Exercise

1. Three equal cubes are placed adjacently in a row. The ratio of total surface area of the new cuboid to that of the sum of the surface areas of the three cubes is

(a) 3 : 1 (b) 6 : 5 (c) 7 : 9 (d) 6 : 7

2. A class room is 7 m long, 6.5 m wide and 4 m high. It has one door 3 m × 1.4 m and three windows each measuring 2 m × 1 m . The interior walls are to be coloured washed. The contractor charges ₹ 5.25 per sq m. The cost of colour washing is

(a) ₹ 519.45 (b) ₹ 159.45 (c) ₹ 513.45 (d) ₹ 419.45

3. The dimensions of a field are 12 m × 10 m. A pit 5 m long, 4 m wide and 2 m deep is dug in one corner of the field and the Earth removed has been evenly spread over the remaining area of the field. The level of the field is raised by

(a) 30 cm (b) 35 cm (c) 38 cm (d) 40 cm

4. A cube of 9 cm edge is immersed completely in a rectangular vessel containing water. If the dimensions of base are 15 cm and 12 cm. Then, the rise in water level in the vessel is

(a) 4.05 cm (b) 4 cm
(c) 3.5 cm (d) 3 cm

5. The curved surface area of a cylinder is 1320 cm^2 and its base has diameter 21 cm, then the height of the cylinder is
(a) 10 cm (b) 20 cm (c) 22 cm (d) 25 cm

6. A cylindrical vessel can hold 154 gm of water. If the radius of its base is 3.5 cm and 1 cm^3 of water weights 1 g. The depth of the water
(a) 2 cm (b) 3 cm (c) 4 cm (d) 5 cm

7. The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3. The diameter of the pillar is
(a) 3 m (b) 6 m (c) 7 m (d) 14 m

8. How many metres of cloth 50 m wide will be required to make a conical tent, the radius of whose base is 7 m and whose height is 24 m?
(a) 9 m (b) 11 m (c) 12 m (d) 13 m

9. The radius and height of a right circular cone are in the ratio of 5 : 12 and its volume is 2512 cm^3. The slant height of the cone is
(a) 24 cm (b) 25 cm (c) 26 cm (d) 27 cm

10. If the height of a cone is doubled, then its volume is increased by
(a) 100% (b) 200% (c) 300% (d) 400%

11. If the surface areas of two spheres are in the ratio of 4 : 25, then the ratio of their volumes is
(a) 2 : 25 (b) 4 : 75
(c) 8 : 125 (d) 16 : 125

12. A cone and a cylinder are of the same height. Their radii of the bases are in ratio of 2 : 1. The ratio of their volumes is
(a) 2 : 1 (b) 3 : 2
(c) 4 : 3 (d) 1 : 3

13. If the height and diameter of a right circular cylinder are 32 cm and 6 cm respectively, then the radius of the sphere whose volume is equal to the volume of the cylinder is
(a) 3 cm (b) 4 cm
(c) 6 cm (d) 8 cm

14. From a solid cube of edge 3 m, a solid of largest sphere is curved out. What is the volume of solid left?
(a) $(27 - 2.25\pi)$ cu m (b) $(27 - 4.5\pi)$ cu m
(c) 2.25π cu m (d) 4.5π cu m

15. Two solid spheres of gold having diameters 3 cm and 4 cm are molten and then cast into one big sphere of gold. If the radius of this sphere is x, then what is the value of x^3?
(a) 125 cu cm (b) 15.625 cu cm
(c) 11.375 cu cm (d) 9.875 cu cm

16. Assertion (A) When eight drops of water combine to form a single drop, the surface area of all the eight drops is greater than the surface area of big drop.

Reason (R) Square of volume of a spherical body is directly proportional to cube of its surface area.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true, but R is not the correct explanation of A
(c) A is true, but R is false
(d) A is false, but R is true

17. Consider the following :

The length of a side of a cube is 1 cm. Which of the following can be the distance between any two vertices?

I. 1 cm II. $\sqrt{2}$ cm III. $\sqrt{3}$ cm

Select the correct answer using the code given below.
(a) Only I (b) Only II
(c) Only III (d) I, II and III

Directions (Q. Nos. 18-19) *The following two questions consists of two statements, one labelled as the 'Assertion (A)' and the other as 'Reason (R)'. You are to examine these two statements carefully and select the answers to these items using the codes given below.*
(a) Both A and R are individually true and R is the correct explanation of A
(b) Both A and R are individually true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

18. Assertion (A) The volume of a cuboid is the product of the lengths of its coterminous edges.

Reason (R) The surface area of a cuboid is twice the sum of the products of lengths of its coterminous edges taken two at a time.

