$\Rightarrow \frac{22}{7} \times r^2 = 154$

$r^2 = 154 \times \frac{7}{22}$

$\Rightarrow r = 7m$

$\Rightarrow l = \sqrt{r^2 + h^2} = \sqrt{49 + 576}$

$= \sqrt{625} = 25$

LSA $= \pi r l = \frac{22}{7} \times 7 \times 25 = 550$

$\therefore$ length of canvas required

$= \frac{550}{2} = 275m$

62. (B) $\frac{V_1}{V_2} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \left(\frac{3}{4}\right)^2 = \frac{9}{16}$

$\therefore V_1 : V_2 = 9 : 16$

63. (C) External radius $= \frac{6}{2} = 3$

Internal radius $= 3 - 0.5 = 2.5$

$\therefore$ Volume of ball

$= \frac{4}{3}\pi(3^3 - 2.5^3)$

$= \frac{143}{3} = 47\frac{2}{3}\ cm^3$

64. (B) $r_1 + r_2 = 10$

$\frac{4}{3}\pi(r_1^3 + r_2^3) = 880$

$r_1^3 + r_2^3 = 210$

$(r_1 + r_2)^3 - 3r_1 r_2(r_1 + r_2) = 210$

$(10)^3 - 3r_1 r_2(10) = 210$

$1000 - 30 r_1 r_2 = 210$

$\Rightarrow r_1 r_2 = \frac{790}{30} = 26\frac{1}{3}$

65. (D) If radius of sphere is doubled then its volume becomes 8 times.

66. (D) If radius of spheres are in ratio 3 : 2 then their volumes will be in ratio $(3)^3 : (2)^3 = 27 : 8$

67. (B) $3\pi r^2 = 108\pi$

$\Rightarrow r^2 = 36 \Rightarrow r = 6$ cm

Volume

$= \frac{2}{3}\pi r^3 = \frac{2}{3}\pi \times 6 \times 6 \times 6 = 144\pi cm^3$

68. (D) Diameter of sphere = side of cube

$2r = 7 \Rightarrow r = 7/2$

Volume $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times \frac{7}{2}$

$= 179.67\ cm^3$

69. (C) If surface areas of sphere are in the ratio 4 : 9 then volumes will be in the ratio $4^{3/2} : 9^{3/2} = 8 : 27$

70. (D) $\frac{4}{3}\pi r_1^3 = \frac{2}{3}\pi r_2^3$

$\left(\frac{r_1}{r_2}\right)^3 = \frac{1}{2}$

$\therefore r_1 : r_2 = 1 : \sqrt[3]{2}$

71. (A) $\frac{4}{3} \times \pi\left(\frac{6}{2}\right)^3 = 8 \times \frac{4}{3}\pi r^3$

$3^3 = 8\, r^3$

$\Rightarrow r^3 = \left(\frac{3}{2}\right)^3$

$\therefore$ Radius $= \frac{3}{2} = 1.5$ cm

72. (A) $4\pi r^2 = 8\pi$

$\Rightarrow r = \sqrt{2}$

Volume $= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(\sqrt{2})^3$

$= \frac{8\sqrt{2}}{3}\pi$ cubic units

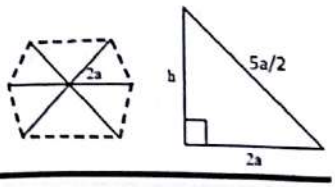
73. (C) Volume of pyramid

$= \frac{1}{3} \times$ Area of base $\times$ height

$= \frac{1}{3} \times 57 \times 10$

$= 190\ cm^3$

74. (C)



Area of base $= 6 \times \frac{\sqrt{3}}{4}(2a)^2$

$= 6\sqrt{3}\ a^2$

$h = \sqrt{\left(\frac{5a}{2}\right)^2 - (2a)^2} = \sqrt{\frac{25a^2}{4} - 4a^2}$

$= \sqrt{\frac{9a^2}{4}} = \frac{3a}{2}$

Volume

$= \frac{1}{3} \times 6\sqrt{3}a^2 \times \frac{3a}{2} = 3\sqrt{3}a^3\ cm^3$

75. (C) Volume

$= \frac{1}{3} \times$ base area $\times$ height

$8000 = \frac{1}{3} \times 40 \times 40 \times$ height

$\therefore$ height $= 15$ cm

76. (C) Volume = Area of base $\times$ height

$1056 = \frac{1}{2}(8+14) \times 8 \times$ height

$h = \frac{1056}{22 \times 4} = 12$ cm

77. (C) Let side of square be a

TSA $= (4a)15 + 2a^2$

$608 = 60a + 2a^2$

$a^2 + 30a - 304 = 0$

$\Rightarrow (a-8)(a+38) = 0$

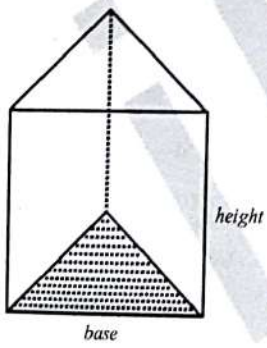
$a \neq 38$ so $a = 8$

Volume = Area of base $\times$ height

$= 8 \times 8 \times 15$

$= 960\ cm^3$

78. (B)



Volume = Area of base $\times$ height

$= \frac{\sqrt{3}}{4} \times 8 \times 8 \times 10$

$= 160\sqrt{3}\ cm^3$

79. (D) Area of triangle

$= \frac{1}{2} \times$ perimeter $\times$ in radius

$= \frac{1}{2} \times 28 \times 4 = 56\ cm^2$

Volume = Area $\times$ height

$366 = 56 \times$ height

$\Rightarrow$ height $= \frac{366}{56} = 6.536$ cm

80. (C) 5, 12, 13 $\Rightarrow$ Right angled

Area $= \frac{1}{2} \times 5 \times 12 = 30$

Volume = Area $\times$ height

$330 = 30 \times$ height

$\Rightarrow$ height $= 11$ cm

81. (A) Earth and moon are assumed to be in spherical shape. If ratio of radius of earth & moon $= 4 : 1$ than ratio of volumes

$= (4)^3 : 1^3$

$= 64 : 1$

82. (C)

$\frac{1}{3} \times \pi \times (12)^2 \times 50 = \pi \times (10)^2 \times h$

$\Rightarrow h = 24$ cm

83. (B) $\pi r^2(9) = \frac{1}{3}\pi\left(\frac{30}{2}\right)^2 \times 108$

$r^2 = \frac{1}{9} \times \frac{1}{3} \times 15 \times 15 \times 108$

$r^2 = 15 \times 15 \times 4$

$\therefore r = 30$

$\therefore$ Diameter $= 2r = 60$ cm

84. (B) $6a^2 = 4\pi r^2$

$\frac{a^2}{r^2} = \frac{2\pi}{3} \Rightarrow \frac{a}{r} = \sqrt{\frac{2\pi}{3}}$

Ratio of volumes $= a^3 : \frac{4}{3}\pi r^3$

$= \frac{a^3}{r^3} : \frac{4\pi}{3}$

$= \frac{2\pi}{3} \times \sqrt{\frac{2\pi}{3}} : \frac{4\pi}{3}$

$= \sqrt{\frac{2\pi}{3}} : 2$

$= \sqrt{\pi} : \sqrt{6}$

85. (B) Folded along length

$\therefore$ Length becomes circumference of cylinder and breadth becomes height of cylinder

$2\pi r = 22 \Rightarrow r = \frac{7}{2}$ & $h = 12$

$\therefore$ Volume

$= \pi r^2 h = \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 12 = 462\ cm^3$

86. (B) Sphere fits inside cube

$\Rightarrow$ Diameter of sphere = side of the cube

$2r = a$

$\Rightarrow \frac{a}{r} = 2$

Volume of cube sphere

$= a^3 : \frac{4}{3}\pi r^3$

$= \frac{a^3}{r^3} : \frac{4}{3}\pi$

$= 8 : \frac{4}{3}\pi$

$= 6 : \pi$

87. (A) $\pi r^2 h = \frac{4}{3}\pi r^3$

$h = \frac{4}{3}r$

$\frac{3}{2} = \frac{2r}{h}$

$\therefore$ Diameter of sphere : height of cylinder $= 3 : 2$

88. (C) $2\pi r = 100$ & $h = 44$

$r = 100 \times \frac{1}{2} \times \frac{7}{22} = \frac{175}{11}$

Volume

$= \pi r^2 h = \frac{22}{7} \times \frac{175}{11} \times \frac{175}{11} \times 44$

$= 35,000\ cm^3$

89. (A) Same heights $\Rightarrow h = r$

Ratio $= \frac{1}{3}\pi r^2 h : \frac{2}{3}\pi r^3 : \pi r^2 h$

$= \frac{1}{3} : \frac{2}{3} : 1 = 1 : 2 : 3$

90. (C)

$\frac{V_1}{V_2} = \frac{\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = 3\left(\frac{r_1}{r_2}\right)^2\left(\frac{h_1}{h_2}\right)$

$= 3 \times \left(\frac{3}{4}\right)^2\left(\frac{2}{3}\right)$

$= \frac{9}{16} \times 2 = \frac{9}{8}$

$\therefore V_1 : V_2 = 9 : 8$

91. (A) Area of pipe

$= \pi r^2 = \frac{22}{7}\left(\frac{14}{2}\right)^2 = \frac{22}{7} \times 7 \times 7$

$= 154\ cm^2$

Volume of water through pipe

$= 154 \times 5000 \times 100\ cm^3/hr$

$= 77\ m^3/hr$

Time taken to fill tank

$= \frac{50 \times 44 \times 0.07}{77} = 2$ hours

92. (A) $2\pi rh + 2\pi r^2 = 2 \times 4\pi r^2$

$2\pi rh = 6\pi r^2$

$h = 3r$

Volume ratio $= \pi r^2 h : \frac{4}{3}\pi r^3$

$= 3\pi r^3 : \frac{4}{3}\pi r^3$

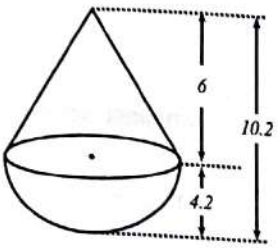
$= 9 : 4$

93. (B) Increase in volume = volume of spherical ball

$\pi\left(\frac{24}{2}\right)^2 h = \frac{4}{3}\pi \times 6^3$

$h = \frac{4\times 6^3}{3\times 12^2} = 2\text{cm}$

94. (D) Radius of hemisphere & cone are equal



Height of cone = 10.2 − 4.2 = 6

Volume of toy = volume of cone + volume of sphere

$= \frac{1}{3}\pi \times (4.2)^2 \times 6 + \frac{2}{3}\pi(4.2)^3$

$= \frac{1}{3}\pi \times (4.2)^2 \times (6 + 8.4)$

$= \frac{1}{3} \times \frac{22}{7} \times 4.2 \times 4.2 \times 14.4$

$= 266\ \text{cm}^3$

95. (C) Height of cylinder h = radius of hemisphere r

$\frac{2}{3}\pi r_{hs}^3 = \pi r_{cy}^2 h$

$\frac{2}{3} r_{hs}^3 = r_{cy}^2 r_{hs}$

$\left(\frac{r_{hs}}{r_{cy}}\right)^2 = \frac{3}{2}$

$\Rightarrow r_{hs} : r_{cy} = \sqrt{3} : \sqrt{2}$

96. (B) $a^3 : \frac{4}{3}\pi r^3 = 363 : 49$

$\frac{a^3}{r^3} = \frac{4}{3} \times \frac{22}{7} \times \frac{363}{49}$

$= \frac{8 \times 11 \times 121}{7 \times 49} = \left(\frac{22}{7}\right)^3$

$\therefore a : r = 22 : 7$

97. (C)

$\pi(10)^2 \times 21 - \frac{1}{3}\pi(10)^2 h = 4400$

$100 \times \frac{22}{7}\left(21 - \frac{h}{3}\right) = 4400$

$21 - \frac{h}{3} = 14$

$\Rightarrow \frac{h}{3} = 7$

$\Rightarrow h = 21\ \text{cm}$

98. (C) Given $\frac{1}{3}\pi r^2 h = 27\pi$

Volume of water needed

$= \pi r^2 h - \frac{1}{3}\pi r^2 h$

$= \frac{2}{3}\pi r^2 h$

$= 2 \times 27\pi = 54\ \pi$

99. (C) Let intial height of water be h.

After solid sphere is placed water just covers the sphere

$\Rightarrow$ Height of water = 2r

$\therefore \pi r^2 h + \frac{4}{3}\pi r^3 = \pi r^2 (2r)$

$\pi r^2 h + \frac{4}{3}\pi r^3 = 2\pi r^3$

$\pi r^2 h = \frac{2}{3}\pi r^3$

$\Rightarrow h = \frac{2}{3}r = \frac{2}{3} \times 3.5 = \frac{7}{3}\ \text{cm}$

100. (B) $\frac{A}{B} = \frac{\pi r^2 h}{\frac{4}{3}\pi r^3} = \frac{3}{4}\frac{\pi r^2 (2r)}{\pi r^3} = \frac{3}{2}$

101. (B) $\frac{1}{3}\pi a^2 h = \frac{4}{3}\pi a^3$

$\Rightarrow h = 4a$

102. (C) Perimeter of sheet = circumference to base of cone

radius of sheet = slant height of cone

$\Rightarrow l = 14\ \text{cm}$

$2\pi r = 14\pi$

$\Rightarrow r = 7\ \text{cm}$

$h = \sqrt{l^2 - r^2}$

$= \sqrt{14^2 - 7^2} = 7\sqrt{3}\ \text{cm}$

Volume $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 7\sqrt{3}$

$= 622.36\ \text{cm}^3$

103. (D) $\frac{1}{3}\pi r^2 h = \pi m^2 r^2 h$

$\Rightarrow h^1 = \frac{h}{3m^2}$

104. (B) $\frac{\pi r^2 h}{\frac{1}{3}\pi r'^2 h} = \frac{3}{1}$

$r^2 = 3 \times \frac{1}{3} r'^2$

$\therefore$ Diameter of cylinder = Diameter of cone

105. (A) Volume of cone

$= \frac{1}{3} \times \frac{22}{7}(1)^2 \times 7 = \frac{22}{3}\ \text{cm}^3$

Volume of cuboid

$= 10 \times 5 \times 2 = 100$

Wastage

$= 100 - \frac{22}{3} = \frac{300 - 22}{3} = \frac{278}{3}$

Wastage

$= \frac{\frac{278}{3}}{100} \times 100 = \frac{278}{3} = 92\frac{2}{3}\%$

106. (C) Volume $= \pi r^2 h$

$100 \xrightarrow[-50]{50\%\downarrow} 50 \xrightarrow[-25]{50\%\downarrow} 25 \xrightarrow[12.5]{50\%\uparrow} 37.5$

$\therefore$ Volume is decreased by 100 − 37.5 =62.5%

107. (A) Volume $= \frac{1}{3}\pi r^2 h$

$100 \xrightarrow[+100]{100\%\uparrow} 200 \xrightarrow[+200]{100\%\uparrow} 400 \xrightarrow[+400]{100\%\uparrow} 800$

$\therefore$ Volume is increased by 800 − 100 = 700%

108. (D) Volume $= \frac{1}{3}\pi r^2 h$

$100 \xrightarrow[+20]{+20\%\uparrow} 120 \xrightarrow[+24]{20\%\uparrow} 144 \xrightarrow[28.8]{20\uparrow} 172.8$

Volume is increased by 172.8 − 100 = 72.8%

109. (D) Volume $= \frac{1}{3}\pi r^2 h$

$100 \xrightarrow[+200]{200\%\uparrow} 300 \xrightarrow[-150]{50\%\downarrow} 150 \xrightarrow[-75]{50\%\downarrow} 75$

$\therefore$ Volume decreased by 100 − 75 = 25%

110. (D) Volume $= \frac{1}{3}\pi r^2 h$

$100 \xrightarrow[+100]{100\%\uparrow} 200 \xrightarrow[+200]{100\%\uparrow} 400 \xrightarrow[+400]{100\%\uparrow} 800$

$\therefore$ Volume increases by $= \frac{800}{100}$

= 8 times the original

111. (B) Volume $= \pi r^2 h$

$100 \xrightarrow[-50]{50\%\downarrow} 50 \xrightarrow[-25]{50\%\downarrow} 25 \xrightarrow[+15]{60\%\uparrow} 40$

$\therefore$ Volume decreased by 100 − 40 = 60%

112. (D) Let length $l = x$ b = 2x h = 3x

$\Rightarrow lbh = 6x^3$

New dimensions

$l' = 2x$ $b' = 6x$ $h' = 9x$

$l'b'h' = 108x^3$

$\therefore \frac{\text{Increase in volume}}{\text{Original}}$

$= \frac{108x^3 - 6x^3}{6x^3}$

$= \frac{102}{6} = 17$ times

113. (C) Volume $= \pi r^2 h$

$100 \xrightarrow[+10]{10\%\uparrow} 110 \xrightarrow[+11]{10\%\uparrow}$

$121 \xrightarrow[12.1]{10\%\uparrow} 133.1$

$\therefore$ Increase in volume $= 133.1 - 100 = 33.1\%$

114. (A) If height of cone increases by 100% then volume of cone also increases by 100%

115. (A) % of coffee filled

$$= \frac{\frac{2}{3}\pi(4)^3}{\frac{1}{3}\pi(8)^2 \times 16} = \frac{1}{8}$$

% of cone empty

$$= \frac{7}{8} \times 100 = 87.5\%$$

116. (B) Volume of rain water = Area × height

$$= 1.5 \times 10{,}000 \times \frac{5}{100}$$

$= 750\ m^3$

117. (A) Side of tetrahedon = a = 3

Volume of tetrahedeon $= \frac{a^3}{6\sqrt{2}}$

$$= \frac{3 \times 3 \times 3}{6\sqrt{2}}$$

$$= \frac{9}{2\sqrt{2}} = \frac{9\sqrt{2}}{4}\ cm^3$$

118. (D) Area of triangle base

$$= \frac{1}{2} \times \text{perimeter} \times \text{in radius}$$

$$= \frac{1}{2} \times 15 \times 3 = \frac{45}{2}$$

Volume = Area × height

$$270 = \frac{45}{2} \times \text{height}$$

$\Rightarrow$ height = 12 cm

119. (B) Area of base

$$= \frac{1}{2} \times 10 \times 12 = 60$$

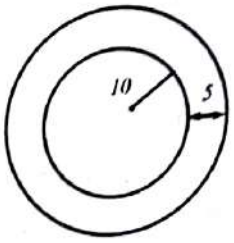
Volume = Area × height = 60 × 20 = 1200 cm^3

$1\ cm^3 \rightarrow 6gms$

$1200 cm^3 \rightarrow ?$

$\therefore$ Weight of prism = 1200 × 6 = 7200g = 7.2 kg

120. (A)