19. Assertion (A) The curved surface area of a right circular cone of base radius r and height h is given by $\pi r(\sqrt{h^2 + r^2})$.

Reason (R) The right circular cone of base radius r and height h when cut opened along the slant height, forms a rectangle of length πr and breadth $\sqrt{h^2 + r^2}$.

20. The total surface area of a cone, whose generator is equal to the radius R of its base, is S. If A is the area of a circle of radius $2R$, then which one of the following is correct?
(a) $A = S$ (b) $A = 2S$
(c) $A = S/2$ (d) $A = 4S$

1. A cylinder having base of circumference 60 cm is rolling without sliding at a rate of 5 rounds per second. How much distance will the cylinder roll in 5 s?
(a) 15 m (b) 1.5 m
(c) 30 m (d) 3 m

2. 27 drops of water form a big drop of water. If the radius of each smaller drop is 0.2 cm, then what is the raidus of the bigger drop?
(a) 0.4 cm (b) 0.6 cm
(c) 0.8 cm (d) 1.0 cm

3. A rectangular tank is 80×40 cm^3. Water flows into it through a pipe 40 cm^2 are the opening at the speed of 10 km/h. The rise in the level of water in the tank in $\frac{1}{2}$ h is
(a) $\frac{3}{2}$ cm
(b) $\frac{4}{3}$ cm
(c) $\frac{5}{8}$ cm
(d) 6 cm

4. A circus tent is made of canvas and is in the form of a right circular cylinder and a right circular cone above it the diameter and height of the cylindrical part of the tent are 126 m and 5 m, respectively. The total height of the tent is 21 m. Then, the cost of the canvas used for tent at the rate of ₹ 12 per m^2
(a) ₹ 14850 (b) ₹ 168200
(c) ₹ 178200 (d) ₹ 112000

5. A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5 cm and its height is 32 cm. The uniform thickness of the cylinder is
(a) 1.5 cm (b) 3 cm (c) 1.2 cm (d) 1 cm

6. Given a solid cylinder of radius 10 cm and length 1000 cm a cylindrical hole is made into it to obtain a cylindrical shell of uniform thickness and having volume equal to one-fourth of the original volume of the original cylinder. The thickness of the cylindrical shell is
(a) $5(\sqrt{5}-2)$ cm (b) $7(2-\sqrt{3})$ cm
(c) 10 cm (d) $5\sqrt{2}$ cm

7. A tent is of the shape of right circular cylinder upto a height of 3 m and then becomes a right circular cone with a maximum height of 13.5 m above the ground. The cost of painting the inner side of the tent at the rate of ₹ 2 per m^2, if the radius of the base is 14 m is
(a) ₹ 2048 (b) ₹ 2068 (c) ₹ 2008 (d) ₹ 2088

28. A measuring jar of internal diameter 10 cm is partially filled with water. Four equal spherical balls of diameter 2 cm each are dropped in it and they sink down in the water completely. The change in the level of water in the jar is
(a) $\frac{16}{65}$ cm (b) $\frac{15}{16}$ cm
(c) $\frac{16}{75}$ cm (d) None of these

29. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}$ of the volume of the given cone, then the height above the base where the section is made, is
(a) 2 cm (b) 6 cm (c) 10 cm (d) 12 cm

30. A container is in the form of a right circular cylinder surmounted by a hemisphere of the same radius 15 cm as the cylinder. If the volume of the container is 32400π cm^3, then the height h of the container satisfies which one of the following?
(a) 135 cm $< h <$ 150 cm (b) 140 cm $< h <$ 147 cm
(c) 145 cm $< h <$ 148 cm (d) 139 cm $< h <$ 145 cm

31. A conical flask of base radius r and height h is full of milk. The milk is now poured into a cylinderical flask of radius $2r$. What is the height to which the milk will rise in the flask?
(a) $\frac{h}{3}$ (b) $\frac{h}{6}$ (c) $\frac{h}{9}$ (d) $\frac{h}{12}$

32. From a wooden cylindrical block, whose diameter is equal to its height, a sphere of maximum possible volume is curved out. What is the ratio of the volume of the utilised wood to that of the wasted wood?
(a) 2 : 1 (b) 1 : 2 (c) 2 : 3 (d) 3 : 2

33. The base diameter of a right circular cylinder is 3 cm. There is a section making an angle of 30° with the cross section. What is its area?
(a) $\frac{9\pi}{4}$ sq cm (b) $\frac{3\sqrt{3}\pi}{2}$ sq cm
(c) $\frac{9\pi}{8}$ sq cm (d) $\frac{9\sqrt{3}\pi}{8}$ sq cm

34. A cone is inscribed in a hemisphere such that their bases are common. If C is the volume of the cone and H that of the hemisphere, then what is the value of $C:H$?
(a) 1 : 2 (b) 2 : 3 (c) 3 : 4 (d) 4 : 5

35. If the diameter of a wire is decreased by 10%, by how much per cent (approximately) will the length be increased to keep the volume constant?
(a) 5% (b) 17% (c) 20% (d) 23%

36. The diameter of a solid metallic right circular cylinder is equal to its height. After cutting out the largest possible solid sphere S from this cylinder, the remaining material is recast to form a solid sphere S_1. What is the ratio of the radius of sphere S to that of sphere S_1?

(a) $1 : 2^{\frac{1}{3}}$ (b) $2^{\frac{1}{3}} : 1$

(c) $2^{\frac{1}{3}} : 3^{\frac{1}{3}}$ (d) $3^{\frac{1}{2}} : 2^{\frac{1}{2}}$

37. A square has its side equal to the radius of a sphere. The square revolves round a side to generate a surface of total area S. If A is the surface area of the sphere, then which one of the following is correct?

(a) $A = 3S$ (b) $A = 2S$

(c) $A = S$ (d) $A < S$

38. A swimming pool is 24 m long and 15 m broad. When x number of men dive into the pool, the height of the water rises by 1 cm. If the average amount of water displaced by one man is 0.1 m^3, then what is the value of x?

(a) 36 (b) 72

(c) 108 (d) 360

39. Water is distributed to a town of 50000 inhabitants from a rectangular reservoir consisting of 3 equal compartments. Each compartment has length and breadth 200 m, 100 m, respectively and 12 m depth of water in the beginning. The allowance is 20 L per head per day. For how many days will the supply of water hold out?

(a) 240 days (b) 720 days (c) 800 days (d) 900 days

40. A right circular cylinder and a right circular cone have equal bases and equal volumes. But the lateral surface area of the right circular cone is 15/8 times the lateral surface area of the right circular cylinder. What is the ratio of radius to height of the cylinder?

(a) 3 : 4 (b) 9 : 4

(c) 15 : 8 (d) 8 : 15

41. The volume of a cuboid whose sides are in the ratio of 1 : 2 : 4 is same as that of a cube. What is the ratio of length of diagonal of cuboid to that of cube?

(a) $\sqrt{125}$ (b) $\sqrt{1.75}$

(c) $\sqrt{2}$ (d) $\sqrt{3.5}$

42. A field is 125 m long and 15 m wide. A tank 10 m × 7.5 m × 6 m was dug in it and the Earth, thus dug out was spread equally on the remaining field. The level of the field thus raised is equal to which one of the following?

(a) 15 cm (b) 20 cm

(c) 25 cm (d) 30 cm

43. If C_1 is a right circular cone with base radius r_1 cm and height h_1 cm and C_2 is a right circular cylinder with base radius r_2 cm and height h_2 cm and if $r_1 : r_2 = 1 : n$ (where n is a positive integer) and their volumes are equal, then which one of the following is correct?

(a) $h_1 = 3nh_2$ (b) $h_1 = 3n^2h_2$

(c) $h_1 = 3h_2$ (d) $h_1 = n^2h_2$

44. A right circular cone is cut by a plane parallel to its base in such a way that the slant heights of the original and the smaller cone thus obtained are in the ratio 2 : 1. If V_1 and V_2 are respectively the volumes of the original cone and of the new cone, then what is $V_1 : V_2$?

(a) 2 : 1 (b) 3 : 1 (c) 4 : 1 (d) 8 : 1

45. The radius and height of a right circular cone are in the ratio 3 : 4 and its volume is 96 π cm^3. What is the lateral surface area?