Volume of copper rod = Volume of wire

$$\pi \times \left(\frac{1}{2}\right)^2 \times 8 = \pi r^2 \times 1800$$

$$r^2 = \frac{1}{900}$$

$$\Rightarrow r = \frac{1}{30}\ cm$$

$$\text{Diameter} = 2r = \frac{1}{15}\ cm$$

121. (C) Volume of earth dug = Volume of embankment

$$\pi \times \left(\frac{20}{2}\right)^2 \times 14$$

$$= \pi (15^2 - 10^2) \times h$$

$1400 = 125h$

$$\Rightarrow h = \frac{1400}{125} = 11.2\,m$$

122. (B) $\pi(4)^2 \times 6 + \pi(5)^2 4 = \pi r^2 \times 1$

$96 + 100 = r^2$

$\Rightarrow r = \sqrt{196} = 14$ cm

123. (A) $\frac{2}{3}\pi R^3 = \frac{1}{3}\pi R^2 H$

$\Rightarrow H = 2R$

124. (D)

$$\frac{4}{3}\pi(3)^3 + \frac{4}{3}\pi(4)^3 + \frac{4}{3}\pi(5)^3 = \frac{4}{3}\pi r^3$$

$27 + 64 + 125 = r^3$

$\Rightarrow r^3 = 216$

$\Rightarrow r = 6$ cm

$\therefore$ Diameter = 12 cm

125. (D)

$$\frac{4}{3}\pi(1)^3 + \frac{4}{3}\pi(6)^3 + \frac{4}{3}\pi(8)^3 = \frac{4}{3}\pi r^3$$

$r^3 = 1 + 216 + 512$

$r^3 = 729$

$\therefore$ Radius r = 9 cm

126. (C) Volume of water rise = Volume of sphere

$$\pi(4)^2 \times h = \frac{4}{3}\pi(2)^3$$

$$h = \frac{4}{3} \times 8 \times \frac{1}{16}$$

$$h = \frac{2}{3}\ cm$$

127. (B) $12 \times \frac{4}{3}\pi\left(\frac{d}{2}\right)^3 = \pi \times (8)^2 \times 2$

$$12 \times \frac{4}{3}\pi \times \frac{d^3}{8} = \pi \times 64 \times 2$$

$d^3 = 64$

$\therefore$ diameter = 4 cm

128. (A) Let the diameters be 6x, 8x, 10x

$$\frac{4}{3}\pi(6)^3 = \frac{4}{3}\pi(3x)^3 + \frac{4}{3}\pi(4x)^3 + \frac{4}{3}\pi(5x)^3$$

$6^3 = (27 + 64 + 125)x^3$

$$x^3 = \frac{6^3}{6^3}$$

$\Rightarrow x = 1$

Radius of smallest sphere = 3x = 3cm

129. (C) $\frac{4}{3}\pi(0.3)^3 = \pi r^2(0.001)$

$$r^2 = \frac{4}{3} \times \frac{0.027}{0.001} = 4 \times 9 = 36$$

$\Rightarrow r = 6$

$\therefore$ Diameter = 2 × 6 = 12 m

130. (B) $\pi(0.1)^2 \times 3600 = \frac{4}{3}\pi r^3$

$$36 \times \frac{3}{4} = r^3$$

$\Rightarrow r = 3$ cm

131. (A) $\frac{1}{3}\pi(6)^2 \times 24 = \frac{4}{3}\pi r^3$

$$12 \times 24 \times \frac{3}{4} = r^3$$

$\Rightarrow r = 6$ cm

132. (D) $\frac{4}{3}\pi(3)^3 = \frac{1}{3}\pi(6)^2 h$

$$\frac{4 \times 27}{36} = h$$

$\Rightarrow h = 3$ cm

133. (B) $\frac{4}{3}\pi(7)^3 = \pi \times r^2 \times \frac{7}{3}$

$r^2 = 4 \times 7^2$

r = 14 cm

Diameter = 2r = 28 cm

134. (C) $\pi r^2 \times 6 = \frac{1}{3}\pi r^2 \times h$

$\Rightarrow h = 18$ cm

135. (B) $\frac{1}{3}\pi r^2 \times h = \pi r^2 \times 7$

h = 21 cm

136. (D) $\frac{4}{3}\pi(7)^3 = \pi(7)^2 \times h$

$$\Rightarrow h = \frac{28}{3}$$

137. (D) $\frac{4}{3}\pi r^3 = \frac{1}{3}\pi r^2 h$

$4r = h$

$\therefore h : r = 4 : 1$

138. (B) Volume of water level rises = volume of the sphere

$\pi \times (6)^2 \times h = \frac{4}{3}\pi(3)^3$

$h = \frac{4\times 9}{6\times 6} = 1$ cm

139. (B) $\frac{4}{3}\pi(9)^3 = \pi(0.2)^2 \times h$

$\frac{4\times 9\times 9\times 9}{3\times 0.2\times 0.2} = h$

$\Rightarrow h = 24300$ cm

$= 243$ m

140. (A) $\frac{4}{3}\pi r^3 = 21\times 77\times 24$

$r^3 = \frac{3}{4}\times\frac{7}{22}\times 21\times 77\times 24$

$r^3 = 3\times 7\times 3\times 7\times 7\times 3$

$r^3 = 21^3$

$\Rightarrow r = 21$ cm

141. (D) $\pi r^2 h = 6 \times \frac{4}{3}\pi r^3$

$h = 8r$

$= 8 \times 50$

$= 400$ cm

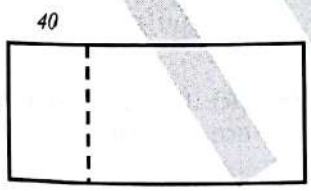
$= 4$ m

142. (B) $\frac{1}{3}\pi(3)^2 h + \frac{1}{3}\pi(4)^2 h = \frac{4}{3}\pi(5)^3$

$\frac{1}{3}\pi h(5)^2 = \frac{4}{3}\pi(5)^3$

$h = 4 \times 5 = 20$ cm

143. (C)



Volume of earth dug = (Area of field without tank) × height

$40 \times 30 \times 12 = (960 \times 30) \times h$

$h = \frac{40\times 30\times 12}{960\times 30} = 0.5$ m

144. (D) Volume $= \frac{1}{3}$ Area × height

$= \frac{1}{3}\times\frac{\left(\sqrt{1152}\right)^2}{2}\times 6$

$= 1152$ m^3

145. (A) $\frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2} = \frac{2}{3}$

$\left(\frac{r_1}{r_2}\right)^2 \cdot \frac{h_1}{h_2} = \frac{2}{3}$

$\left(\frac{1}{2}\right)^2 \frac{h_1}{h_2} = \frac{2}{3}$

$\therefore h_1 : h_2 = 8 : 3$

146. (C) If volume of cubes are in ratio $a_1^3 : a_2^3 = 27 : 64$ then surface areas are in ratio

$a_1^2 : a_2^2 = (27)^{\frac{2}{3}} : (64)^{\frac{2}{3}} = 9 : 16$

147. (A) If both radius & height of cone are doubled then the volume of cone becomes 8 times of the previous volume

148. (A) Density $= \frac{\text{Weight}}{\text{Volume}}$

Volume $= \frac{\text{Weight}}{\text{Density}}$

$V_1 : V_2 = \frac{W_1}{W_2}\times\frac{d_2}{d_1}$

$V_1 : V_2 = \frac{8}{17}\times\frac{64}{289} = \frac{8^3}{17^3}$

If volumes of sphere are in ratio $8^3 : 17^3$ then radii will be in the ratio 8 : 17

149. (A) $6^3 + 8^3 + 1^3 = a^3$

$\Rightarrow a^3 = 216 + 512 + 1$

$a^3 = 729$

$\Rightarrow a = 9$

Surface area

$= 6a^2 = 6\times 9\times 9 = 486$ cm^2

150. (A) $8 \times \frac{2}{3}\pi r^3 = \frac{1}{3}\pi(6)^2 \times 12$

$r^3 = \frac{6\times 6\times 12}{8\times 2} = 27$

$\Rightarrow r = 3$ cm

151. (D) Let Radius of cylinder be r

$\therefore$ Radius of sphere $= \frac{r}{2}$

$\pi r^2 \times h = \frac{4}{3}\pi\left(\frac{r}{2}\right)^3$

$\pi r^2 h = \frac{4}{3}\pi\frac{r^3}{8}$

$\frac{h}{r} = \frac{1}{6}$

$h : r = 1 : 6$

152. (B) No.of bricks

$= \frac{20}{25\times 12.5\times 8\times 10^{-6}}$

$= \frac{20\times 10^6}{25\times 12.5\times 8} = 8{,}000$

153. (A)

Volume $= \frac{1}{3}\times$ area × height

$500 = \frac{1}{3}\times 30 \times$ height

$\therefore$ height $= 50$ m

154. (A) Volume = area × height

LSA = perimeter × height

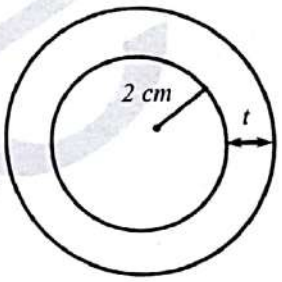
$\therefore \frac{\text{Volume}}{\text{LSA}} = \frac{\text{Area}}{\text{Perimeter}}$

$\frac{40\sqrt{3}}{120} = \frac{\frac{\sqrt{3}}{4}a^2}{3a}$

$\frac{1}{\sqrt{3}} = \frac{a}{4\sqrt{3}}$

$\Rightarrow a = 4$ cm

155. (D)



Let the thickness be t cm

$\frac{4}{3}\pi(2)^3 = \frac{4}{3}\pi\left((2+t)^3 - 2^3\right)$

$(2+t)^3 = 2\times 2^3$

$2 + t = 2(2)^{1/3}$

$\Rightarrow t = 2(2^{1/3} - 1)$

$\therefore$ thickness $= 2(1.259 - 1)$

$= 2 \times 0.259$

$= 0.518$ cm

156. (D) $V_s = \frac{4}{3}\pi R^3$

$V_c = \frac{1}{3}\pi R^3$

with same radius & height, 4 cones can be found from a sphere

$\therefore \frac{1}{4}\times$ volume of large sphere = volume of cone = volume of small sphere

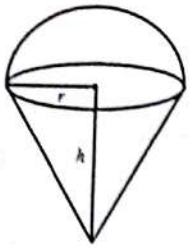
$\therefore$ Volume of small sphere : Volume of large sphere $= 1 : 4$

$\therefore$ Ratio of surface area

$= 1^{2/3} : 4^{2/3}$

$= 1 : 2^{4/3}$

157. (A)



Radius of hemisphere = Radius of cone = 7 cm
=Height of cone= 7 cm
∴ Volume

$= \frac{2}{3}\pi(7)^3 + \frac{1}{3}\pi(7)^2 \times 7$

$= \pi \times 7^3$
$= 22 \times 7 \times 7$
$= 1078\ cm^3$

158. (C) $\frac{4}{3}\pi(5^3 - 3^3) = \frac{1}{3}\pi(4)^2 \times h$

$4(125 - 27) = 16\ h$

$\Rightarrow h = \frac{98}{4} = 24.5$ cm

159. (C) Volume of tetrahedron

$= \frac{a^3}{6\sqrt{2}} = \frac{4 \times 4 \times 4}{6\sqrt{2}}$

$= \frac{16\sqrt{2}}{3}\ cm^3$

160. (D) $\frac{1}{3} \times \pi r^2 \times 24 = \pi \times \left(\frac{r}{3}\right)^2 \times h$

$\Rightarrow h = 72$ cm

161. (A) $6a^2 = 150$

$\Rightarrow a^2 = 25$
$\Rightarrow a = 5$
Volume of cube $= a^3 = 125\ cm^3$

162. (B) $\frac{4}{3}\pi(3)^3 = \frac{1}{3}\pi(6)^2 \times h$

$\frac{4 \times 27}{36} = h$

$\Rightarrow h = 3$ cm

163. (D) No.of bottles

$= \frac{\frac{2}{3}\pi(15)^3}{\pi\left(\frac{5}{2}\right)^2 \times 6}$

$= \frac{2}{3} \times \frac{15 \times 15 \times 15 \times 4}{25 \times 6} = 60$

164. (A)

$V_1 : V_2 : V_3 = \frac{1}{3}\pi r^3 : \frac{4}{3}\pi r^3 : \pi r^3$

$V_1 : V_2 : V_3 = \frac{1}{3} : \frac{4}{3} : 1$

$V_1 : V_2 : V_3 = 1 : 4 : 3$

$\therefore \frac{V_1}{1} = \frac{V_2}{4} = \frac{V_3}{3}$

165. (B) If radius of sphere doubles then volume becomes 8 times
⇒ Percentage increase in volume
= 800 − 100 = 700%

166. (D) 64 × Volume of bucket

$= \frac{2}{3} \times 1.2 \times 1.2 \times 1.2$

∴ Volume of bucket

$= \frac{2 \times 1.2 \times 1.2 \times 1.2}{3 \times 64} m^3$

$= 0.018 m^3$
= 18 litres

167. (D) No.of boxes

$= \frac{8 \times 7 \times 6}{0.08 \times 0.07 \times 0.06}$

$= 10^6 = 1000000$

168. (C) $\pi r_1^2 h_1 = \pi r_2^2 h_2$

$\left(\frac{r_1}{r_2}\right)^2 = \frac{h_2}{h_1} = \frac{2}{1}$

$\frac{r_1}{r_2} = \frac{\sqrt{2}}{1}$

$\Rightarrow r_1 : r_2 = \sqrt{2} : 1$

169. (C) $2\pi r = 22$ & $h = 12$

$2 \times \frac{22}{7} \times r = 22$

$\Rightarrow r = \frac{7}{2}$

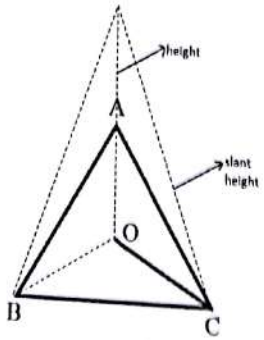
Volume $= \pi r^2 h$

$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 12 = 462\ cm^3$

170. (A) Radius of cylinder = radius of sphere = R
Height of cylinder = Diameter of sphere = 2R
Volume

$= \pi r^2 h = \pi R^2 (2R) = 2\pi R^3$

171. (C)



Side = 4cm, slant edge = 5 cm

$OC = \frac{2}{3} \times \left(\frac{\sqrt{3}}{2} \times 4\right) = \frac{4}{\sqrt{3}}$

Height

$= \sqrt{(5)^2 - \left(\frac{4}{\sqrt{3}}\right)^2} = \sqrt{25 - \frac{16}{3}} = \sqrt{\frac{59}{3}}$

Volume $= \frac{1}{3} \times$ area $\times$ height

$= \frac{1}{3} \times \frac{\sqrt{3}}{4} \times 4 \times 4 \times \sqrt{\frac{59}{3}} = \frac{4}{3}\sqrt{59}$

172. (A) $\pi r l = 550$

$\frac{22}{7} \times 7 \times l = 550$

$l = 25$ r = 7
$\therefore h = 24$

$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24$

$= 1232\ cm^3$

173. (A) $\frac{2}{3}\pi r^3 = \pi(9)^2 \times 162$

$r^3 = \frac{3}{2} \times 9 \times 9 \times 162$

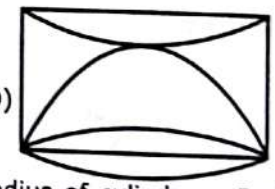
$r^3 = (27)^3$
$\Rightarrow r = 27$ cm

174. (A) $\frac{4}{3}\pi(27)^3 = \pi r^2 \times 729$

$\frac{4}{3} \times \frac{(27)^3}{729} = r^2$

$\Rightarrow r^2 = 36$
∴ Radius of wire = 6 cm

175. (D)



Radius of cylinder = Radius of hemisphere
= height of cylinder

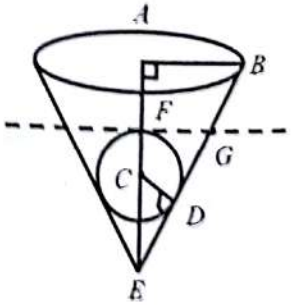
Volume ratio $= \pi r^2 (r) : \frac{2}{3}\pi r^3$

$= 3 : 2$

176. (A) If ratio of volumes of cubes are in ratio 8 : 125 then ratio of surface areas $= 8^{\frac{2}{3}} : 125^{\frac{2}{3}}$

$= 4 : 25$

177. (A)



$AE = \sqrt{36-9} = \sqrt{27} = 3\sqrt{3}$

$\Delta AEB \sim \Delta DEC$

AA similarity angle $\angle A$ is common & $\angle D = \angle A = 90^\circ$

$\frac{AB}{DC} = \frac{EB}{EC}$

$\Rightarrow EC = \frac{DC \times EB}{AB} = \frac{1 \times 6}{3} = 2$ cm

$EF = EC + CF = 2 + 1 = 3$ cm

$\Delta BAE \sim \Delta GFE$

$\therefore \frac{BA}{GF} = \frac{AE}{FE} \Rightarrow GF = \frac{BA \times FE}{AE}$

$= \frac{3\sqrt{3}}{3\sqrt{3}} = \sqrt{3}$

Volume of water = volume of small cone − volume of sphere

$= \frac{1}{3}\pi(\sqrt{3})^2 3 - \frac{4}{3}\pi(1)^3$

$= 3\pi - \frac{4\pi}{3} = \frac{5\pi}{3}$

178. (C)

$\frac{1}{3}\pi\left(\frac{h}{2}\right)^2 h = 32000 \times \frac{4}{3}\pi\left(\frac{1}{20}\right)^3$

$h^3 = 4 \times 32000 \times 4 \times \frac{1}{20 \times 20 \times 20}$

$h^3 = 64$

$\therefore h = 4$ cm

179. (C) $h = 4c$

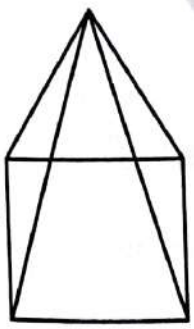
$c = 2\pi r \Rightarrow r = \frac{c}{2\pi}$

Volume of cylinder $= \pi r^2 h$

$= \pi \times \frac{c}{2\pi} \times \frac{c}{2\pi} \times 4c$

$= \frac{c^3}{\pi}$ cubic units

180. (B)



Area = 324

$a^2 = 324$

$\Rightarrow a = 18$

Volume $= \frac{1}{3}$ Area × height

$1296 = \frac{1}{3} \times 324 \times$ height

$\Rightarrow$ height $= \frac{3 \times 1296}{324} = 12$

Area of slant surfaces

$= 4 \times \frac{1}{2} \times 18 \times 15 = 540$ m²

181. (B) If surface areas of sphere are in ratio

$a_1^2 : a_2^2 = 9 : 16$ then the volumes are in the ratio

$a_1^3 : a_2^3 = 9^{\frac{3}{2}} : 16^{\frac{3}{2}} = 27 : 64$

182. (D) $\pi(20)^2 \times 9 = \frac{1}{3}\pi(r^2)\,108$

$r^2 = \frac{400 \times 9 \times 3}{108}$

$r^2 = 100$

$\Rightarrow$ Radius = 10 cm

183. (D) $\frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r^2 h_1}{\pi r^2 h_2}$

$\frac{V_1}{V_2} = \frac{1}{3} \times \frac{2}{3}$

$V_1 : V_2 = 2 : 9$

184. (C) $V_1 : V_2 : V_3$

$= \frac{1}{3}\pi r^2(r) : \pi r^2(r) : \frac{2}{3}\pi r^3$

$= \frac{1}{3} : 1 : \frac{2}{3}$

$= 1 : 3 : 2$

185. (B) $\frac{4}{3}\pi(5^3 - 3^3) = \pi r^2 \times \frac{8}{3}$

$r^2 = \frac{1}{2}(125 - 27)$

$r^2 = 49$

$r = 7$ cm

$\therefore$ Diameter $= 2r = 14$ cm

186. (A) $748 = \pi(9^2 - r^2) \times 14$

$9^2 - r^2 = 748 \times \frac{7}{22} \times \frac{1}{14}$

$9^2 - r^2 = 17$

$\Rightarrow r^2 = 81 - 17 = 64$

$\Rightarrow r = 8$ cm

Thickness = R − r = 9 − 8 = 1cm

187. (C) Volume of water rised = volume of 2 spheres

$\pi(12)^2 h = 2 \times \frac{4}{3}\pi(6)^3$

$h = \frac{2 \times 4 \times 6^3}{3 \times 12} = 4$ cm

188. (C) $4a = 20 \Rightarrow a = 5$cm

Volume

$= a^3 = (5)^3 = 125$ cm³

189. (A) $\frac{4}{3}\pi r^3 = 4\pi r^2$

$r = 3$

$\therefore$ Diameter $= 2r = 6$ cm

190. (D) Volume of water rised = volume of conical iron piece

$\pi(r^2)6.4 = \frac{1}{3}\pi(14)^2 \times 30$

$r^2 = \frac{14^2 \times 30}{3 \times 6.4} = 306.25$

$\Rightarrow r = 17.5$

$\therefore$ Diameter $= 2r = 35$ cm

191. (A) Area of triangle

$s = \frac{5+10+13}{2} = 14$

$\therefore$ Area

$= \sqrt{14 \times 9 \times 4 \times 1} = 6\sqrt{14}$

Volume = Area × height

$= 6\sqrt{14} \times 10 = 60\sqrt{14}$ cm³

1 cm³ → 7g

$60\sqrt{14}$ cm³ → ?