(a) 24 π cm^2 (b) 36 π cm^2 (c) 48 π cm^2 (d) 60 π cm^2

Previous Years' Questions

46. The diagonals of three faces of a cuboid are 13, $\sqrt{281}$ and 20 linear units. Then, the total surface area of the cuboid is **2015 I**

(a) 650 sq units (b) 658 sq units

(c) 664 sq units (d) 672 sq units

47. A rectangular paper of 44 cm long and 6 cm wide is rolled to form a cylinder of height equal to width of the paper. The radius of the base of the cylinder so rolled is **2015 I**

(a) 3.5 cm (b) 5 cm

(c) 7 cm (d) 14 cm

48. If the height of a right circular cone is increased by 200% and the radius of the base is reduced by 50%, then the volume of the cone **2015 I**

(a) remains unaltered (b) decreases by 25%

(c) increases by 25% (d) increases by 50%

49. If three metallic spheres of radii 6 cm, 8 cm and 10 cm are melted to form a single sphere, then the diameter of the new sphere will be **2015 I**

(a) 12 cm (b) 24 cm (c) 30 cm (d) 36 cm

50. If the radius of a sphere is increased by 10%, then the volume will be increased by **2015 I**

(a) 33.1% (b) 30% (c) 50% (d) 10%

51. The radius of a sphere is equal to the radius of the base of a right circular cone, and the volume of the sphere is double the volume of the cone. The ratio of the height of the cone to the radius of its base is **2015 I**

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

52. A sphere and a cube have same surface area. The ratio of square of their volumes is 2015 I
(a) $6 : \pi$ (b) $5 : \pi$ (c) 3 : 5 (d) 1 : 1

53. The total outer surface area of a right circular cone of height 24 cm with a hemisphere of radius 7 cm upon its base is 2015 I
(a) 327π sq cm (b) 307π sq cm
(c) 293π sq cm (d) 273π sq cm

54. What is the maximum distance between two points of a cube of side 2 cm? 2014 II
(a) $\sqrt{3}$ cm (b) $2\sqrt{3}$ cm (c) $4\sqrt{3}$ cm (d) $2\sqrt{2}$ cm

55. The diameter of a metallic sphere is 6 cm. The sphere is melted and drawn into a wire of uniform circular cross-section. If the length of the wire is 36 m, then what is its radius? 2014 II
(a) 0.1 cm (b) 0.01 cm
(c) 0.001 cm (d) 1.0 cm

56. Consider the following statements in respect of four spheres A, B, C and D having respective radii 6, 8, 10 and 12 cm. 2014 II
I. The surface area of sphere C is equal to the sum of surface areas of spheres A and B.
II. The volume of sphere D is equal to the sum of volumes of spheres A, B and C.
Which of the above statements is/are correct?
(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

57. What is the number of pairs of perpendicular planes in a cuboid? 2014 II
(a) 4 (b) 8
(c) 12 (d) None of these

58. The areas of the three adjacent faces of a cuboidal box are x, $4x$ and $9x$ sq unit. What is the volume of the box? 2014 II
(a) $6x^2$ cu unit (b) $6x^{3/2}$ cu unit
(c) $3x^{3/2}$ cu unit (d) $2x^{3/2}$ cu unit

Directions (Q. Nos. 59-60) *Read the following information carefully and answer the given questions that follow.*

A toy is in the form of a cone mounted on the hemisphere with the same radius. The diameter of the base of the conical portion is 12 cm and its height is 8 cm.

59. What is the total surface area of the toy? 2014 II
(a) 132π cm^2 (b) 112π cm^2
(c) 96π cm^2 (d) 66π cm^2

60. What is the volume of the toy?
(a) 180π cm^3 (b) 240π cm^3
(c) 300π cm^3 (d) 320π cm^3

61. A cylinder circumscribes a sphere. What is the ratio of volume of the sphere to that of the cylinder? 2014 II
(a) 2 : 3 (b) 1 : 2
(c) 3 : 4 (d) 3 : 2

62. If the side of a cube is increased by 100%, then by what percentage is the surface area of the cube increased? 2014 II
(a) 150% (b) 200%
(c) 300% (d) 400%

Directions (Q. Nos. 63-64) *Read the following information carefully and answer the given questions that follow.*

A right angled triangle having hypotenuse 25 cm and legs in the ratio 3 : 4 is made to revolve about its hypotenuse. ($\pi = 3.14$)

63. What is the volume of the double cone so formed? 2014 II
(a) 3124 cm^3 (b) 3424 cm^3
(c) 3768 cm^3 (d) 3924 cm^3

64. What is the surface area of the double cone so formed? 2014 II
(a) 1101.2 cm^2 (b) 1111.4 cm^2
(c) 1310.4 cm^2 (d) 1318.8 cm^2

65. The volume of a hollow cube is $216x^3$. What surface area of the largest sphere which be enclosed in it? 2014 II
(a) $18\pi x^2$ (b) $27\pi x^2$ (c) $36\pi x^2$ (d) $72\pi x^2$

66. What is the diameter of the largest circle lying on the surface of a sphere of surface area 616 sq cm? 2014 II
(a) 14 cm (b) 10.5 cm (c) 7 cm (d) 3.5 cm

67. The dimensions of a field are 15 m by 12 m. A pit 8 m long, 2.5 m wide and 2 m deep is dug in one corner of the field and the earth removed is evenly spread over the remaining area of the field. The level of the field is raised by 2014 II
(a) 15 cm (b) 20 cm (c) 25 cm (d) $\frac{200}{9}$ cm

68. If 64 identical small spheres are made out of big sphere of diameter 8 cm, then what is surface area of each small sphere? 2014 II
(a) π cm^2 (b) 2π cm^2
(c) 4π cm^2 (d) 8π cm^2

69. A cone of radius r cm and height h cm is divided into two parts by drawing a plane through the middle point of its height and parallel to the base. What is the ratio of the volume of the original cone to the volume of the smaller cone?
(a) 4 : 1 (b) 8 : 1 (c) 2 : 1 (d) 6 : 1

70. A cube has each edge 2 cm and a cuboid is 1 cm long, 2 cm wide and 3 cm high. The paint in a certain container is sufficient to paint an area equal to 54 cm^2. **2014 II**

Which one of the following is correct?

(a) Both cube and cuboid can be painted
(b) Only cube can be painted
(c) Only cuboid can be painted
(d) Neither cube nor cuboid can be painted

71. A drainage tile is a cylindrical shell 21 cm long. The inside and outside diameters are 4.5 cm and 5.1 cm, respectively. What is the volume of the clay required for the tile? **2014 II**

(a) 6.96π cm^3 (b) 6.76π cm^3
(c) 5.76π cm^3 (d) None of these

72. The diameter of the base of a cone is 6 cm and its altitude is 4 cm. What is the approximate curved surface area of the cone? **2014 I**

(a) 45 cm^2 (b) 47 cm^2 (c) 49 cm^2 (d) 51 cm^2

73. A cylinder is surmounted by a cone at one end, a hemisphere at the other end. The common radius is 3.5 cm, the height of the cylinder is 6.5 cm and the total height of the structure is 12.8 cm. The volume V of the structure lies between **2014 I**

(a) 370 cm^3 and 380 cm^3 (b) 380 cm^3 and 390 cm^3
(c) 390 cm^3 and 400 cm^3 (d) None of these

74. If x is the curved surface area and y is the volume of a right circular cylinder, then which one of the following is correct? **2014 I**

(a) Only the ratio of the height to radius of the cylinder is independent of x
(b) Only the ratio of height to radius of the cylinder is independent of y
(c) Either (a) or (b)
(d) Neither (a) nor (b)

75. A tent is in the form of a right circular cylinder surmounted by a cone. The diameter of the cylinder is 24 m. The height of the cylindrical portion is 11 m, while the vertex of the cone is 16 m above the ground. What is the area of the curved surface for conical portion? **2013 II**

(a) 3434/9 sq m (b) 3431/8 sq m
(c) 3432/7 sq m (d) 3234/7 sq m

76. What is the whole surface area of a cone of base radius 7 cm and height 24 cm? **2013 II**

(a) 654 sq cm (b) 704 sq cm
(c) 724 sq cm (d) 964 sq cm

77. A conical cap has the base diameter 24 cm and height 16 cm. What is the cost of painting the surface of the cap at the rate of 70 paise per sq cm? **2013 II**

(a) ₹ 520 (b) ₹ 524
(c) ₹ 528 (d) ₹ 532

78. The diameter of the Moon is approximately one-fourth of the diameter of the Earth. What is the ratio (approximate) of their volumes? **2013 II**

(a) 1 : 16 (b) 1 : 64 (c) 1 : 4 (d) 1 : 128

79. The height of a cylinder is 15 cm. The lateral surface area is 660 sq cm. Its volume is **2013 II**

(a) 1155 cu cm (b) 1215 cu cm
(c) 1230 cu cm (d) 2310 cu cm

80. A bucket is of a height 25 cm. Its top and bottom radii are 20 cm and 10 cm, respectively. Its capacity (in L) is **2013 I**

(a) $17.5\pi/3$ (b) 17.5π
(c) 20π (d) 25π

81. The volume of a right circular cone of height 3 cm and slant height 5 cm is **2013 I**

(a) 49.3 cu cm (b) 50.3 cu cm
(c) 52 cu cm (d) 53 cu cm

82. If the heights and the areas of the base of a right circular cone and a pyramid with square base are the same, then they have **2013 I**