$\therefore$ Weight

$= 60\sqrt{14} \times 7 \approx 1570.8$ g

192. (C) No. of cones

$= \frac{\frac{1}{3}\pi(15)^2 \times 20}{\frac{1}{3}\pi(1.5)^2 \times 5} = 400$

193. (B) Area of triangle

$s = \frac{13+20+21}{2} = \frac{54}{2} = 27$

Area $= \sqrt{27 \times 14 \times 7 \times 6}$

$= 9 \times 7 \times 2 = 126$

Volume = Area × height

$= 126 \times 9$

$= 1134$ cm³

194. (C) Portion of ditch filled

$= \frac{\pi(2)^2 \times 56}{48 \times 16.5 \times 4}$

$= \frac{22 \times 4 \times 56}{7 \times 48 \times 16.5 \times 4} = \frac{2}{9}$

195. (C) $\frac{2}{3}\pi R^3 = 4 \times \frac{4}{3}\pi r^3$

$\frac{r^3}{R^3} = \frac{1}{8} \Rightarrow \frac{r}{R} = \frac{1}{2}$

$\Rightarrow r = \frac{R}{2}$

$\therefore$ Radius of sphere $= \frac{1}{2}$ of radius of hemisphere

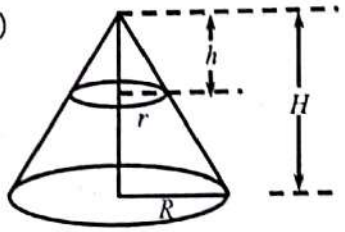
196. (B) $\pi(8)^2 \times 2 = \frac{1}{3}\pi(r)^2 \times 6$

$\Rightarrow r^2 = \frac{3 \times 64 \times 2}{6}$

$\Rightarrow r^2 = 64$

$r = 8$ cm

197. (A)



$\frac{r}{R} = \frac{h}{H}$

$\frac{\frac{1}{3}\pi r^2 h}{\frac{1}{3}\pi R^2 H} = \frac{1}{2}$

$\left(\frac{h}{H}\right)^3 = \frac{1}{2}$

$\frac{h}{H} = \frac{1^{\frac{1}{3}}}{2^{\frac{1}{3}}}$

$h : H = 1 : 2^{1/3}$

So, $h : H - h$

$= 1 : \sqrt[3]{2} - 1$

198. (D) $\frac{4}{3}\pi(1)^3 + \frac{4}{3}\pi(6)^3$

$= \frac{4}{3}\pi(9^3 - r^3)$

$1 + 216 = 729 - r^3$

$\Rightarrow r^3 = 729 - 217 = 512$

$\therefore r = 8$

$\therefore$ thickness $= 9 - r = 9 - 8 = 1$ cm

199. (A) Volume = Area × height

$= \frac{1}{2}(10 + 6)5 \times 8$

$= 320\ cm^3$

200. (D) Volume $= \frac{2}{3}\pi r^3$

$= \frac{2}{3} \times \frac{22}{7} \times 6 \times 6 \times 6$

$= 452.57\ cm^3$

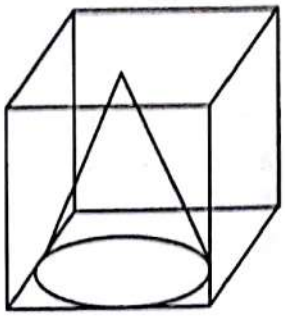
201. (D) Volume of tetrahedron

$= \frac{a^3}{6\sqrt{2}}$

$= \frac{1}{6\sqrt{2}}$

$= \frac{\sqrt{2}}{12}\ cm^3$

202. (C)



Diameter of cone = Edge of cube

Height of cone = Edge of cube

$\Rightarrow 2r = 4.2 \Rightarrow r = 2.1$ dm, $h = 4.2$ dm

$\therefore$ Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 2.1 \times 2.1 \times 4.2$

$= 19.404\ dm^3$

203. (B) Let length = 3x, breadth = 2x

TSA = Perimeter of base × height + 2× base area

$288 = 2(3x + 2x) \times 12 + 2(3x \times 2x)$

$24 = 10x + x^2$

$\Rightarrow x^2 + 10x - 24 = 0$

$(x - 2)(x + 12) = 0$

$x \neq 12 \qquad \therefore x = 2$

Volume = Area × height

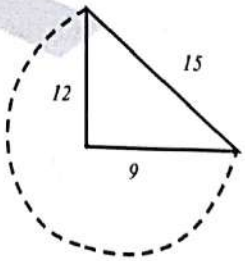
$= 3x \times 2x \times 12$

$= 72x^2$

$= 72 \times 4$

$= 288 cm^3$

204. (D)



Height of cone = 12 cm

Radius of cone = 9 cm

Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \pi \times 9 \times 9 \times 12$

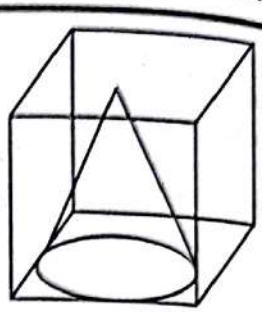
$= 324\ \pi\ cm^3$

205. (D) Volume $= \pi r^2 h$

$= \frac{22}{7} \times 5 \times 5 \times 21$

$= 1650\ cm^3$

206. (B)



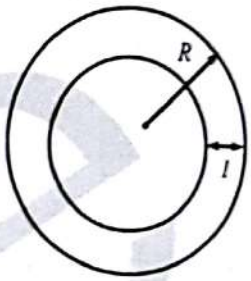
Diameter of cone = Edge of cube $\Rightarrow r = \frac{7}{2}$

Height of cone = Edge of cube $\Rightarrow h = 7$

Volume

$= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 7 \approx 89.8 cm^3$

207. (A)



$\frac{4}{3}\pi(1)^3 + \frac{4}{3}\pi(6)^3$

$= \frac{4}{3}\pi(r^3 - (r-1)^3)$

$= r^3 - (r-1)^3 = 217$

$= r^3 - (r^3 - 1 - 3r^2 + 3r) = 217$

$\Rightarrow r^3 - r^3 + 1 + 3r^2 - 3r = 217$

$\Rightarrow 3r^2 - 3r = 216$

$\Rightarrow r^2 - r = 72$

$\Rightarrow r = 9$ cm

208. (A) Area $= \frac{b}{4}\sqrt{4a^2 - b^2}$

$= \frac{6}{4}\sqrt{4(5)^2 - 6^2}$

$= \frac{6}{4}\sqrt{100 - 36}$

$= \frac{6}{4} \times 8 = 12$

$\therefore$ Volume = Area × height

$= 12 \times 8 = 96\ cm^3$

209. (B) Rise in level

$= \frac{630 \times 10^{-3}}{2.1 \times 1.5} = 0.2 m$

102. A hemispherical bowl has 3.5 cm radius. It is to be painted inside as well as outside. The cost of painting it at the rate of Rs. 5 per 10 sq. cm will be:
A) Rs. 77 B) Rs. 100
C) Rs. 175 D) Rs. 50

103. The total surface area of a right circular cylinder with radius of the base 7 cm and height 20 cm, is:
A) 900 cm^2 B) 140 cm^2
C) 1000 cm^2 D) 1188 cm^2

104. The diameter of a 120 cm long roller is 84 cm. It takes 500 complete revolutions of the roller to level a ground. The cost of levelling the ground at Rs. 1.50 per sq. m. is:
A) Rs. 6000 B) Rs. 3762
C) Rs. 2376 D) Rs. 5750

105. A hemispherical bowl has internal radius of 6 cm. The internal surface area would be: (Take $\pi = 3.14$)
A) 225 cm^2 B) 400 cm^2
C) 289.75 cm^2 D) 226.08 cm^2

106. The surface area of a sphere is 616 cm^2. The volume of the sphere would be:
A) $1437\frac{1}{3} cm^2$ B) 2100 cm^2
C) 2500 cm^2 D) $1225\frac{3}{5} cm^2$

TYPE-VI

1. The circumference of the base of a circular cylinder is 6π cm. The height of the cylinder is equal to the diameter of the base. How many litres of water can it hold?
A) 54 π cc B) 36 π cc
C) 0.054 π cc D) 0.54 π cc

2. The diameter of the base of a cylindrical drum is 35 dm. and the height is 24 dm. It is full of kerosene. How many tins each of size 25 cm × 22 cm × 35 cm can be filled with kerosene from the drum? $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 1200 B) 1020
C) 600 D) 120

3. Marbles of diameter 1.4 cm are dropped into a cylindrical beaker containing some water and are fully submerged. The diameter of the beaker is 7 cm. Find how many marbles have been dropped in it if the water rises by 5.6 cm?
A) 50 B) 150
C) 250 D) 350

4. A right cylindrical vessel is full with water. How many right cones having the same diameter and height as that of the right cylinder will be needed to store that water? $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) 4 B) 2
C) 3 D) 5

5. How many cubes, each of edge 3 cm, can be cut from a cube of edge 15 cm?
A) 25 B) 27
C) 125 D) 144

6. A cuboidal block of 6 cm × 9 cm × 12 cm is cut up into exact number of equal cubes. The least possible number of cubes will be
A) 6 B) 9
C) 24 D) 30

7. A soap cake is of size 8 cm × 5 cm × 4 cm. The number of such soap cakes that can be packed in a box measuring 56 cm × 35 cm × 28 cm is:
A) 49 B) 196
C) 243 D) 343

8. The cost of carpeting a room is 120. If the width had been 4 metres less, the cost of the Carpet would have been 20 less. The width of the room is:
A) 24 m B) 20 m
C) 25 m D) 18.5 m

9. A hall 25 metres long and 15 metres broad is surrounded by a verandah of uniform width of 3.5 metres. The cost of flooring the verandah, at Rs. 27.50 per square metres is
A) Rs. 9149.50
B) Rs. 8146.50
C) Rs. 9047.50
D) Rs. 4186.50

10. A cube of edge 6 cm is painted on all sides and then cut into unit cubes. The number of unit cubes with no sides painted is
A) 0 B) 64
C) 186 D) 108

11. The height of a conical tank is 60 cm and the diameter of its base is 64 cm. The cost of painting from outside at the rate of Rs. 35 per sq. m. is:
A) Rs. 52.00 approx.
B) Rs. 39.20 approx.
C) Rs. 35.20 approx.
D) Rs. 23.94 approx.

12. Some solid metallic right circular cones, each with radius of the base 3 cm and height 4 cm, are melted to form a solid sphere of radius 6 cm. The number of right circular cones is
A) 12 B) 24
C) 48 D) 6

13. The diameter of a circular wheel is 7 m. How many revolutions will it make in travelling 22 km ?
A) 100 B) 400
C) 500 D) 1000

14. A spherical lead ball of radius 10cm is melted and small lead balls of radius 5mm are made. The total number of possible small lead balls is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 8000 B) 400
C) 800 D) 125

15. The total number of spherical bullets, each of diameter 5 decimeter, that can be made by utilizing the maximum of a rectangular block of lead with 11 metre length, 10 metre breadth and 5 metre width is (assume that $\pi > 3$)
A) equal to 8800
B) less than to 8800
C) equal to 8400
D) greater than to 9000

16. A solid metallic cone of height 10cm, radius of base 20 cm is melted to make spherical balls each of 4cm diameter. How many such balls can be made?
A) 25 B) 75
C) 50 D) 125

17. A cylindrical rod of iron whose height is eight times its radius is melted and cast into spherical balls each of half the radius of the cylinder. The number of such spherical balls is
A) 12 B) 16
C) 24 D) 48

18. The number of spherical bullets that can be made out of a solid cube of lead whose edge measures 44 cm, each bullet being of 4 cm diameter, is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 2541 B) 2451
C) 2514 D) 2415

19. The radius of a metallic cylinder is 3 cm and its height is 5 cm. It is melted and moulded into small cones, each of height 1 cm and base radius 1 mm. The number of such cones formed, is
A) 450 B) 1350
C) 8500 D) 13500

20. If a metallic cone of radius 30 cm and height 45 cm is melted and recast into metallic spheres of radius 5 cm, find the number of spheres.
A) 81 B) 41
C) 80 D) 40

21. Water flows at the rate of 10 metres per minute from a cylindrical pipe 5 mm in diameter. How long it take to fill up a conical vessel whose diameter at the base is 30 cm and depth 24 cm?
A) 28 minutes 48 seconds
B) 51 minutes 12 seconds
C) 51 minutes 24 seconds
D) 28 minutes 36 seconds

22. A metallic sphere of radius 10.5 cm is melted and then recast into small cones each of radius 3.5 cm and height 3 cm. The number of cones thus formed is
A) 140 B) 132
C) 112 D) 126

23. The radius of the base of a Conical tent is 12 m. The tent is 9 m high. Find the cost of canvas required to make the tent, if one square metre of canvas costs Rs.120 (Take π = 3.14)
A) Rs. 67,830 B) Rs. 67,800
C) Rs. 67,820 D) Rs. 67, 824

24. If the radius of a cylinder is decreased by 50 % and the height is increased by 50 %, then the change in volume is
A) 52.5 % B) 67.5 %
C) 57.5 % D) 62.5 %

25. The base of a triangle is increased by 10%. To keep the area unchanged the height of the triangle is to be decreased by
A) $9\frac{1}{11}\%$ B) $11\frac{1}{9}\%$
C) 11% D) 9%

26. If the area of the base of a cone is increased by 100%, and if the height being constant then the volume increases by
A) 200% B)182%
C) 141% D) 100%

27. The percentage increase in the surface area of a cube when each side is doubled is
A) 50% B) 200%
C) 150% D) 300%

28. Each side of a cube is decreased by 25%. Find the ratio of the volumes of the original cube and the resulting cube.
A) 8 : 1 B) 27 : 64
C) 64 : 1 D) 64 : 27

29. If water is freezed to become ice, its volume is increased by 10%, then if the ice is melted to water again, its volume will be decreased by :
A) 9% B) $9\frac{1}{11}\%$
C) 8% D) $9\frac{1}{2}\%$

TYPE - VII

1. If the arcs of same length in two circles subtend angles of 60° and 75° at their centres, the ratio of their radii is
A) 3 : 4 B) 4 : 5
C) 5 : 4 D) 3 : 5

2. The length of the perpendiculars drawn from any point in the interior of an equilateral triangle to the respective sides are p_1, p_2 and p_3. The length of each side of the triangle is
A) $\frac{2}{\sqrt{3}}(p_1 + p_2 + p_3)$
B) $\frac{1}{3}(p_1 + p_2 + p_3)$
C) $\frac{1}{\sqrt{3}}(p_1 + p_2 + p_3)$
D) $\frac{4}{\sqrt{3}}(p_1 + p_2 + p_3)$

3. The sides of a triangle are in the ratio 3 : 4 : 5. The measure of the largest angle of the triangle is
A) 60° B) 90°
C) 120° D) 150°

4. From a point within an equilateral triangle, perpendiculars drawn to the three sides, are 6 cm, 7 cm and 8 cm respectively. The length of the side of the triangle is
A) 7 cm B) 10.5 cm
C) $14\sqrt{3}$ cm D) $\frac{14\sqrt{3}}{3}$ cm

5. The base and altitude of a right angled triangle are 12 cm and 5 cm respectively. The perpendicular distance of its hypotenuse from the opposite vertex is
A) $4\frac{4}{13}$ cm B) $4\frac{8}{13}$ cm
C) 5 cm D) 7 cm

6. One acute angle of a right angled triangle is double the other. If the length of its hypotenuse is 10 cm, then its area is
A) $25\frac{\sqrt{3}}{2}$ cm² B) 25 cm²
C) $25\sqrt{3}$ cm² D) $\frac{75}{2}$ cm²

7. In an equilateral triangle ABC of side 10cm, the side BC is trisected at D. Then the length (in cm) of AD is
A) $3\sqrt{7}$ B) $7\sqrt{3}$
C) $\frac{10\sqrt{7}}{3}$ D) $\frac{7\sqrt{10}}{3}$

8. The perimeter of a triangle is 40cm and its area is 60 cm². If the largest side measures 17cm, then the length (in cm) of the smallest side of the triangle is
A) 4 B) 6
C) 8 D) 15

9. The ratio of the area of two isosceles triangles having the same vertical angle (i.e. angle between equal sides is 1 : 4. The ratio of their heights is
A) 1 : 4 B) 2 : 5
C) 1 : 2 D) 3 : 4

10. The length of one side of a rhombus is 6.5 cm and its altitude is 10 cm. If the length of its diagonal be 26 cm, the length of the other diagonal will be :
A) 5 cm B) 6.5 cm
C) 10 cm D) 26 cm

11. The measure of each of two opposite angles of a rhombus is 60° and the measure of one of its sides is 10cm. The length of its smaller diagonal is:
A) 10 cm B) $10\sqrt{3}$ cm
C) $10\sqrt{2}$ cm D) $\frac{5}{4}\sqrt{2}$ cm

12. Two adjacent sides of a parallelogram are of length 15 cm and 18 cm. If the distance between two smaller sides is 12 cm, then the distance between two bigger sides is
A) 8 cm B) 10 cm
C) 12 cm D) 15

13. A parallelogram ABCD has sides AB =24 cm and AD = 16 cm. The distance between the sides AB and DC is 10 cm. Find the distance between the sides AD and BC.
A) 16 cm. B) 18 cm.
C) 15 cm. D) 26 cm.