(a) same volume and same surface area
(b) same surface area but different volumes
(c) same volume but different surface areas
(d) different volumes and different surface areas

83. From a solid wooden right circular cylinder, a right circular cone whose radius and height are same as the radius and height of the cylinder, respectively is curved out. What is the ratio of the volume of the utilised wood to that of the wasted wood? **2013 I**

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

84. A cylindrical tube open at both ends is made of metal. The internal diameter of the tube is 6 cm and length of the tube is 10 cm. If the thickness of the metal used is 1 cm, then the outer curved surface area of the tube is **2013 I**

(a) 140π sq cm (b) 146.5π sq cm
(c) 70π sq cm (d) None of these

85. The ratio of surface area to diameter of a sphere whose volume is 36π cu cm, is **2013 I**

(a) 3π (b) 6π
(c) 6 (d) None of these

86. The volume of the material of a hemispherical shell with outer and inner radii 9 cm and 7 cm, respectively is approximately **2013 I**

(a) 808 cu cm (b) 800 cu cm
(c) 816 cu cm (d) 824 cu cm

87. What is the quantity of cloth required to roll upto form a right circular tent whose base is of radius 12 m and height 5 cm? **2013 I**

(a) 40π sq m (b) 60π sq m
(c) 78π sq m (d) 156π sq m

88. What is the volume of the largest sphere that can be curved out of a cube of edge 3 cm? **2012 II**
(a) 9π cu cm (b) 6π cu cm
(c) 4.5π cu cm (d) 3π cu cm

89. If the ratio of the diameters of two spheres is 3 : 5, then what is the ratio of their surface areas? **2012 II**
(a) 9 : 25 (b) 9 : 10 (c) 3 : 5 (d) 27 : 125

90. What is the height of a solid cylinder of radius 5 cm and total surface area is 660 sq cm? **2012 II**
(a) 10 cm (b) 12 cm (c) 15 cm (d) 16 cm

91. The diameter of base of a right circular cone is 7 cm and slant height is 10 cm, then what is its lateral surface area? **2012 II**
(a) 110 sq cm (b) 100 sq cm
(c) 70 sq cm (d) 49 sq cm

92. The volume of a cube is numerically equal to sum of its edges. What is the total surface area? **2012 II**
(a) 12 (b) 36 (c) 72 (d) 144

93. A right circular metal cone (solid) is 8 cm high and the radius is 2 cm. It is melted and recast into a sphere. What is the radius of the sphere? **2012 II**
(a) 2 cm (b) 3 cm
(c) 4 cm (d) 5 cm

94. 10 circular plates each of thickness 3 cm, each are placed one above the other and a hemisphere of radius 6 cm is placed on the top just to cover the cylindrical solid. What is the volume of the solid so formed? **2012 II**
(a) 264π cu cm (b) 252π cu cm
(c) 236π cu cm (d) None of these

95. Let the largest possible right circular cone and largest possible sphere be fitted into two cubes of same length. If C and S denote the volume of cone and volume of sphere, respectively. Then, which one of the following is correct? **2012 II**
(a) $C = 2S$ (b) $S = 2C$
(c) $C = S$ (d) $C = 3S$

Directions (Q. Nos. 96-97) *Read the following information carefully and answer the given questions that follow.*

The areas of the ends of a frustum of a pyramid are P and Q, where $P < Q$ and H is its thickness.

96. What is the difference in radii of the ends of the frustum?
(a) $\frac{\sqrt{Q}-\sqrt{P}}{\sqrt{\pi}}$ (b) $\frac{\sqrt{Q}-\sqrt{P}}{\pi}$
(c) $\sqrt{Q}-\sqrt{P}$ (d) None of these

97. What is the volume of the frustum?
(a) $3H(P+Q+\sqrt{PQ})$ (b) $H(P+Q+\sqrt{PQ})$
(c) $H(P+Q+\sqrt{PQ})/3$ (d) $H(P+Q-\sqrt{PQ})/3$

98. If the surface area of a sphere is 616 sq cm, then what is its volume? **2012 I**
(a) 4312/3 cu cm (b) 4102/3 cu cm
(c) 1257 cu cm (d) 1023 cu cm

99. What are the dimensions (length, breadth and height, respectively) of a cuboid with volume 720 cu cm, surface area 484 sq cm and the area of the base 72 sq cm? **2012 I**
(a) 9, 8 and 10 cm (b) 12, 6 and 10 cm
(c) 18, 4 and 10 cm (d) 30, 2 and 12 cm

100. A large solid metallic cylinder whose radius and height are equal to each other is to be melted and 48 identical solid balls are to be recast from the liquid metal, so formed. What is the ratio of the radius of a ball to the radius of the cylinder? **2012 I**
(a) 1 : 16 (b) 1 : 12
(c) 1 : 8 (d) 1 : 4

101. The curved surface area of a right circular cone of radius 14 cm is 440 sq cm. What is the slant height of the cone? **2012 I**
(a) 10 cm (b) 11cm
(c) 12 cm (d) 13 cm

102. If the volume of a cube is 729 cu cm, then what is the length of its diagonal? **2012 I**
(a) $9\sqrt{2}$ cm (b) $9\sqrt{3}$ cm (c) 18 cm (d) $18\sqrt{3}$ cm

103. The total surface area of a cube is 150 sq cm. What is its volume? **2012 I**
(a) 64 cu cm (b) 81 cu cm
(c) 125 cu cm (d) 160 cu cm

104. What is the length of the uniform wire of diameter 0.4 cm that can be drawn from a solid sphere of radius 9 cm? **2012 I**
(a) 243 m (b) 240 m
c) 60.75 m (d) 60 m

105. What will be the cost to plaster the inner surface of a well 14 m deep and 4 m in diameter at the rate of ₹ 25 per sq m? **2012 I**
(a) ₹ 4000 (b) ₹ 4200 (c) ₹ 4400 (d) ₹ 5400

106. What is the number of wax balls, each of radius 1 cm, that can be molded out of a sphere of radius 8 cm? **2011 II**
(a) 256 (b) 512 (c) 768 (d) 1024

107. 10 cylindrical pillars of a building have to be painted. The diameter of each pillar is 70 cm and the height is 4 m. What is the cost of painting at the rate of ₹ 5 per sq m? **2011 II**
(a) ₹ 400 (b) ₹ 440 (c) ₹ 480 (d) ₹ 500

108. The radii of the circular ends of a bucket of height 40 cm are of lengths 35 cm and 14 cm. What is the volume of the bucket? **2011 II**

(a) 60060 cu cm (b) 70040 cu cm
(c) 80080 cu cm (d) 80160 cu cm

109. If S is the total surface area of a cube and V is its volume, then which one of the following is correct? **2011 II**

(a) $V^3 = 216\,S^2$ (b) $S^3 = 216\,V^2$
(c) $S^3 = 6\,V^2$ (d) $S^2 = 36\,V^3$

110. A cylindrical tank 7 m in diameter, contains water to a depth of 4 m. What is the total area of wetted surface? **2011 II**

(a) 110.5 sq m (b) 126.5 sq m
(c) 131.5 sq m (d) 136.5 sq m

111. The radii of two cylinders are in the ratio 2 : 3 and their curved surface areas are in the ratio 5 : 3. What is the ratio of their volumes?

(a) 20 : 27 (b) 10 : 9
(c) 9 : 10 (d) 27 : 20

112. A cylindrical vessel of height 10 cm has base radius 60 cm. If d is the diameter of a spherical vessel of equal volume, then what is? **2011 II**

(a) 30 cm (b) 60 cm
(c) 90 cm (d) 120 cm

113. The surface area of a sphere is 616 sq cm. If its radius is changed so that the area gets reduced by 75%, then the radius becomes **2011 II**

(a) 1.6 cm (b) 2.3 cm (c) 2.5 cm (d) 3.5 cm

114. A hollow sphere of internal and external diameters 4 cm and 8 cm, respectively is melted into a cone of base diameter 8 cm. The height of the cone is **2011 II**

(a) 11 cm (b) 12 cm (c) 14 cm (d) 16 cm

115. If the diameter of a sphere is doubled, how does its surface area change? **2011 II**

(a) It increases two times
(b) It increases three times
(c) It increases four times
(d) It increases eight times

116. A sphere is inscribed in a cubical box such that the sphere is tangent to all six faces of the box. What is the ratio of the volume of the cubical box to the volume of sphere? **2011 II**

(a) 6π (b) 36π (c) $\frac{4\pi}{3}$ (d) $\frac{6}{\pi}$

117. From a solid cylinder of height 4 cm and radius 3 cm, a conical cavity of height 4 cm and of base radius 3 cm is hollowed out. What is the total surface area of the remaining solid? **2011 II**