14. The adjacent sides of a parallelogram are 36 cm and 27 cm in length. If the distance between the shorter sides is 12 cm, then the distance between the longer sides is
A) 10 cm B) 12 cm
C) 16 cm D) 9 cm

15. If the diagonals of a rhombus are 8 and 6 , then area of the square of its size is
A) 25 B) 55
C) 64 D) 36

16. One of the four angles of a rhombus is 60°. If the length of each side of the rhombus is 8cm, then the length of the longer diagonal is
A) $8\sqrt{3}$ cm B) 8cm
C) $4\sqrt{3}$ cm D) $\frac{8}{\sqrt{3}}$ cm

17. The diagonals of a rhombus are 12 cm and 16 cm respectively. The length of one side is
A) 8 cm B) 6 cm
C) 10 cm D) 12 cm

18. Each interior angle of a regular polygon is 18° more than eight times an exterior angle. The number of sides of the polygon is
A) 10 B) 15
C) 20 D) 25

19. An exterior angle of a regular polygon is 72°. The sum of all the interior angles is
A) 360° B) 480°
C) 520° D) 540°

20. A cylindrical tank of diameter 35 cm is full of water. If 11 litres of water is drawn off, the water level in the tank will drop by: $\left(\text{Use } \pi = \frac{22}{7}\right)$
A) $10\frac{1}{2}$ cm. B) $12\frac{6}{7}$ cm.
C) 14 cm. D) $11\frac{3}{7}$ cm.

21. A right circular cylinder is formed by rolling a rectangular paper 12 cm long and 3 cm wide along its length. The radius of the base of the cylinder will be
A) $\frac{3}{2\pi}$ cm B) $\frac{6}{\pi}$ cm
C) $\frac{9}{2\pi}$ cm D) 2π cm

22. The diameter of the base of a right circular cone is 4 cm and its height $2\sqrt{3}$ cm. The slant height of the cone is
A) 5cm B) 4cm
C) $2\sqrt{3}$ cm D) 3cm

23. A sector is formed by opening out a cone of base radius 8 cm and height 6 cm. Then the radius of the sector is (in cm)
A) 4 B) 8
C) 10 D) 6

24. A right circular cone is 3.6 cm high and radius of its base is 1.6 cm. It is melted and recast into a right circular cone with radius of its base as 1.2 cm. Then the height of the cone (in cm) is
A) 3.6 B) 4.8
C) 6.4 D) 7.2

25. A copper sphere of radius 3cm is beaten and drawn into a wire of diameter 0.2 cm. The length of the wire is:
A) 9m B) 12m
C) 18m D) 36m

26. If surface area and volume of a sphere are S and V respectively, then value of $\frac{S^3}{V^2}$ is
A) 36 π units B) 9 π units
C) 18 π units D) 27 π units

27. Assume that a drop of water is spherical and its diameter is one-tenth of a cm. A conical glass has a height equal to the diameter of its rim. If 32,000 drops of water fill the glass completely, then the height of the glass (in cm) is
A) 1 B) 2
C) 3 D) 4

28. A cistern of capacity 8000 litres measures externally 3.3 m by 2.6 m by 1.1 m and its walls are 5 cm thick. The thickness of the bottom is:
A) 1m B) 1.1m
C) 1dm D) 90 cm

29. A cone is cut at midpoint of its height by a frustum parallel to its base. The ratio between the two parts of cone would be
A) 1 : 1 B) 1 : 8
C) 1 : 4 D) 1 : 7

30. The area of a circle of radius 5 is numerically what percent of its circumference?
A) 200% B) 225%
C) 240% D) 250%

31. If the circumference and area of a circle are numerically equal, then the diameter is equal to:
A) area of the circle
B) $\frac{\pi}{2}$
C) 2π
D) 4

32. A chord of length 30 cm is at a distance of 8 cm from the center of a circle. The radius of the circle is:
A) 17 cm B) 23 cm
C) 21 cm D) 19 cm

33. The circum radius of an equilateral triangle is 8 cm. The in radius of the triangle is
A) 3.25 cm B) 3.50 cm
C) 4 cm D) 4.25 cm

34. A circle is inscribed in a square. An equilateral triangle of side $4\sqrt{3}$ cm is inscribed in that circle. The length of the diagonal of the square (in centimeters) is
A) $4\sqrt{2}$ B) 8
C) $8\sqrt{2}$ D) 16

35. The height of an equilateral triangle is. $4\sqrt{3}$ cm. The ratio of the area of its circumcircle to that of its in-circle is
A) 2 : 1 B) 4 : 1
C) 4 : 3 D) 3 : 2

36. A circle is inscribed in a square whose length of the diagonal is $12\sqrt{2}$ cm. An equilateral triangle is inscribed in that circle. The length of the side of the triangle is
A) $4\sqrt{3}$ cm B) $8\sqrt{3}$ cm
C) $6\sqrt{3}$ cm D) $11\sqrt{3}$ cm

37. The radius of the in-circle of a triangle whose sides are 9 cm, 12 cm and 15 cm is
A) 9 cm B) 13 cm
C) 3 cm D) 6 cm

38. The ratio of in radius and circum- radius of a square is:
A) $1 : \sqrt{2}$ B) $\sqrt{2} : \sqrt{3}$
C) 1 : 3 D) 1 : 2

39. The perimeter of a rectangle and a square are 160 m each. The area of the rectangle is less than that of the square by 100 sq. m. The length of the rectangle is
A) 30 m B) 60 m
C) 40 m D) 50 m

40. The volume of a right circular cylinder and that of a sphere are equal and their radii are also equal. If the height of the cylinder be h and the diameter of the sphere d, then which of the following relation is correct?
A) h = d B) 2h = d
C) 2h = 3d D) 3h = 2d

41. A solid cone of height 9 cm with diameter of its base 18 cm is cut out from a wooden solid sphere of radius 9 cm. The percentage of wood wasted is:
A) 25% B) 30%
C) 50% D) 75%

42. Two circles with centres A and B and radius 2 units touch each other externally at 'C'. A third circle with centre 'C' and radius '2' units meets other two at D and E. Then the area of the quadrilateral ABDE is
A) $2\sqrt{2}$ sq.units
B) $3\sqrt{3}$ sq.units
C) $3\sqrt{2}$ sq.units
D) $2\sqrt{3}$ sq.units

43. Two cubes of sides 6 cm each are kept side by side to form a rectangular parallelepiped. The area (in sq. cm) of the whole surface of the rectangular parallelepiped is
A) 432 B) 360
C) 396 D) 340

44. The diameter of a copper sphere is 18 cm. The sphere is melted and is drawn into a long wire of uniform circular cross-section. If the length of the wire is 108 m, the diameter of the wire is
A) 1 cm B) 0.9cm
C) 0.3 cm D) 0.6 cm

45. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water (in litres) will fall into the sea in a minute?
A) 4,00,000 B) 40,00,000
C) 40,000 D) 4,000

46. Water is flowing at the rate of 3 km/hr through a circular pipe of 20 cm internal diameter into a circular cistern of diameter 10m and depth 2m. In how much time will the cistern be filled?
A) 1 hour
B) 1 hour 40 minutes
C) 1 hour 20 minutes
D) 2 hours 40 minutes

47. The rain water from a roof 22 m × 20 m drains into a cylindrical vessel having a diameter of 2 m and height 3.5 m. If the vessel is just full, then the rainfall (in cm) is:
A) 2 B) 2.5
C) 3 D) 4.5

48. 2 cm of rain has fallen on a square km of land. Assuming that 50% of the raindrops could have been collected and contained in a pool having a 100 m ×10 m base, by what level would the water level in the pool have increased?
A) 1 km B) 10 m
C) 10 cm D) 1 m

49. A parallelepiped whose sides are in ratio 2 : 4 : 8 have the same volume as a cube. The ratio of their surface area is:
A) 7 : 5 B) 4 : 3
C) 8 : 5 D) 7 : 6

50. If two adjacent sides of a rectangular parallelepiped are 1 cm and 2 cm and the total surface area of the parallelepiped is 22 square cm, then the diagonal of the parallelepiped is

A) $\sqrt{10}$ cm B) $2\sqrt{3}$ cm

C) $\sqrt{14}$ cm D) 4cm

51. The perimeters of a circle square and an equilateral triangle are same and their areas are C, S and T respectively. Which of the following statement is true?

A) C = S = T B) C > S >T

C) C < S < T D) S < C < T

52. The base of a right prism is a quadrilateral ABCD. Given that AB = 9cm, BC = 14cm, CD = 13cm, DA = 12cm and $\angle DAB = 90°$. If the volume of the prism be 2070 cm^3, then the area of the lateral surface is

A) 720 cm^2 B) 810 cm^2

C) 1260 cm^2 D) 2070 cm^2

53. An elephant of length 4m is at one corner of a rectangular cage of size (16m × 30m)and faces towards the diagonally opposite corner. If the elephant starts moving towards the diagonally opposite corner it takes 15 seconds to reach this corner. Find the speed of the elephant.

A) 1m/sec B) 2m/sec

C) 1.87 m/sec D) 1.5m/sec

54. A horse takes $2\frac{1}{2}$ seconds to complete a round around a circular field. If the speed of the horse was 66m/sec, then the radius of the field is, $\left(\text{Given } \pi = \frac{22}{7}\right)$

A) 25.62m B) 26.52m

C) 25.26m D) 26.25m

55. The diameter of the front wheel of an engine is 2x cm and what of rear wheel is 2y cm. To cover the same distance, find the number of times the rear wheel will revolve when the front wheel revolves 'n' times.

A) $\frac{n}{xy}$ times B) $\frac{yn}{x}$ times

C) $\frac{nx}{y}$ times D) $\frac{xy}{n}$ times

56. A bicycle wheel has a diameter (including the tyre) of 56 cm. The number of times the wheel will rotate to cover a distance of 2.2 km is $\left(\text{Assume } \pi = \frac{22}{7}\right)$

A) 625 B) 1250

C) 1875 D) 2500

57. If one diagonal of a rhombus of side 13 cm is 10 cm, then the other diagonal is

A) 24cm B) 20 cm

C) 16 cm D) 28 cm

58. A brick 2" thick is placed against a wheel to act for a stop. The horizontal distance of the face of the brick from the point where the wheel touches the ground is 6". The radius of the wheel in inches is

A) 10 B) 5

C) 12 D) 6

2016 – 2017 QUESTIONS

1. The ratio between the length and the breadth of a rectangular park is 3 : 2. If a man cycling along the boundary of the park at the speed of 12 km/hour completes one round in 8 minutes, then the area of the park is

A) 153650 sq.metre

B) 135600 sq.metre

C) 153600 sq.metre

D) 156300 sq.metre

2. A rectangular park 60 metre long and 40 metre wide has two concrete crossroads running in the middle of the park and rest of the park has been used as a lawn. If the area of the lawn is 2109 $metre^2$ then the width of the road is

A) 3 metre B) 5 metre

C) 6 metre D) 2 metre

3. ΔABC is similar to ΔDEF. If the area of ΔABC is 9 sq.cm. and the area of ΔDEF is 16 sq.cm. and BC = 2.1 cm, then the length of EF will be

A) 5.6 cm. B) 2.8 cm.

C) 3.7 cm. D) 1.4 cm.

4. Area of the circle inscribed in a square of diagonal $6\sqrt{2}$ cm. (in sq. cm.) is

A) 9π B) 6π

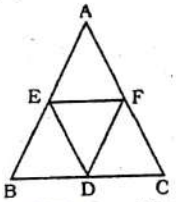
C) 3π D) $6\sqrt{2}\pi$

5. The diagonals of two squares are in the ratio 5 : 2. The ratio of their area is

A) 5 : 6 B) 25 : 4

C) 5 : 4 D) 125 : 8

6. If D, E and F are the mid-points of the sides of an equilateral triangle ABC, then the ratio of the area of triangle DEF and DCF is :



A) 1.1 : 1 B) 1 : 1.1

C) 0.9 : 1 D) 1 : 1

7. The area of a rectangle is 60 cm^2 and its perimeter is 34 cm, then the length of the diagonal is

A) 17 cm B) 11 cm

C) 15 cm D) 13 cm

8. In a trapezium ABCD.AB | | CD, AB < CD, CD = 6 cm and dis-tance between the parallel sides is 4 cm. If the area of ABCD is 16 cm^2, then AB is

A) 1 cm B) 2 cm

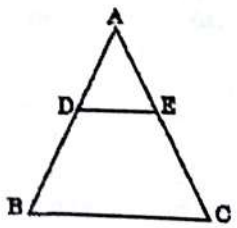
C) 3 cm D) 8 cm

9. In a triangle ABC, AB = 8 cm, AC = 10 cm and $\angle B = 90°$, then the area of ΔABC is

A) 49 sq.cm B) 36 sq.cm

C) 25 sq.cm D) 24 sq.cm

10. In figure, DE | | BC. If DE = 3 cm, BC = 6 cm and area of ΔADE = 15 sq. cm, then the area of ΔABC is



A) 75 sq. cm. B) 45 sq. cm.

C) 30 sq. cm. D) 60 sq. cm.

11. Two adjacent sides of a parallelogram are 21 cms and 20 cms. The diagonal joining the end points of these two sides is 29 cms. The area of the parallelogram (in sq. cms) is

A) 240 B) 120
C) 210 D) 420

12. The perimeters of a square and a rectangle are equal. If their area be 'A' m^2 and 'B' m^2 respectively, then correct statement is
A) $A < B$ B) $A \leq B$
C) $A > B$ D) $A \geq B$

13. If O is the centroid and AD, BE and CF are the three medians of ΔABC with an area of 96 cm^2 then the area of ΔBOD in cm^2 is
A) 8 B) 12
D) 16 D) 24

14. The length and breadth of a rectangular piece of a land are in a ratio 5:3. The owner spent Rs. 6000 for surrounding it from all sides at Rs. 7.50 per metre. The difference between its length and breadth is
A) 50 metre B) 100 metre
C) 150 metre D) 250 metre

15. The ratio between the area of a square and that of a circle, when the length of a side of the square is equal to that of the diameter of the circle, is

$\left(\text{Taken, } \pi = \frac{22}{7}\right)$

A) 14 : 11 B) 28 : 11
C) 7 : 22 D) 22 : 7

16. A piece of wire 132 cm. long is bent successively in the shape of an equilateral triangle, a square and a circle. Then area will be longest in shape of
A) Circle
B) Equilateral triangle
C) Square
D) Equal in all the shapes

17. The area of the largest triangle that can be inscribed in a semi-circle of radius 6 m is
A) 36 m^2 B) 72 m^2
C) 18 m^2 D) 12 m^2

18. Point O is the centre of a circle of radius 5 cm. At a distance of 13 cm from O, a point P is is taken. From this point, two tangents PQ and PR are drawn to the circle. Then , the area of quadrilateral PQOR is
A) 60 cm^2 B) 32.5 cm^2
C) 65 cm^2 D) 30 cm^2

19. The length of a median of an equilateral triangle is $12\sqrt{3}$ cms. Then the area of the triangle is :
A) 144 sq. cm.
B) $288\sqrt{3}$ sq. cm.
C) $144\sqrt{3}$ sq. cm.
D) 288 sq. cm.

20. The area of a triangle ABC is 10.8 cm^2. If CP = PB and 2AQ = QB, then the area of the triangle APQ is
A) 3.6 cm^2 B) 0.9 cm^2
C) 2.7 cm^2 D) 1.8 cm^2

21. In ΔABC, the medians AD and BE meet at G. The ratio of the areas of ΔBDG and the quadrilateral GDCE is :
A) 1 : 2 B) 1 : 3
C) 2 : 3 D) 3 : 4

22. The area of the circle with radius y is w. The difference between the areas of the bigger circle (with radius y) and that of the smaller circle (with radius x) is w'. So $\frac{x}{y}$ is equal to
A) $\sqrt{1-\frac{w'}{w}}$ B) $\sqrt{1+\frac{w'}{w}}$
C) $\sqrt{1+\frac{w}{w'}}$ D) $\sqrt{1-\frac{w}{w'}}$

23. D, E and F are the mid points of the sides BC, CA and AB respectively of a ΔABC. Then the ratio of the areas of ΔDEF and ΔABC is
A) $\frac{1}{2}$ B) $\frac{1}{4}$
C) $\frac{1}{8}$ D) $\frac{1}{16}$

24. In a trapezium ABCD, AB and DC are parallel sides and $\angle ADC = 90°$. If AB = 15 cm, CD = 40 cm and diagonal AC = 41 cm. then the area of the trapezium ABCD is
A) 245 cm^2 B) 240 cm^2
C) 247.5 cm^2 D) 250 cm^2

25. The sum of the length and breadth of a rectangle is 6 cm. A square is constructed such that one of its sides is equal to a diagonal of the rectangle. If the ratio of areas of the square and rectangle is 5 : 2, the area of the square in cm^2 is
A) 20 B) 10
C) $4\sqrt{5}$ D) $10\sqrt{2}$

26. The length of a side of an equilateral triangle is 8 cm. The area of the region lying between the circum circle and the incircle of the triangle is

$\left(\text{Use : } \pi = \frac{22}{7}\right)$

A) $50\frac{1}{7}$ cm^2 B) $50\frac{2}{7}$ cm^2
C) $75\frac{1}{7}$ cm^2 D) $75\frac{2}{7}$ cm^2

27. Two equal circles intersect so that their centres, and the points at which they intersect form a square of side 1 cm. The area (in sq.cm) of the portion that is common to the circles is
A) $\frac{\pi}{4}$ B) $\frac{\pi}{2}-1$
C) $\frac{\pi}{5}$ D) $\left(\sqrt{2}-1\right)$

28. D and E are points on the sides AB and AC respectively of ΔABC such that DE is parallel to BC and AD : DB = 4 : 5, CD and BE intersect each other at F. Then find the ratio of the areas of ΔDEF and ΔCBF.
A) 16 : 25 B) 16 : 81
C) 81 : 16 D) 4 : 9

29. Diagonals of a Trapezium ABCD with AB || CD intersect each other at the point O. If AB = 2CD, then the ratio of the areas of ΔAOB and ΔCOD is
A) 4 : 1 B) 1 : 16
C) 1 : 4 D) 16 : 1

30. Four circles of equal radii are described about the four corners of a square so that each touches two of the other circles. If each side of the square is 140 cm then area of the space enclosed between the circumference of the circle is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 4200 cm^2 B) 2100 cm^2
C) 7000 cm^2 D) 2800 cm^2

31. The sides of a triangle are in the ratio $\frac{1}{2}:\frac{1}{3}:\frac{1}{4}$ and its perimeter is 104 cm. The length of the longest side (in cm) is
A) 52 B) 48
C) 32 D) 26

32. In an isosceles triangle, the length of each equal side is twice the length of the third side. The ratio of areas of the isosceles triangle and an equilateral triangle with same perimeter is

A) $30\sqrt{5} : 100$

B) $32\sqrt{5} : 100$

C) $36\sqrt{5} : 100$

D) $42\sqrt{5} : 100$

33. The radius of the incircle of an equilateral ΔABC of side $2\sqrt{3}$ units is x cm. The value of x is:

A) $\frac{1}{3}$ B) $\frac{1}{2}$

C) 1 D) $\sqrt{3}$

34. The four sides of a quadrilateral are in the ratio of 2 : 3 : 4 : 5 and its perimeter is 280 metre. The length of the longest side is :

A) 100 metre B) 150 metre
C) 175 metre D) 180 metre

35. If x is the area, y is the circumference and z is the diameter of circle then the value of $\frac{x}{yz}$ is

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

36. The lengths of diagonals of a rhombus are 24 cm and 10 cm the perimeter of the rhombus (in cm.) is :

A) 52 B) 56
C) 68 D) 72

37. The length of the base of an isosceles triangle is 2x – 2y + 4z, and its perimeter is 4x – 2y + 6z. Then the length of each of the equal sides is

A) x + y B) x + y + z
C) 2 (x + y) D) x + z

38. Which of the following ratios can be the ratio of the sides of a right angled triangle?

A) 9 : 6 : 3 B) 13 : 12 : 5
C) 7 : 6 : 5 D) 5 : 3 : 2

39. A square playground measures 1127.6164 sq. cm. If a man walks $2\frac{9}{20}$ m a minute, the time taken by him to walk one round around it is approximately.

A) 50.82 minutes
B) 54.82 minutes
C) 54.62 minutes
D) 50.62 minutes

40. What will be the percentage increase in the area of a square when each of the its sides is increased by 10%?

A) 20 B) 11
C) 121 D) 21

41. If the length and breadth of a rectangle are increased by 10% and 8% respectively, then the area of the rectangle increases by :

A) $18\frac{7}{5}\%$ B) $18\frac{4}{5}\%$

C) 18% D) $18\frac{1}{5}\%$

42. A solid sphere of radius 9 cm is melted to form a sphere of radius 6 cm and a right circular cylinder of same radius. The height of the cylinder so formed is

A) 19 cm B) 21 cm
C) 23 cm D) 25 cm

43. If the areas of three adjacent faces of a rectangular box which meet in a corner are 12 cm^2, 15 cm^2 and 20 cm^2 respectively, then the volume of the box is

A) 3600 cm^3 B) 300 cm^3
C) 60 cm^3 D) 180 cm^3

44. A hemispherical bowl of internal radius 9 cm, contains a liquid. This liquid is to be filled into small cylindrical bottles of diameter 3 cm and height 4 cm. Then the number of bottles necessary to empty the bowl is

A) 18 B) 45
C) 27 D) 54

45. A rectangular water tank is 80 metre x 40 metre. Water flows Into it through a pipe of 40 sq.cm at the opening at a speed of 10 km/hr. The water level will rise in the tank in half an hour by

A) $\frac{3}{2}$ cm. B) $\frac{4}{9}$ cm.

C) $\frac{5}{9}$ cm. D) $\frac{5}{8}$ cm.

46. A solid cylinder has the total surface area 231 square cm. If its curved surface area is $\frac{2}{3}$ of the total surface area, then the volume of the cylinder is

A) 154 cu. cm.
B) 308 cu. cm.
C) 269.5 cu. cm
D) 370 cu. cm

47. The sides of a rectangle with dimension 7 cm × 11 cm are joined to form a cylinder with height 11 cm. What is the volume of this cylinder?

A) 85.75 cm^3 B) 86.92 cm^3
C) 54.25 cm^3 D) 42.875 cm^3

48. The volume of a right rectangular pyramid is 220 m^3. What is the height of the pyramid, if the area of its base is 55 m^2 ?

A) 8 metre B) 13.5 metre
C) 12 metre D) 9 metre

49. A prism with a right triangular base is 25 cm high. If the shorter sides of the triangle are in the ratio of 1 : 2 and the volume of the prism is 100 cm^3, what is the length of the longest side of the triangle?

A) $\sqrt{5}$ cm B) $2\sqrt{5}$ cm

C) $5\sqrt{2}$ cm D) 5 cm

50. How many hemispherical balls can be made from a cylinder 56 cm high and 12 cm diameter, when every ball being 0.75 cm in radius?

A) 1792 B) 3584
C) 4824 D) 7168

51. A sphere of radius 5 cm is melted to form a cone with base of same radius. The height (in cm) of the cone is

A) 5 B) 10
C) 20 D) 22

52. The diameters of two cylinders are in the ratio 3:2 and their volumes are equal. The ratio of their heights is

A) 2 : 3 B) 3 : 2
C) 9 : 4 D) 4 : 9

53. A cylindrical vessel of radius 4 cm. contains water. A solid sphere of radius 3 cm. is dipped into the water until it is completely immersed. The water level in the vessel will rise by

A) 3.5 cm. B) 2.25 cm.
C) 2 cm. D) 3.8 cm.

54. The base of a right prism is a trapezium whose lengths of parallel sides are 25 cm. and 11 cm. and the perpendicular distance between the parallel sides is 16 cm. If the height of the prism is 10 cm., then the volume of the prism is
A) 1440 cu. cm. B) 1540 cu. cm.
C) 2880 cu. cm. D) 960 cu. cm.

55. The external and the internal radii of a hollow right circular cylinder of height 15 cm. are 6.75 cm. and 5.25 cm. respectively. If it is melted to form a solid cylinder of height half of the original cylinder, then the radius of the solid cylinder is
A) 6 cm. B) 6.5 cm.
C) 7 cm. D) 7.25 cm.

56. A right circular cylinder is partially filled with water. Two iron spherical balls are completely immersed in the water so that the height of the water in the cylinder rises by 4 cm. If the radius of one ball is half of the other and the diameter of the cylinder is 18 cm., then the radii of the spherical balls are
A) 6 cm. and 12 cm.
B) 4 cm. and 8 cm.
C) 3 cm. and 6 cm.
D) 2 cm. and 4 cm.

57. The volume of metallic cylindrical (hollow) pipe of uniform thickness is 748 c.c. Its length is 14 cm and its external radius is 9 cm. The thickness of the pipe is
A) 0.5 cm B) 1.5 cm
C) 1 cm D) 2 cm

58. The ratio of the weights of two spheres is 8 : 27 and the ratio of weights per 1 cc of materials of two is 8 : 1. The ratio of the radii of the spheres is
A) 2 : 3 B) 1 : 3
C) 3 : 1 D) 3 : 2

59. The heights of a cone and a cylinder are equal. The radii of their bases are in the ratio 2:1. The ratio of their volumes is :
A) 4 : 3 B) 3 : 4
C) 2 : 1 D) 1 : 2

60. The radius of cross section of a solid right circular cylindrical rod is 3.2 dm. The rod is melted and 44 equal solid cubes of side 8 cm are formed. The length of the rod is :
$\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 56 cm. B) 7 cm.
C) 5.6 cm. D) 0.7 cm.

61. Three cubes of iron whose edges are 6 cm, 8 cm and 10cm respectively are melted and formed into a single cube. The edge of the new cube formed is
A) 12 cm. B) 14 cm.
C) 16 cm. D) 18 cm.

62. The radius of a sphere is 6 cm. It is melted and drawn into a wire of radius 0.2 cm. The length of the wire is
A) 81 metre B) 80 metre
C) 75 metre D) 72 metre

63. From each of the four corners of a rectangular sheet of dimensions 25 cm × 20 cm, a square of side 2 cm is cut off and a box is made. The volume of the box is
A) 828 cm^3 B) 672 cm^3
C) 500 cm^3 D) 1000 cm^3

64. A solid sphere of radius 3 cm is melted to form a hollow right circular cylindrical tube of length 4 cm and external radius 5 cm. The thickness of the tube is
A) 1 cm B) 9 cm
C) 0.6 cm D) 1.5 cm.

65. The height of a right circular cylinder is three times the radius of the base. If the height were four times the radius, the volume would be 1078 cubic centimetre more than it was previously. Find the radius of the base.
A) 6 cm B) 5 cm
C) 7.5 cm D) 7 cm

66. Thousand solid metallic spheres of diameter 6 cm each are melted and recast into a new solid sphere. The diameter of the new sphere (in cm) is
A) 30 B) 90
C) 45 D) 60

67. The diameter of a sphere is twice the diameter of another sphere. The surface area of the first sphere is equal to the volume of the second sphere. The magnitude of the radius of the first sphere is
A) 12 B) 24
C) 16 D) 48

68. The length of the two parallel sides of a trapezium are 16m and 20m respectively. If its height is 10m, its area in square metre is
A) 360 B) 260
C) 240 D) 180

69. The diagonal of a cuboid of length 5 cm, width 4 cm and height 3 cm is
A) $5\sqrt{2}$ cm B) $2\sqrt{5}$ cm
C) 12 cm D) 10 cm

70. The diameter of a sphere is twice the diameter of another sphere. The curved surface area of the first and the volume of the second are numerically equal. The numerical value of the radius of the first sphere is
A) 3 B) 24
C) 8 D) 16

71. A sphere has the same curved surface area as a cone of vertical height 40 cm and radius 30 cm. The radius of the sphere is
A) $5\sqrt{5}$ cm B) $5\sqrt{3}$ cm
C) $5\sqrt{15}$ cm D) $5\sqrt{10}$ cm

72. The whole surface area of a pyramid whose base is a regular polygon is 340 $cm.^2$ and area of its base is 100 cm^2. Area of each lateral face is 30 cm^2. Then the number of lateral faces is
A) 8 B) 9
C) 7 D) 10

73. The height and the total surface area of a right circular cylinder are 4 cm and 8π sq.cm. respectively. The radius of the base of cylinder is
A) $\left(2\sqrt{2}-2\right)$ cm
B) $\left(2-\sqrt{2}\right)$ cm
C) 2 cm
D) $\sqrt{2}$ cm

74. A solid brass sphere of radius 2.1 dm is converted into a right circular cylindrical rod of length 7 cm. The ratio of total surface areas of the rod to the sphere is
A) 3 : 1 B) 1 : 3
C) 7 : 3 D) 3 : 7

75. A solid has 12 vertices and 30 edges. How many faces does it have?
A) 22 B) 24
C) 26 D) 20

129.(C)	130.(B)	131.(A)	132.(D)
133.(B)	134.(C)	135.(B)	136.(D)
137.(D)	138.(B)	139.(B)	140.(A)
141.(D)	142.(B)	143.(C)	144.(D)
145.(A)	146.(C)	147.(A)	148.(A)
149.(A)	150.(A)	151.(D)	152.(D)
153.(A)	154.(A)	155.(D)	156.(D)
157.(A)	158.(C)	159.(C)	160.(D)
161.(A)	162.(B)	163.(D)	164.(A)
165.(B)	166.(D)	167.(D)	168.(C)
169.(C)	170.(C)	171.(C)	172.(A)
173.(A)	174.(A)	175.(D)	176.(A)
177.(A)	178.(C)	179.(C)	180.(B)
181.(B)	182.(D)	183.(D)	184.(C)
185.(B)	186.(A)	187.(C)	188.(C)
189.(A)	190.(D)	191.(A)	192.(C)
193.(B)	194.(C)	195.(C)	196.(B)
197.(D)	198.(D)	199.(A)	200.(D)
201.(D)	202.(C)	203.(B)	204.(D)
205.(D)	206.(B)	207.(A)	208.(A)
209.(B)			

Type – V

1.(D)	2.(B)	3.(A)	4.(B)
5.(A)	6.(A)	7.(A)	8.(A)
9.(C)	10.(C)	11.(C)	12.(C)
13.(A)	14.(B)	15.(D)	16.(C)
17.(D)	18.(C)	19.(B)	20.(B)
21.(A)	22.(D)	23.(C)	24.(C)
25.(B)	26.(C)	27.(B)	28.(D)
29.(B)	30.(C)	31.(C)	32.(C)
33.(B)	34.(B)	35.(A)	36.(C)
37.(D)	38.(B)	39.(D)	40.(D)
41.(D)	42.(D)	43.(B)	44.(B)
45.(C)	46.(C)	47.(B)	48.(C)
49.(D)	50.(C)	51.(D)	52.(A)
53.(A)	54.(D)	55.(C)	56.(C)
57.(B)	58.(C)	59.(C)	60.(B)
61.(A)	62.(D)	63.(A)	64.(D)
65.(D)	66.(B)	67.(A)	68.(B)
69.(D)	70.(B)	71.(A)	72.(C)
73.(A)	74.(C)	75.(B)	76.(A)
77.(D)	78.(D)	79.(B)	80.(B)

81.(C)	82.(C)	83.(A)	84.(B)
85.(B)	86.(C)	87.(C)	88.(D)
89.(A)	90.(A)	91.(D)	92.(C)
93.(D)	94.(D)	95.(D)	96.(D)
97.(C)	98.(D)	99.(A)	100.(D)
101.(C)	102.(A)	103.(D)	104.(C)
105.(D)	106.(A)		

Type – VI

1.(A)	2.(A)	3.(B)	4.(C)
5.(C)	6.(C)	7.(D)	8.(A)
9.(C)	10.(B)	11.(D)	12.(B)
13.(D)	14.(A)	15.(B)	16.(D)
17.(D)	18.(A)	19.(D)	20.(A)
21.(A)	22.(D)	23.(D)	24.(D)
25.(A)	26.(D)	27.(D)	28.(D)
29(B)			

Type – VII

1.(C)	2.(A)	3.(B)	4.(C)
5.(B)	6.(A)	7.(C)	8.(C)
9.(C)	10.(A)	11.(A)	12.(B)
13.(C)	14.(D)	15.(A)	16.(A)
17.(C)	18.(C)	19.(D)	20.(D)
21.(B)	22.(B)	23.(C)	24.(C)
25.(D)	26.(A)	27.(D)	28.(C)
29.(D)	30.(D)	31.(D)	32.(A)
33.(C)	34.(C)	35.(B)	36.(C)
37.(C)	38.(A)	39.(D)	40.(D)
41.(D)	42.(B)	43.(B)	44.(D)
45.(B)	46.(B)	47.(B)	48.(B)
49.(D)	50.(C)	51.(B)	52.(A)
53.(B)	54.(D)	55.(C)	56.(B)
57.(A)	58.(D)		

2016 – 2017

1.(C)	2.(A)	3.(B)	4.(A)
5.(B)	6.(D)	7.(D)	8.(B)
9.(D)	10.(D)	11.(D)	12.(C)
13.(D)	14.(B)	15.(A)	16.(A)
17.(A)	18.(A)	19.(C)	20.(D)
21.(A)	22.(A)	23.(B)	24.(C)
25.(A)	26.(B)	27.(B)	28.(B)

29.(A)	30.(A)	31.(B)	32.(C)
33.(C)	34.(A)	35.(B)	36.(A)
37.(D)	38.(B)	39.(B)	40.(D)
41.(B)	42.(A)	43.(C)	44.(D)
45.(D)	46.(C)	47.(D)	48.(C)
49.(B)	50.(D)	51.(C)	52.(D)
53.(B)	54.(C)	55.(A)	56.(C)
57.(C)	58.(B)	59.(A)	60.(B)
61.(A)	62.(D)	63.(B)	64.(A)
65.(D)	66.(D)	67.(B)	68.(D)
69.(A)	70.(B)	71.(C)	72.(A)
73.(A)	74.(C)	75.(D)	

TYPE-V

1. A cistern 6 m long and 4 m wide, contains water up to a depth of 1 m 25 cm. The total area of the wet surface is
A) 55 m^2 B) 53.5 m^2
C) 50 m^2 D) 49 m^2

2. If the height of a cylinder is increased by 15 per cent and the radius of its base is decreased by 10 per cent then by what percent will its curved surface area change?
A) 3.5 per cent decrease
B) 3.5 per cent increase
C) 5 per cent increase
D) 5 per cent decrease

3. The radii of the base of two cylinders are in the ratio 3 : 5 and their heights in the ratio 2 : 3. The ratio of their curved surface will be:
A) 2 : 5 B) 2 : 3
C) 3 : 5 D) 5 : 3

4. Water flows through a cylindrical pipe, whose radius is 7 cm, at 5 metre per second. The time, it takes to fill an empty water tank, with height 1.54 metres and area of the base (3 × 5) square metres, is $\left(\text{Take } \pi = \frac{22}{7}\right)$
A) 6 minutes B) 5 minutes
C) 10 minutes D) 9 minutes

5. A solid cylinder has total surface area of 462 sq. cm. Its curved $\frac{1}{3}$rd surface area. Then the radius of the cylinder is
A) 7 cm B) 3.5 cm
C) 9 cm D) 11 cm

6. The diameter of a cylinder is 7 cm and its height is 16 cm. Using the value of $\pi = \frac{22}{7}$, the lateral surface area of the cylinder is
A) 352 cm^2 B) 350 cm^2
C) 355 cm^2 D) 348 cm^2

7. The height of a solid right circular cylinder is 6 metres and three times the sum of the area of its two end faces is twice the area of its curved surface. The radius of its base (in metre) is
A) 4 B) 2
C) 8 D) 10

8. The height of a circular cylinder is increased six times and the base area is decreased to one ninth of its value. The factor by which the lateral surface of the cylinder increases is
A) 2 B) $\frac{1}{2}$
C) $\frac{2}{3}$ D) $\frac{3}{2}$

9. The radius and height of a cylinder are in the ratio. 5 : 7 and its volume is 550 cm^3. Calculate its curved surface area in sq. cm.
A) 110 B) 444
C) 220 D) 616

10. The area of the curved surface and the area of the base of a right circular cylinder are a square cm and b square cm respectively. The height of the cylinder is
A) $\frac{2a}{\sqrt{\pi b}}$ cm B) $\frac{a\sqrt{b}}{2\sqrt{\pi}}$ cm
C) $\frac{a}{2\sqrt{\pi b}}$ cm D) $\frac{a\sqrt{\pi}}{2\sqrt{b}}$ cm

11. Find the length of the largest rod that can be placed in a room 16m long, 12m broad and $10\frac{2}{3}$ m high.
A) 23m. B) 68 m.
C) $22\frac{2}{3}$ m. D) $22\frac{1}{3}$ m.

12. If the volume of two cubes are in the ratio 27 : 64, then the ratio of their total surface area is:
A) 27 : 64 B) 3 : 4
C) 9 : 16 D) 3 : 8

13. Find the length of the longest rod that can be placed in a hall of 10 m length, 6 m breadth and 4 m height.
A) $2\sqrt{38}$ m B) $4\sqrt{38}$ m
C) $2\sqrt{19}$ m D) 19m

14. The volume of a cuboid is twice the volume of a cube. If the dimensions of the cuboid are 9cm, 8 cm and 6 cm, the total surface area of the cube is:
A) 72 cm^2 B) 216 cm^2
C) 432 cm^2 D) 108 cm^2

15. The length, breadth and height of a room is 5m, 4m and 3m respectively. Find the length of the largest bamboo that can be kept inside the room.
A) 5 m B) 60 m
C) 7 m D) $5\sqrt{2}$ m

16. The length of the longest rod that can be placed in a room which is 12 m long, 9 m broad and 8 m high is
A) 27 m B) 19 m
C) 17 m D) 13 m

17. A cube of edge 5 cm is cut into cubes each of edge of 1 cm. The ratio of the total surface area of one of the small cubes to that of the large cube is equal to:
A) 1 : 125 B) 1 : 5
C) 1 : 625 D) 1 : 25

18. The perimeter of the floor of a room is 18 m. what is the area of the walls of the room, if the height of the room is 3 m?
A) 21 m^2 B) 42 m^2
C) 54 m^2 D) 108 m^2

19. The length (in metres) of the longest rod that can be put in a room of dimensions 10 m × 10m × 5m is
A) $15\sqrt{3}$ B) 15
C) $10\sqrt{2}$ D) $5\sqrt{3}$

20. The floor of a room is of size 4 m × 3 m and its height is 3 m. The walls and ceiling of the room require painting. The area to be painted is
A) 66 m^2 B) 54 m^2
C) 43 m^2 D) 33 m^2

21. If the sum of three dimensions and the total surface area of a rectangular box are 12 cm and 94 cm^2 respectively, then the maximum length of a stick that can he placed inside the box is
A) $5\sqrt{2}$ cm B) 5 cm
C) 6 cm D) $2\sqrt{5}$ cm

22. If the length of the diagonal of a cube is $8\sqrt{3}$ cm, then its surface area is
A) 192 cm^2 B) 512 cm^2
C) 768 cm^2 D) 384 cm^2

23. The area of the four walls of a room is 660 m^2 and its length is twice its breadth. If the height of the room is 11 m, then area of its floor (in m^2) is
A) 120 B) 150
C) 200 D) 330

24. The maximum length of a pencil that can be kept in a rectangular box of dimensions 8cm × 6cm × 2cm is
A) $2\sqrt{13}$ cm B) $2\sqrt{14}$ cm
C) $2\sqrt{26}$ cm D) $10\sqrt{2}$ cm

25. The volume of a cubical box is 3.375 cubic metres. The length of edge of the box is
A) 75 cm B) 1.5 m
C) 1.125 m D) 2.5 m

26. Diagonal of a cube is $6\sqrt{3}$ cm. Ratio of its total surface area and volume (numerically) is
A) 2 : 1 B) 1 : 6
C) 1 : 1 D) 1 : 2

27. The length of the largest possible rod that can be placed in a cubical room is $35\sqrt{3}$ m. The surface area of the largest possible sphere that fit within the cubical room $\left(\text{assuming } \pi=\frac{22}{7}\right)$ (in square m) is
A) 3,500 B) 3,850
C) 2,450 D) 4,250

28. The volume of air in a room is 204 m^3. The height of the room is 6 m. What is the floor area of the room?
A) 32 m^2 B) 46 m^2
C) 44 m^2 D) 34 m^2

29. The slant height of a conical mountain is 2.5 km and the area of its base is 1.54 km^2. Taking $\pi=\frac{22}{7}$, the height of the mountain is:
A) 2.2 km B) 2.4 km
C) 3 km D) 3.11 km

30. The base of a conical tent is 19.2 meters in diameter and the height of its vertex is 2.8 meters. The area of the canvas required to put up such a tent (in square meters) $\left(\text{Taking } \pi=\frac{22}{7}\right)$ is nearly
A) 3017.1 B) 3170
C) 301.7 D) 30.17

31. If S denotes the area of the curved surface of a right circular cone of height h and semi vertical angle α then S equals
A) $\pi h^2 \tan^2\alpha$
B) $\frac{1}{3}\pi h^2 \tan^2\alpha$
C) $\pi h^2 \sec\alpha \tan\alpha$
D) $\frac{1}{3}\pi h^2 \sec\alpha \tan\alpha$

32. The height and the radius of the base of a right circular cone are 12 cm and 6cm respectively. The radius of the circular cross section of the cone cut by a plane parallel to its base at a distance of 3 cm from the base is
A) 4 cm B) 5.5 cm
C) 4.5 cm D) 3.5 cm

33. The radius of base and slant height of a cone are in the ratio 4 : 7. If its curved surface area is 792 cm^2, then the radius (in cm) of its base is [Use $\pi = 22/7$]
A) 8 B) 12
C) 14 D) 16

34. A semi-circular sheet of metal of diameter 28 cm is bent into an open conical cup. The depth of the cup is approximately
A) 11 cm B) 12 cm
C) 13 cm D) 14 cm

35. The radius and the height of a cone are in the ratio 4 : 3. The ratio of the curved surface area and total surface area of the cone is
A) 5 : 9 B) 3 : 7
C) 5 : 4 D) 16 : 9

36. A right angled sector of radius r cm is rolled up into a cone in such a way that the two binding radii are joined together. Then the curved surface area of the cone is
A) πr^2 cm^2 B) $4\pi r^2$ cm^2
C) $\frac{\pi r^2}{4}$ cm^2 D) $2\pi r^2$ cm^2

37. The radius of the base of a conical tent is 16 metre. If $427\frac{3}{7}$ sq. metre canvas is required to construct the tent, then the slant height of the tent is: $\left(\text{Take } \pi=\frac{22}{7}\right)$
A) 17 metre B) 15 metre
C) 19 metre D) 8.5 metre

38. The volume of a right circular cone is 1232 cm^3 and its vertical height is 24 cm. Its curved surface area is
A) 154 cm^2 B) 550 cm^2
C) 604 cm^2 D) 704 cm^2

39. If h, c, v are respectively the height, curved surface area and volume of a right circular cone, then the value of $3\pi vh^3 - c^2h^2 + 9v^2$ is
A) 2 B) −1
C) 1 D) 0

40. If the radius of a sphere is increased by 2 cm, its surface area increased by 352 cm^2. The radius of sphere before change is : $\left(\text{Take } \pi=\frac{22}{7}\right)$
A) 3 cm B) 4 cm
C) 5 cm D) 6 cm

41. Spheres A and B have their radii 40 cm and 10 cm respectively. Ratio of surface area of A to the surface area of B is:
A) 1 : 16 B) 4 : 1
C) 1 : 4 D) 16 : 1

42. The volume of a sphere is $\frac{88}{21}\times(14)^3 cm^3$. The curved surface of the sphere is $\left(\text{Take } \pi=\frac{22}{7}\right)$
A) 2424 cm^2 B) 2446 cm^2
C) 2484 cm^2 D) 2464 cm^2

43. The surface area of a sphere is $64\pi cm^2$. Its diameter is equal to
A) 16cm B) 8cm
C) 4cm D) 2cm

44. The diameter of two hollow spheres made from the same metal sheet are 21 cm and 17.5 cm respectively. The ratio of the area of metal sheets required for making the two spheres is
A) 6:5 B) 36:25
C) 3:2 D) 18:25

45. When the circumference of a toy balloon is increased from 20 cm to 25 cm, its radius (in cm) is increased by:
A) 5 B) $\frac{5}{\pi}$
C) $\frac{5}{2\pi}$ D) $\frac{\pi}{5}$

46. If the volume and surface area of a sphere are numerically the same, then its radius is:
A) 1 unit B) 2 units
C) 3 units D) 4 units

47. The ratio of the surface area of a sphere and the curved surface area of the cylinder circumscribing the sphere is
A) 1 : 2 B) 1 : 1
C) 2 : 1 D) 2 : 3

48. The total surface area of a metallic hemisphere is 1848 cm^2. The hemisphere is melted to form a solid right circular cone. If the radius of the base of the cone is the same as the radius of the hemisphere, its height is
A) 42 cm B) 26 cm
C) 28 cm D) 30 cm

49. If the radii of two spheres are in the ratio 1 : 4, then their surface area are in the ratio:
A) 1 : 2 B) 1 : 4
C) 1 : 8 D) 1 : 16

50. A solid metallic sphere of radius 8 cm is melted to form 64 equal small solid spheres. The ratio of the surface area of this sphere to that of a small sphere is
A) 4 : 1 B) 1 : 16
C) 16 : 1 D) 1 : 4

51. If S_1 and S_2 be the surface area of a sphere and the curved surface area of the circumscribed cylinder respectively, then S_1 is equal to
A) $\frac{3}{4}S_2$ B) $\frac{1}{2}S_2$
C) $\frac{2}{3}S_2$ D) S_2

52. The volume of two spheres are in the ratio 8 :27, The ratio of their surface area is:
A) 4 : 9 B) 2 : 3
C) 4 :5 D) 5 : 6

53. The volume of a solid hemisphere is 19404 cm^3. Its total surface area is
A) 4158 cm^2 B) 2858 cm^2
C) 1738 cm^2 D) 2038 cm^2

54. A sphere and a hemisphere have the same volume. The ratio of their curved surface area is:
A) $2^{-\frac{3}{2}}:1$ B) $2^{\frac{2}{3}}:1$
C) $4^{-\frac{2}{3}}:1$ D) $2^{\frac{1}{3}}:1$

55. If the radius of a sphere be doubled, the area of its surface will become
A) Double
B) Three times
C) Four times
D) None of the mentioned

56. A solid hemisphere is of radius 11 cm. The curved surface area in sq. cm. is
A) 1140.85 B) 1386.00
C) 760.57 D) 860.57

57. If the total surface area of a hemisphere is 27π square cm, then the radius of the base of the hemisphere is
A) $9\sqrt{3}$ cm B) 3 cm
C) $3\sqrt{3}$ cm D) 9 cm

58. The base of a solid right prism is a triangle whose sides are 9 cm, 12 cm and 15 cm. The height of the prism is 5 cm. Then, the total surface area of the prism is
A) 180 cm^2 B) 234 cm^2
C) 288 cm^2 D) 270 cm^2

59. The base of a right prism is an equilateral triangle of area 173 cm^2 and the volume of the prism is 10380 cm^3. The area of the lateral surface of the prism $\left(\sqrt{3}=1.73\right)$
A) 1200 cm^2 B) 2400 cm^2
C) 3600 cm^2 D) 4380 cm^2

60. The base of a right pyramid is a square of side 16 cm long. If its height be 15 cm, then the area of the lateral surface in square centimetre is:
A) 136 B) 544
C) 800 D) 1280

61. If the slant height of a right pyramid with square base is 4 metre and the total slant surface of the pyramid is 12 square metre, then the ratio of total slant surface area and area of the base is :
A) 16 :3 B) 24 :5
C) 32 :9 D) 12 :3

62. The base of a right pyramid is an equilateral triangle of side $10\sqrt{3}$ cm. If the total surface area of the pyramid is $270\sqrt{3}$ sq. cm., its height is
A) $12\sqrt{3}$ cm B) 10 cm
C) $10\sqrt{3}$ cm D) 12 cm

63. A right prism stands on a base 6 cm equilateral triangle and its volume is $81\sqrt{3}$ cm^3. The height (in cm) of the prism is
A) 9 B) 10
C) 12 D) 15

64. A right pyramid stands on a square base of diagonal $10\sqrt{2}$ cm. If the height of the pyramid is 12 cm, the area (in cm^2) of its slant surface is
A) 520 B) 420
C) 360 D) 260

65. If the altitude of a right prism is 10 cm and its base is an equilateral triangle of side 12 cm, then its total surface area (in cm^2) is
A) $\left(5+3\sqrt{3}\right)$ B) $36\sqrt{3}$
C) 360 D) $72\left(5+\sqrt{3}\right)$

66. A right pyramid stands on a base 16 cm square and its height is 15 cm. The area (in cm^2) of its slant surface is
A) 514 B) 544
C) 344 D) 444

67. The base of a right prism is a right-angled triangle whose sides are 5 cm, 12 cm and 13 cm. If the area of the total surface of the prism is 360 cm^2. then its height (in cm) is
A) 10 B) 12
C) 9 D) 11

68. A hemisphere and a cone have equal base. If their heights are also equal, the ratio of their curved surface will be:
A) $1:\sqrt{2}$ B) $\sqrt{2}:1$
C) 1 : 2 D) 2 : 1

69. A right circular cylinder just encloses a sphere of radius r. The ratio of the surface area of the sphere and the curved surface area of the cylinder is
A) 2 : 1 B) 1 : 2
C) 1 : 3 D) 1 : 1

70. A sphere and a cylinder have equal volume and equal radius. The ratio of the curved surface area of the cylinder to that of the sphere is
A) 4 : 3 B) 2 : 3
C) 3 : 2 D) 3 : 4

71. A circus tent is cylindrical up to a height of 3 m and conical above it. If its diameter is 105m and the slant height of the conical part is 63 m, then the total area of the canvas required to make the tent is $\left(\text{Take } \pi=\frac{22}{7}\right)$
A) 11385 m^2 B) 10395 m^2
C) 9900 m^2 D) 990 m^2

72. A right circular cylinder and a cone have equal base radius and equal height. If their curved surfaces are in the ratio 8 : 5, then the radius of the base to the height are in the ratio:
A) 2 : 3 B) 4 : 3
C) 3 : 4 D) 3 : 2

73. The base of a cone and a cylinder have the same radius 6 cm. They have also the same height 8 cm. The ratio of the curved surface of the cylinder to that of the cone is
A) 8 : 5 B) 8 : 3
C) 4 : 3 D) 5 : 3

74. A solid right circular cylinder and a solid hemisphere stand on equal bases and have the same height. The ratio of their whole surface area is:
A) 3 : 2 B) 3 : 4
C) 4 : 3 D) 2 : 3

75. A square of side 3 cm is cut off from each corner of a rectangular sheet of length 24cm and breadth 18cm and the remaining sheet is folded to form an open rectangular box. The surface area of the box is
A) 468 cm^2 B) 396 cm^2
C) 612 cm^2 D) 423 cm^2

76. Three solid iron cubes of edges 4 cm, 5cm and 6 cm are melted together to make a new cube, 62 cm^3 of the melted material is lost due to improper handling. The area (in cm^2) of the whole surface of the newly formed cube is
A) 294 B) 343
C) 125 D) 216

77. If each edge of a cube is increased by 50%, the percentage increases in its surface area is
A) 150% B) 75%
C) 100% D) 125%

78. The length of each edge of a regular tetrahedron is 12cm. The area (in sq. cm) of the total surface of the tetrahedron is
A) $288\sqrt{2}$ B) $144\sqrt{2}$
C) $108\sqrt{3}$ D) $144\sqrt{3}$

79. A toy is in the form of a cone mounted on a hemisphere. The radius of the hemisphere and that of the cone is 3cm and height of the cone is 4cm. The total surface area of the toy $\left(\text{Taking } \pi = \frac{22}{7}\right)$
A) 75.43 sq. cm.
B) 103.71 sq. cm.
C) 85.35 sq. cm.
D) 120.71 sq. cm.

80. Area of the floor of a cubical room is 48 sq. m. The length of the longest rod that can be kept in that room is
A) 9 metre B) 12 metre
C) 18 metre D) 6 metre

81. A sphere and a hemisphere have the same radius. Then the ratio of their respective total surface area is
A) 2 : 1 B) 1 : 2
C) 4 : 3 D) 3 : 4

82. If the surface area of a sphere is 346.5 cm^2 , then its radius $\left(\text{Taking } \pi = \frac{22}{7}\right)$
A) 7cm B) 3.25cm
C) 5.25cm D) 9cm

83. The base of a prism is right angled triangle with two sides 5cm and 12cm. The height of the prism is 10 cm. The total surface area of the prism is
A) 360 sq. cm. B) 300 sq. cm.
C) 330 sq. cm. D) 325 sq. cm.

84. The ratio of the length and breadth of a rectangular parallelepiped is 5 : 3 and its height is 6cm. If the total surface area of the parallelepiped be 558 sq. cm, then its length in dm is
A) 9 B) 1.5
C) 10 D) 15

85. Deepali makes a model of a cylindrical kaleidoscope for her science project, She uses a chart paper to make it. If the length of the kaleidoscope is 25cm and radius 3.5cm, the area of the paper she used, in square cm, is $\left(\pi = \frac{22}{7}\right)$
A) 1100 B) 550
C) 500 D) 450

86. If the sum of the dimensions of a rectangular parallelepiped is 24 cm and the length of the diagonal is 15 cm, then the total surface area of it is
A) 420 cm^2 B) 275 cm^2
C) 351 cm^2 D) 378 cm^2

87. The length, breadth and height of a cuboid are in the ratio 3 : 4 : 6 and its volume is 576 cm^3. The whole surface of the cuboid is
A) 216 cm^2 B) 324 cm^2
C) 432 cm^2 D) 460 cm^2

88. The radius of a right circular cone is 3cm and its height is 4cm. The total surface area of the cone is
A) 48.4 sq. cm. B) 64.4 sq. cm.
C) 96.4 sq. cm. D)75.4sq. cm.

89. There are two cones. The curved surface area of one is twice that of the other. The slant height of the latter is twice that of the former. The ratio of their radii is
A) 4 : 1 B) 4 : 3
C) 3 : 4 D) 1 : 4

90. From a solid right circular cylinder of length 4cm and diameter 6 cm, a conical cavity of the same height and base is hollowed out. The whole surface of the remaining solid (in square cm.) is
A) 48 π B) 15 π
C) 63 π D) 24 π

91. The length, breadth and height of a wooden box with a lid are 10cm, 9cm and 7cm, respectively. The total inner surface of the closed box is 262 cm^2. The thickness of the wood (in cm) is
A) 2 B) 3
C) $\frac{23}{3}$ D) 1

92. The total surface area of a regular triangular pyramid with each edge of length 1 cm is
A) $4\sqrt{3}$ cm^2 B) $\frac{4}{3}\sqrt{3}$ cm^2
C) $\sqrt{3}$ cm^2 D) 4 cm^2

93. The number of paving stones each measuring 2.5m × 2m required to pave a rectangular courtyard 30 m long and 17.5 m wide, is
A) 80 B) 33
C) 99 D) 105

94. The length of canvas, 75 cm wide required to build a conical tent of height 14m and the floor area 346.5 m^2 is
A) 665 m B) 860 m
C) 490 m D) 770 m

95. 5 persons will live in a tent. If each person requires 16 m^2 of floor area and 100 m^3 space for air then the height of the cone of smallest size to accommodate these persons would be
A) 16 metre
B) 10.25 metre
C) 20 metre
D) 18.75 metre

96. The paint in a certain container is sufficient to paint an area equal to 9.375 m^2 . How many bricks measuring 22.5 cm by 10 cm by 7.5 cm can be painted out of this container?
A) 200 B) 1000
C) 10 D) 100

97. The ratio between the length and the breadth of a rectangular park is 3 : 2. If a man cycling along the boundary of the park at the speed of 12 kmph completes one round in 8 minutes, then the area of the park is equal to
A) 152600 m^2 B) 153500 m^2
C) 153600 m^2 D) 153800 m^2

98. The base of a right pyramid is a square of side 10 cm. If the height of the pyramid is 12 cm, then its total surface area is
A) 400 cm^2 B) 460 cm^2
C) 260 cm^2 D) 360 cm^2

99. There is a wooden sphere of radius $6\sqrt{3}$ cm. The surface area of the largest possible cube cut out from the sphere will be
A) 864 cm^2
B) $464\sqrt{3}$ cm^2
C) 462 cm^2
D) $646\sqrt{3}$ cm^2

100. A hemisphere and a cone have equal bases. If their heights are also equal, then the ratio of their curved surfaces will be
A) 1 : 2 B) 2 : 1
C) $1:\sqrt{2}$ D) $\sqrt{2}:1$

101. The radius of base and curved surface area of a right cylinder is 'r' units and $4\pi rh$ square units respectively. The height of the cylinder is:
A) $\frac{h}{2}$ units B) h units
C) 2h units D) 4h units

102. A hemispherical bowl has 3.5 cm radius. It is to be painted inside as well as outside. The cost of painting it at the rate of Rs. 5 per 10 sq. cm will be:
A) Rs. 77 B) Rs. 100
C) Rs. 175 D) Rs. 50

103. The total surface area of a right circular cylinder with radius of the base 7 cm and height 20 cm, is:
A) 900 cm^2 B) 140 cm^2
C) 1000 cm^2 D) 1188 cm^2

104. The diameter of a 120 cm long roller is 84 cm. It takes 500 complete revolutions of the roller to level a ground. The cost of levelling the ground at Rs. 1.50 per sq. m. is:
A) Rs. 6000 B) Rs. 3762
C) Rs. 2376 D) Rs. 5750

105. A hemispherical bowl has internal radius of 6 cm. The internal surface area would be: (Take $\pi = 3.14$)
A) 225 cm^2 B) 400 cm^2
C) 289.75 cm^2 D) 226.08 cm^2

106. The surface area of a sphere is 616 cm^2. The volume of the sphere would be:
A) $1437\frac{1}{3}cm^2$ B) 2100 cm^2
C) 2500 cm^2 D) $1225\frac{3}{5}cm^2$

TYPE-VI

1. The circumference of the base of a circular cylinder is 6π cm. The height of the cylinder is equal to the diameter of the base. How many litres of water can it hold?
A) 54 π cc B) 36 π cc
C) 0.054 π cc D) 0.54 π cc

2. The diameter of the base of a cylindrical drum is 35 dm. and the height is 24 dm. It is full of kerosene. How many tins each of size 25 cm × 22 cm × 35 cm can be filled with kerosene from the drum? $\left(\text{Use } \pi=\frac{22}{7}\right)$
A) 1200 B) 1020
C) 600 D) 120

LEVEL – V

1. (D) $\ell = 6,\ b = 4,\ h = 1.25$
Total wet surface
$= \ell b + 2(\ell h + bh)$
$= \ell b + 2h(\ell + b)$
$= 6\times4 + 2\times1.25(6+4)$
$= 24 + 2.5(10)$
$= 49\ m^2$

2. (B) Curved surface area $= 2\pi rh$
$100 \xrightarrow[+15]{15\%\uparrow} 115 \xrightarrow[-11.5]{10\%\downarrow} 103.5$
$\therefore$ CSA increases by
$103.5 - 100 = 3.5\%$

3. (A) $\frac{CSA_1}{CSA_2} = \frac{2\pi r_1 h_1}{2\pi r_2 h_2} = \frac{r_1}{r_2}\times\frac{h_1}{h_2}$
$= \frac{3}{5}\times\frac{2}{3} = \frac{2}{5}$
$\therefore\ CSA_1 : CSA_2 = 2:5$

4. (B) Area of pipe $= \pi r^2$
$= \frac{22}{7}\times7\times7 = 154.\ cm^2$
$= 0.0154\ m^2$
Volume through cylindrical pipe
$= 0.0154\times5$ / sec
$= 0.077\ m^3$ / sec
Time taken
$= \frac{3\times5\times1.54}{0.077} = 300$ sec
$\therefore$ Time taken $= \frac{300}{60} = 5$ min

5. (A) CSA $+ 2\pi r^2 =$ TSA
$2\pi r^2 = \frac{2}{3}\times462$
$r^2 = \frac{2}{3}\times462\times\frac{1}{2}\times\frac{7}{22}$
$r^2 = 49$
$\Rightarrow r = 7$ cm

6. (A) LSA $= 2\pi rh$
$= 2\times\frac{22}{7}\times\frac{7}{2}\times16$
$= 352\ cm^2$

7. (A) $3\times2\pi r^2 = 2\times2\pi rh$
$3r = 2h$
$r = \frac{2h}{3} = \frac{2}{3}\times6 = 4$ metres

8. (A) $h^1 = 6h$
Area decreased to $1/9^{th}$
$\Rightarrow$ Radius decreased by 1/3
$\frac{LSA^1}{LSA} = \frac{2\pi r^1 h^1}{2\pi rh} = \frac{r/3\times6h}{rh} = 2$
$\therefore$ LSA increased by 2 times

9. (C) Let radius = 5x, cylinder = 7x
$V = \pi r^2 h = 550$
$\frac{22}{7}\times5x\times5x\times7x = 550$
$\Rightarrow x = 1$
$CSA = 2\pi rh = 2\times\frac{22}{7}\times5\times7 = 220\ cm^2$

10. (C) $2\pi rh = a$
$\pi r^2 = b$
$\Rightarrow r = \sqrt{\frac{b}{\pi}}$
$\frac{2\pi rh}{\pi r^2} = \frac{a}{b}$
$h = \frac{r}{2}\cdot\frac{a}{b} = \frac{1}{2}\times\frac{\sqrt{b}}{\sqrt{\pi}}\cdot\frac{a}{b} = \frac{a}{2\sqrt{b\pi}}$

11. (C) Length of longest rod
$= \sqrt{16^2 + 12^2 + \left(\frac{32}{3}\right)^2}$
$= \sqrt{256 + 144 + \frac{1024}{9}}$
$= \sqrt{\frac{4624}{9}} = \frac{68}{3} = 22\frac{2}{3}$

12. (C) If volumes of cubes all in ratio 27 : 64 then ratio of surface areas are
$27^{2/3} : 64^{2/3}$
$= 9 : 16$

13. (A) Length of longest rod
$= \sqrt{10^2 + 6^2 + 4^2}$
$= \sqrt{100 + 30 + 16}$
$= 2\sqrt{25 + 9 + 4}$
$= 2\sqrt{38}$ m

14. (B) $9\times8\times6 = 2a^3$
$a^3 = 27\times8$
$\Rightarrow\ a = 6$
$TSA = 6a^2 = 6\times6^2 = 216\ cm^2$

15. (D) Length of longest bamboo
$= \sqrt{5^2 + 4^2 + 3^2} = \sqrt{50}$
$= 5\sqrt{2}$

16. (C) Length of longest rod
$= \sqrt{12^2 + 9^2 + 8^2}$
$= \sqrt{144 + 81 + 64}$
$= \sqrt{289} = 17$ m

17. (D) TSA of small cube : Large cube
$= 6(1)^2 : 6(5)^2 = 1:25$

18. (C) $2(\ell + b) = 18$
Area of walls $= 2\ell h + 2bh$
$= 2(\ell + b)h$
$= 18\times3 = 54\ m^2$

19. (B) Length of longest rod
$= \sqrt{100 + 100 + 25}$
$= \sqrt{225} = 15$ m

20. (B) Area of walls & ceiling
$= 2\ell h + 2bh + \ell b$
$= 2h(\ell + b) + \ell b$
$= 2\times3(4+3) + 4\times3$
$= 42 + 12 = 54\ m^2$

21. (A) $\ell + b + h = 12$
$2(\ell b + bh + h\ell) = 94$
$(\ell + b + h)^2 = 144$
$\ell^2 + b^2 + h^2 = 2(\ell b + bh + h\ell) = 144$
$\ell^2 + b^2 + h^2 = 144 - 94 = 50$
Max length
$= \sqrt{\ell^2 + b^2 + h^2} = \sqrt{50} = 5\sqrt{2}$

22. (D) $\sqrt{3}a = 8\sqrt{3}$
$\Rightarrow a = 8$
$TSA = 6a^2 = 6(8)^2$
$= 6\times64 = 384\ m^2$

23. (C) $2h\ (l + b) = 660$
$l + b = \frac{660}{2\times11} = 30$
$\Rightarrow\ \ell = 2b \qquad \Rightarrow 3b = 30$
$\Rightarrow b = 10 \quad \ell = 20$
Area of floor
$= \ell b = 20\times10 = 200\ m^2$

24. (C) Max length $= \sqrt{\ell^2 + b^2 + h^2}$
$= \sqrt{64 + 36 + 4}$
$= \sqrt{104} = 2\sqrt{26}$ cm

25. (B) $a^3 = 3.375$
$\Rightarrow a = (3.375)^{1/3} = 1.5$m

26. (C) $\sqrt{3}a = 6\sqrt{3}$
$\Rightarrow a = 6$
TSA : Volume
$= 6a^2 : a^3 = 6 : a = 6 : 6 = 1 : 1$

27. (B) $\sqrt{3}\ a = 35\sqrt{3}$
$\Rightarrow a = 35$
Diameter of sphere = Side of the cube
$2r = 35$
$\Rightarrow r = 35/2$
Surface area of sphere
$= 4\pi r^2 = 4\times\frac{22}{7}\times\frac{35}{2}\times\frac{35}{2} = 3850\ m^2$

28. (D) Floor area $= \frac{\text{Volume}}{\text{Height}}$
$= \frac{204}{6} = 34$

29. (B) $\pi r^2 = 1.54$
$r^2 = 1.54\times\frac{7}{22}$
$r^2 = 0.49$

$\Rightarrow r = 0.7$ km

$H = \sqrt{\ell^2 - r^2}$

$= \sqrt{2.5^2 - 0.7^2} = 2.4$ km

30. (C) $2r = 19.2 \Rightarrow r = 9.6$

$h = 2.8$ m

$\therefore \ell = \sqrt{9.6^2 + 2.8^2}$

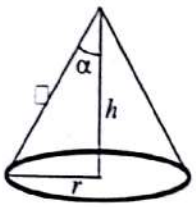
$= \sqrt{92.16 + 7.84}$

$= \sqrt{100} = 10$

$CSA = \pi rl = \frac{22}{7} \times 9.6 \times 10$

$= 301.7\ m^2$

31. (C) $S = \pi r\ell$



$\tan\alpha = \frac{r}{h} \Rightarrow r = h\tan\alpha$

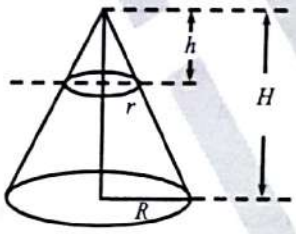
$\cos\alpha = \frac{h}{\ell} \Rightarrow \ell = h\sec\alpha$

$\therefore S = \pi r\ell = \pi(h\tan\alpha)(h\sec\alpha)$

$= \pi h^2 \tan\alpha \sec\alpha$

32. (C) $R = 6$ $H = 12$

$h = 12 - 3 = 9$



$\frac{R}{r} = \frac{H}{h} \Rightarrow r = \frac{Rh}{H}$

$\Rightarrow \frac{6 \times 9}{12} = 4.5$ cm

33. (B) Let $r = 4x$ $\ell = 7x$

$\pi r\ell = 792$

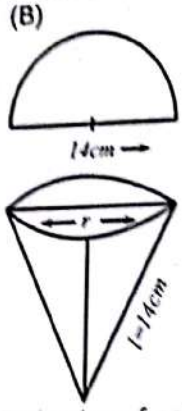
$\frac{22}{7} \times 4x \times 7x = 792$

$\Rightarrow x^2 = \frac{792}{88} = 9$

$\therefore \sqrt{x} = \sqrt{9} = 3$

Radius $= 4x = 4 \times 3 = 12$ cm

34. (B)



Perimeter of semi circle = Circumference of base of cone

Radius of semicircle = slant height of cone

$\Rightarrow 14\pi = 2\pi r \Rightarrow r = 7$ cm

$\ell = 14$ cm

$h = \sqrt{\ell^2 - r^2} = \sqrt{14^2 - 7^2} = 7\sqrt{3}$

$h = 7\sqrt{3} = 7 \times 1.732 \approx 12$ cm

35. (A) radius $= 4x$, height $= 3x$

$\therefore \ell = 5x$

$\frac{CSA}{TSA} = \frac{\pi r\ell}{\pi r\ell + \pi r^2} = \frac{\ell}{\ell + r}$

$\frac{5x}{5x + 4x} = \frac{5}{9} = 5:9$

36. (C) Radius of sector = Slant height of the cone

Perimeter of sector = Circumference of base of cone

$\frac{\pi r}{2} = 2\pi$(radius of cone)

$\Rightarrow$ radius of cone $= r/4$

$\ell = r$

Curved surface area

$= \pi \times$ radius of cone $\times \ell$

$= \frac{\pi r^2}{4}$

37. (D) $\pi r\ell = 427\frac{3}{7}$

$\frac{22}{7} \times 16 \times \ell = \frac{2992}{7}$

$\Rightarrow \ell = \frac{2992}{16 \times 22} = 8.5$ m

38. (B) $\frac{1}{3}\pi(r^2)24 = 1232$

$r^2 = \frac{3 \times 1232 \times 7}{24 \times 22} = 49$

$\Rightarrow r = 7$

$r = 7$, $h = 24$ $\therefore \ell = 25$

$CSA = \pi r\ell = \frac{22}{7} \times 7 \times 25 = 550\ cm^2$

39. (D) $3\pi Vh^3 - c^2h^2 + 9V^2$

$= h^2(3\pi Vh - C^2) + 9V^2$

$= h^2\left(3\pi \times \frac{1}{3}\pi rh^2 - \pi^2r^2\ell^2\right)$

$+9\left(\frac{1}{3}\pi r^2h\right)^2$

$= h^2(\pi^2r^2h^2 - \pi^2r^2h^2 + \pi^2r^2.r^2)$

$+\pi^2r^4h^2$

$= -\pi^2 r^4 h^2 + \pi^2r^4 h^2 = 0$

40. (D) $4\pi\left((r+2)^2 - r^2\right) = 352$

$(2r + 2)(2) = 352 \times \frac{1}{4} \times \frac{7}{22}$

$4(r + 1) = 28$

$r + 1 = 7$

$\Rightarrow r = 6$ cm

41. (D) Radii of spheres are in ratio 4 : 1. So surface areas are in ratio $4^2 : 1^2 = 16 : 1$

42. (D) $\frac{4}{3}\pi r^3 = \frac{88}{21} \times 14^3$

$\frac{4}{3} \times \frac{22}{7} \times r^3 = \frac{88}{21} \times 14^3$

$\Rightarrow r = 14$

$CSA = 4\pi r^2 = 4 \times \frac{22}{7} \times 14 \times 14$

$= 2464\ cm^2$

43. (B) $4\pi r^2 = 64\pi$

$r^2 = 16$

$r = 4$ cm

$\therefore$ Diameter $= 2r = 8$ cm

44. (B) $r_1 : r_2 = \frac{21}{2} : \frac{17.5}{2} = 6 : 5$

$\therefore$ Areas ratio

$= r_1^2 : r_2^2 = 36 : 25$

45. (C) Circumference increased for 20 to 35

$\Rightarrow$ Radius increased from $\frac{20}{2\pi}$ to $\frac{25}{2\pi}$

$\therefore$ Increase in radius

$= \frac{25}{2\pi} - \frac{20}{2\pi} = \frac{5}{2\pi}$

46. (C) $\frac{4}{3}\pi r^3 = 4\pi r^2$

$r = 3$ units

47. (B) Radius of cylinder = Radius of sphere

Height of cylinder = Diameter of sphere

Ratio $= 4\pi r^2 : 2\pi r(2r) = 1 : 1$

48. (C) $3\pi r^2 = 1848$

$3\times\frac{22}{7}\times r^2 = 1848$

$r^2 = 1848\times\frac{7}{22}\times\frac{1}{3} = 196$

$\therefore r = 14$ cm

$\frac{2}{3}\pi r^3 = \frac{1}{3}\pi r^2 h$

$2r = h$

$\therefore$ Height of cylinder

$= 2r = 2\times 14 = 28$cm

49. (D) Radii of spheres are in ratio is 1 : 4

So ratio of surface areas are in ratio

$1^2 : 4^2 = 1 : 16$

50. (C) $\frac{4}{3}\pi R^3 = 64\times\frac{4}{3}\pi r^3$

$R^3 = 64\, r^3$

$\Rightarrow R = 4r \Rightarrow R : r = 4 : 1$

Radii are in ratio 4 : 1.

So surface areas are in ratio

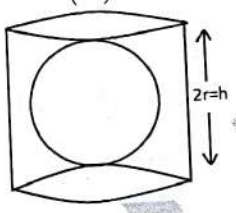
$4^2 : 1 = 16 : 1$

51. (D) Radius of cylinder = Radius of sphere

Height of cylinder = Diameter of sphere

$S_1 = 4\pi r^2$; $S_2 = 2\pi rh$

$= 2\pi r(2r) = 4\pi r^2$



$\therefore S_1 = S_2$

52. (A) Volume of spheres are in ratio = 8 : 27

$\therefore$ Ratio of surface areas

$= (8)^{2/3} = (27)^{2/3}$

$= 4 : 9$

53. (A) $\frac{2}{3}\pi r^3 = 19404$

$r^3 = 19404\times\frac{3}{2}\times\frac{7}{22} = 9261$

$\therefore r = (9261)^{1/3} = 21$ cm

$TSA = 3\pi r^2$

$= 3\times\frac{22}{7}\times 21\times 21 = 4158$ cm^2

54. (D) $\frac{4}{3}\pi r_1^3 = \frac{2}{3}\pi r_2^3$

$r_1^3 : r_2^3 = 1 : 2$

$\Rightarrow r_1 : r_2 = 1 : 2^{1/3}$

$\therefore$ Ratio of CSA $= 4\pi r_1^2 : 2\pi r_2^2$

$= 2\, r_1^2 : r_2^2 = 2 : 2^{2/3} = 2^{1/3} : 1$

55. (C) If radius of sphere is doubled then area of its surface becomes four times

56. (C) CSA of sphere $= 2\pi r^2$

$= 2\times\frac{22}{7}\times 11\times 11$

$= 760.57$ cm^2

57. (B) $3\pi r^2 = 27\pi$

$\Rightarrow r^2 = 9$

$\Rightarrow r = 3$ cm

58. (C) Area of $\Delta\ell e$ with sides 9, 12, 15

$\Rightarrow$ right angled

Area $= \frac{1}{2}\times 9\times 12 = 54$ cm^2

Total surface Area

= (Perimeter) $\times$ height + 2 (Area of the base)

= 180+2 (54)

$= 288$cm^2

59. (C) $\frac{\sqrt{3}}{4}a^2 = 173$

$\Rightarrow a^2 = 173\times\frac{4}{1.73} = 400$

$\Rightarrow a = 20$ cm

$\therefore$ Perimeter = 3a = 60 cm

Height $= \frac{\text{Volume}}{\text{Area}} = \frac{10380}{173} = 60$

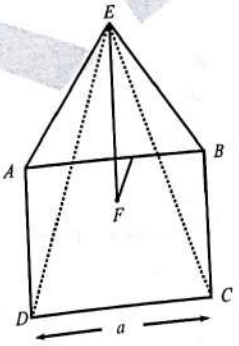
Area of lateral surface of prism

= Perimeter $\times$ Height

= 60 $\times$ 60

= 3600 cm^2

60. (B)



a = 16

Height of triangle

$= \sqrt{8^2 + 15^2} = 17$

LSA $= 4\times\frac{1}{2}\times$ base $\times$ height

$= 4\times\frac{1}{2}\times 16\times 17 = 544$ cm^2

61. (A) Let side of square be a

Total slant surface

$= 4\times$ Area of triangle

$12 = 4\times\frac{1}{2}\times a\times 4$

$\Rightarrow a = \frac{12}{8} = 3/2$

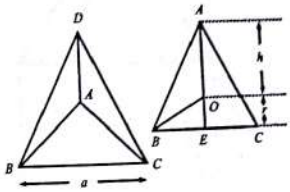
$\therefore$ Area of base

$= (3/2)^2 = 9/4$

Total slant surface area = 12 : 9/4

= 16 : 3

62. (D) $a = 10\sqrt{3}$



In radius

$r = \frac{a}{2\sqrt{3}} = \frac{10\sqrt{3}}{2\sqrt{3}} = 5$

$\therefore$ Let the height of pyramid be h

$\therefore$ Slant Height of triangle

$= \sqrt{5^2 + h^2} = \sqrt{25 + h^2}$

TSA of pyramid = Base Area + Perimeter $\times$ Slant height

= Base area

$+3\times\frac{1}{2}\times a\times$ Slant Height of Δle

$270\sqrt{3} = \frac{\sqrt{3}}{4}\left(10\sqrt{3}\right)^2 + 3\times\frac{1}{2}$

$\times 10\sqrt{3}\times\sqrt{25+h^2}$

$270\sqrt{3} = 75\sqrt{3} + 15\sqrt{3}\ \sqrt{25+h^2}$

$\frac{195\sqrt{3}}{15\sqrt{3}} = \sqrt{25+h^2}$

$13 = \sqrt{25+h^2}$

$\Rightarrow 25 + h^2 = 169$

$\Rightarrow h^2 = \sqrt{169-25} = \sqrt{144} = 12$

63. (A) Volume = Area of base $\times$ Height

$81\sqrt{3} = \frac{\sqrt{3}}{4}\times 6^2\times$ height

$\Rightarrow$ height = 9 cm

64. (D) $\sqrt{2}a = 10\sqrt{2}$

$\Rightarrow a = 10$ cm

$a/2 = \frac{10}{2} = 5$cm

Height of pyramid = 12

$\therefore$ Height of triangle

$= \sqrt{12^2 + 5^2} = 13$

$\therefore$ Area of slant surface $= 4\times\frac{1}{2}\times 10\times 13$

$= 260$ cm^2

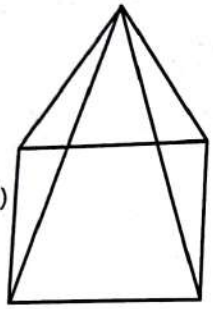
65. (D) TSA = Perimeter × height +2× Area of base

$= 3\times12\times10 + 2\times\frac{\sqrt{3}}{4}(12^2)$

$= 360 + 72\sqrt{3}$

$= 72\left(5+\sqrt{3}\right)$ cm²

66. (B)



a = 16

Slant Height of triangle

$= \sqrt{h^2 + (a/2)^2} = \sqrt{8^2 + 15^2} = 17$

Area of slant surface

$= 4\times\frac{1}{2}\times16\times17 = 544$ cm²

67. (A) Area of base

$= \frac{1}{2}\times5\times12 = 30$ cm²

TSA = Perimeter × height + 2 × base area

$360 = (5+12+13)h + 2\times30$

$300 = 30\,h$

$\Rightarrow h = 10$ cm

68. (B) Radius of cone = Radius of hemisphere = Height of cone = r

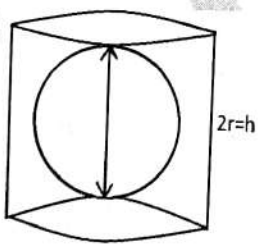
$\ell = \sqrt{r^2+h^2} = \sqrt{r^2+r^2} = \sqrt{2}.\,r$

Ratio of CSA $= 2\pi r^2 : \pi r\ell$

$= 2\pi r^2 : \sqrt{2}\,\pi r^2$

$= \sqrt{2} : 1$

69. (D)



Radius of cylinder = Radius of sphere = r

Height of cylinder = Diameter of sphere = 2r

Ratio of CSA's $= 4\pi r^2 : 2\pi rh$

$= 4\pi r^2 : 4\pi r^2$

$= 1 : 1$

70. (B) $\frac{4}{3}\pi r^3 = \pi r^2 h$

$\frac{4}{3}r = h$

Ratio of CSA $= 2\pi rh : 4\pi r^2$

$= h : 2r$

$= \frac{4}{3}r : 2r$

$= 2 : 3$

71. (A) Height of cylinder H = 3m

Radius of cone $= \frac{105}{2}$

$\ell = 63$

Total area of canvas

$= 2\pi rh + \pi r\ell$

$= \pi r(2H+\ell)$

$= \frac{22}{7}\times\frac{105}{2}(2\times3+63)$

$= \frac{22}{7}\times\frac{105}{2}\times69$

$= 11385$ m²

72. (C) $2\pi rh : \pi r\ell = 8:5$

$\frac{h}{\ell} = \frac{4}{5}$

$\frac{h}{\sqrt{r^2+h^2}} = \frac{4}{5}$

$\frac{h^2}{r^2+h^2} = \frac{16}{25}$

$\Rightarrow \frac{r^2+h^2}{h^2} = \frac{25}{16}$

$\frac{r^2}{h^2} + 1 = \frac{25}{16}$

$\frac{r^2}{h^2} = \frac{9}{16}$

$\Rightarrow r:h = 3:4$

73. (A) r = 6, h = 8 $\therefore \ell = 10$

Ratio of CSA's $= 2\pi rh : \pi r\ell$

$= 2h : \ell$

$= 2\times8 : 10$

$= 8:5$

74. (C) Ratio of TSA's

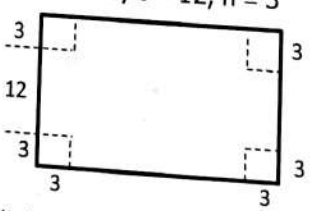
$= 2\pi rh + 2\pi r^2 : 3\pi r^2$

$= 2\pi r(r) + 2\pi r^2 : 3\pi r^2$

$= 4\pi r^2 : 3\pi r^2$

$= 4:3$

75. (B) $\ell = 18$, b = 12, h = 3



it is nothing but area of the 4 walls + Area of the floor.

$\therefore$ Surface area

$= 18\times12 + 2(18\times3 + 12\times3)$

$= 216 + 2(54+36)$

$= 396$ cm²

76. (A) $a^3 = 4^3 + 5^3 + 6^3 - 62$

$= 64 + 125 + 216 - 62 = 343$

$= 343$

$\Rightarrow a = 7$

Surface area

$= 6a^2 = 6\times7^2 = 294$ cm²

77. (D)

$100 \xrightarrow[+50]{50\%\uparrow} 150 \xrightarrow[+75]{50\%\uparrow} 225$

$\therefore$ Increase in surface area

$= 225 - 100 = 125\%$

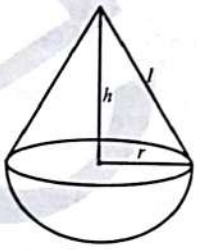
78. (D) a = 12

$TSA = 4\times\frac{\sqrt{3}}{4}a^2$

$= \sqrt{3}\times12^2$

$= 144\sqrt{3}$ cm²

79. (B) r = 3 h = 4 $\therefore \ell = 5$



$TSA = 2\pi r^2 + \pi r\ell$

$= 2\times\frac{22}{7}\times9 + \frac{22}{7}\times3\times5$

$= 103.71$ cm²

80. (B) $a^2 = 48$

$a = 4\sqrt{3}$

length of longest rod $= \sqrt{3}a$

$= \sqrt{3}\times4\sqrt{3} = 12$m

81. (C) Ratio of TSA of sphere and hemisphere having same radii will be $4\pi r^2 : 3\pi r^2 \Rightarrow 4:3$

82. (C) $4\pi r^2 = 346.5$

$\Rightarrow r^2 = 346.5\times\frac{1}{4}\times\frac{7}{22}$

$r^2 = 27.5625$

$\therefore r = 5.25$ cm

83. (A) Sides are 5, 12 so other side is 13

Area of base $= \frac{1}{2}\times5\times12 = 30$

TSA= Perimeter × height + 2 × 2 Area of base

$= (5+12+13)\times10 + 2\times30$

$= 300 + 60 = 360$ cm²

84. (B) Let length = 5x, breadth = 3x

$TSA = 2(\ell b + bh + h\ell)$

$558 = 2(5x \times 3x + 3x \times 6 + 5x \times 6)$

$279 = 15x^2 + 48x$

$5x^2 + 16x - 93 = 0$

$(x-3)(5x+31) = 0$

$\therefore x = 3$

$\therefore$ Length $= 5x = 5 \times 3 = 15$ cm $= 1.5$ dm

85. (B) h = 25 r = 3.5 cm

Area $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 3.5 \times 25 = 550\ cm^2$

86. (C) $\ell + b + h = 24$

$\sqrt{\ell^2 + b^2 + h^2} = 15$

$\ell^2 + b^2 + h^2 = 225$

$(\ell + b + h)^2 = \ell^2 + b^2 + h^2$

$+2(\ell b + bh + h\ell)$

$(24)^2 = 225 + TSA$

$TSA = 576 - 225 = 351\ cm^2$

87. (C) $\ell = 3x$, b = 4x, h = 6x

$576 = \ell bh$

$576 = (3x)(4x)(6x)$

$\Rightarrow x^3 = \frac{576}{3 \times 4 \times 6} = 8$

$\therefore x = 2$

Surface area

$= 2(\ell b + bh + h\ell)$

$= 2(12x^2 + 24x^2 + 18x^2) = 108x^2$

$= 108 \times 4 = 432\ cm^2$

88. (D) r = 3, h = 4 $\therefore \ell = 5$

$TSA = \pi r\ell + \pi r^2$

$= \pi r(\ell + r)$

$= \frac{22}{7} \times 3(5+3) = \frac{22 \times 3 \times 8}{7}$

$\approx 75.4\ cm^2$

89. (A) $CSA_1 = 2CSA_2$; $\ell_2 = 2\ell_1$

$\pi r_1 \ell_2 = 2\pi r_2 \ell_2$

$\frac{r_1}{r_2} = \frac{2\ell_2}{\ell_1} = \frac{2 \times 2}{1} = \frac{4}{1}$

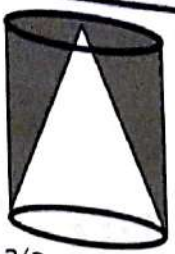
$\therefore r_1 : r_2 = 4 : 1$

90. (A) Surface area

$= 2\pi rh + \pi r^2 + \pi r\ell$

h = 4, r = 3 $\therefore \ell = 5$

Surface area $= \pi r(2h + r + \ell)$



$= \pi \times 3(2 \times 4 + 3 + 5)$

$= \pi \times 3 \times 16 = 48\pi\ cm^2$

91. (D) Let thickness be x cm

length, breadth, height of inner surface are

$10 - 2x, 9 - 2x, 7 - 2x$

Total inner surface

$262 = 2((10-2x)(9-2x) + (9-2x)(7-2x) + (7-2x)(10-2x))$

By substituting x = 1 equation is satisfied (through options)

$\therefore$ Thickness of wood = 1cm

92. (C) $TSA = 4 \times \frac{\sqrt{3}}{4} a^2$

$= \sqrt{3}\, a^2$

$= \sqrt{3}(1)^2$

$= \sqrt{3}\ cm^2$

93. (D) Number of stones

$= \frac{30 \times 17.5}{2.5 \times 2} = 105$

94. (D) $\pi r^2 = 346.5$

$r^2 = 346.5 \times \frac{7}{22} = 110.25$

$\Rightarrow r = 10.5$

r = 10.5, h = 14

$\therefore \ell = \sqrt{14^2 + 10.5^2} = 17.5$

$CSA = \pi r\ell$

$= \frac{22}{7} \times 10.5 \times 17.5 = 577.5$

$\therefore$ Length of canvas

$= \frac{577.5}{0.75} = 770$ m

95. (D) Area $= 5 \times 16 = 80\ m^2$

Volume $= 5 \times 100 = 500\ m^3$

$\frac{\text{Volume}}{\text{Area}} = \frac{\frac{1}{3}\pi r^2 h}{\pi r^2} = \frac{500}{80}$

$\frac{h}{3} = \frac{500}{80}$

$\Rightarrow h = \frac{1500}{80} = 18.75$ m

96. (D) Number of brickes

$= \frac{9.375}{2(\ell b + bh + h\ell)\ cm^2}$

$= \frac{93750}{2(22.5 \times 10 + 10 \times 7.5 + 7.5 \times 22.5)}$

$= \frac{93750}{2(225 + 75 + 168.75)}$

$= \frac{93750}{937.5} = 100$

97. (C) Let length = 3x, breadth = 2x

60 min $\rightarrow$ 1200 m

8 min $\rightarrow$?

$\therefore$ one round = perimeter

$= \frac{8}{60} \times 12000 = 1600$

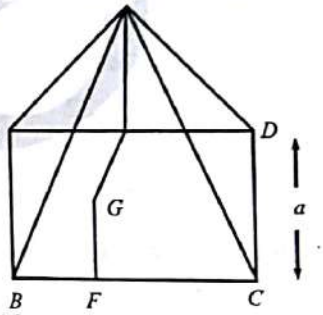
$2(3x + 2x) = 1600$

$\Rightarrow x = 160$

$\therefore$ Area $= 3x \times 2x = 6x^2$

$= 6 \times 160 \times 160 = 153600 m^2$

98. (D)



a = 10 cm

height of pyramid = 12cm

$\therefore$ Slant Height of triangle

$= \sqrt{(12)^2 + \left(\frac{10}{2}\right)^2}$

$= \sqrt{12^2 + 5^2} = 13$

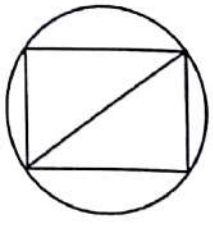
TSA = Area of base

$+\frac{1}{2}$ Perimeter of base $\times$ slant height

$= 10 \times 10 + 4 \times \frac{1}{2} \times 10 \times 13$

$= 100 + 260 = 360\ cm^2$

99. (A)



Diagonal of cube = Diameter of sphere

$\sqrt{3}a = 2 \times 6\sqrt{3}$

$\Rightarrow a = 12$ cm

Surface area

$= 6a^2 = 6(12)^2 = 864$ cm^2

100. (D) Radius = height = r

$\therefore \ell = \sqrt{r^2 + r^2} = \sqrt{2}\, r$

Ratio of CSA

$= 2\pi r^2 : \pi r\ell$

$= 2\pi r^2 : \sqrt{2}\, \pi r^2$

$= \sqrt{2} : 1$

101. (C) CSA of cylinder $= 2\pi r \times$ height

$4\pi rh = 2\pi r \times$ height

$\therefore$ height $= 2h$ units

102. (A) Inner area + outer area

$= 2\pi r^2 + 2\pi r^2 = 4\pi r^2$

$\therefore$ Area $= 4 \times \frac{22}{7} \times 3.5 \times 3.5 = 154$ cm^2

10 cm^2 $\rightarrow$ 5 rs

154 cm^2 $\rightarrow$?

$\therefore$ Cost of painting

$= \frac{154}{10} \times 5 =$ Rs. 77

103. (D) TSA $= 2\pi rh + 2\pi r^2$

$= 2\pi r(h + r)$

$= 2 \times \frac{22}{7} \times 7(20 + 7)$

$= 2 \times 22 \times 27$

$= 1188$ cm^2

104. (C) Area levelled in one revolution

$=$ CSA $= 2\pi rh$

$= 2 \times \frac{22}{7} \times \frac{84}{2} \times 120$

$= 31680$ cm^2

Area levelled in 500 revolutions

$= 500 \times 31680$

$= 15840000$ cm^2

$= 1584$ m^2

$\therefore$ Cost of levelling

$= 1584 \times 1.5 =$ Rs. 2376

105. (D) Internal surface area

$= 2\pi r^2$

$= 2 \times \frac{22}{7} \times 6 \times 6$

$= 226.08$ cm^2

106. (A) $4\pi r^2 = 616$

$r^2 = 616 \times \frac{1}{4} \times \frac{7}{22} = 49$

$r = 7$ cm

Volume $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$

$= \frac{4312}{3} = 1437\frac{1}{3}$ cm^3

TYPE – VI

1. (A) $2\pi r = 6\pi$

$\Rightarrow r = 3$ cm

Height of cylinder = Diameter of base $= 2 \times 3 = 6$ cm

$\therefore$ Volume $= \pi r^2 h$

$= \pi(3)^2 \times 6$

$= 54\ \pi$ cm^3

2. (A) No.of tins

$= \frac{\pi \times \left(\frac{350}{2}\right)^2 \times 240}{25 \times 22 \times 35}$

$= \frac{22 \times 175 \times 175 \times 240}{7 \times 25 \times 22 \times 35}$

$= 1200$

3. (B) No.of marbles

$= \frac{\pi \times \left(\frac{7}{2}\right)^2 \times 5.6}{\frac{4}{3}\pi\left(\frac{1.4}{2}\right)^3}$

$= \frac{3 \times 49 \times 5.6}{4 \times 4 \times (0.7)^3} = 150$

4. (C) Volume of cylinder will be 3 times of volume of cone if both have same radius & height

$\therefore$ 3 cones are required to store same water

5. (C) No.of cubes

$= \frac{15^3}{3^3} = \left(\frac{15}{3}\right)^3 = 125$

6. (C) GCD of 6, 9, 12 is 3

so side of cube $= 3$cm

$\therefore$ No.of cube

$= \frac{6 \times 9 \times 12}{3 \times 3 \times 3} = 24$

7. (D) No.of soaps

$= \frac{56 \times 35 \times 28}{8 \times 5 \times 4} = 343$

8. (A) $l(b) : l(b - 4) = 120 : 100$

$\frac{b}{b-4} = \frac{6}{5}$

$5b = 6b - 24$

$\Rightarrow b = 24$