(a) 15π sq cm (b) 22π sq cm
(c) 33π sq cm (d) 48π sq cm

118. The curved surface of a cylinder is 1000 sq cm. A wire of diameter 5 mm is wound around it, so as to cover it completely. What is the length of the wire used? **2011**

(a) 22 m (b) 20 m
(c) 18 m (d) None of these

119. A cistern 6 m long and 4 m wide contains water to a depth of 1.25 m. What is the area of wetted surface? **2011**

(a) 40 sq m (b) 45 sq m
(c) 49 sq m (d) 73 sq m

120. The outer and inner diameters of a circular pipe are 6 cm and 4 cm, respectively. If its length is 10 cm, then what is the total surface area in sq cm? **2011**

(a) $35\,\pi$ sq cm (b) $110\,\pi$ sq cm
(c) $150\,\pi$ sq cm (d) None of these

121. A toy is in the form of a cone mounted on a hemisphere such that the diameter of the base of the cone is equal to that of the hemisphere. If the diameter of the base of the cone is 6 cm and its height is 4 cm, what is the surface area in sq cm of the toy ? (Take $\pi = 3.14$) **2011**

(a) 93.62 (b) 103.62
(c) 113.62 (d) 115.50

Directions (Q. Nos. 122-124) *Read the following information carefully to answer the questions that follow.*

Let C be a right circular cone. It is given that the two ends of a frustum of C are of radii 3 cm and 6 cm and the height of the frustum is 9 cm.

122. What is the slant height of the given frustum? **2010 II**

(a) $3\sqrt{10}$ cm (b) $6\sqrt{10}$ cm
(c) 12 cm (d) 15 cm

123. What is the height of the cone?

(a) 9 cm (b) 12 cm
(c) 13.5 cm (d) 18 cm

124. What is the total surface area of the given frustum?

(a) $9\pi(2\sqrt{10}+5)$ sq cm (b) $9\pi(3\sqrt{10}+5)$ sq cm
(c) $9\pi(3\sqrt{10}+4)$ sq cm (d) $27\pi(\sqrt{10}+1)$ sq cm

125. A solid cylinder of height 9 m has its curved surface area equal to one-third of the total surface area. What is the radius of the base? **2010 II**

(a) 9 m (b) 18 m (c) 27 m (d) 30 m

126. The volume of a sphere is 8 times that of another sphere. What is the ratio of their surface areas? **2010 II**

(a) 8 : 1 (b) 4 : 1
(c) 2 : 1 (d) 4 : 3

127. In order to fix an electric pole along a roadside, a pit with dimensions 50 cm × 50 cm is dug with the help of a spade. The pit is prepared by removing Earth by 250 strokes of spade. If one stroke of spade removes 500 cm^3 of Earth, then what is the depth of the pit? **2010 II**

(a) 2 m (b) 1 m
(c) 0.75 m (d) 0.5 m

128. A figure is formed by revolving a rectangular sheet of dimensions 7 cm× 4 cm about its length. What is the volume of the figure thus formed? **2010 II**

(a) 352 cu cm (b) 296 cu cm
(c) 176 cu cm (d) 616 cu cm

129. The diagonals of the three faces of a cuboid are x, y, z, respectively. What is the volume of the cuboid? **2010 II**

(a) $\frac{xyz}{2\sqrt{2}}$

(b) $\frac{\sqrt{(y^2+z^2)(z^2+x^2)(x^2+y^2)}}{2\sqrt{2}}$

(c) $\frac{\sqrt{(y^2+z^2-x^2)(z^2+x^2-y^2)(x^2+y^2-z^2)}}{2\sqrt{2}}$

(d) None of the above

130. Half of a large cylindrical tank open at the top is filled with water and identical heavy spherical balls are to be dropped into the tank without spilling water out. If the radius and the height of the tank are equal and each is four times the radius of a ball, what is the maximum number of balls that can be dropped? **2010 II**

(a) 12 (b) 24 (c) 36 (d) 48

131. Smaller lead shots are to be prepared by using the material of a spherical lead shot of radius 1 cm. Same possibilities are listed in the statements given below

I. The material is just sufficient to prepare 8 shots each of radius 0.5 cm.

II. A shot of radius 0.75 cm and a second shot of radius 0.8 cm can be prepared from the available material.

Which of the above statement is/are correct? **2010 II**

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

132. The volume of a cone is equal to that of a sphere. If the diameter of base of cone is equal to the diameter of the sphere, what is the ratio of height of cone to the diameter of the sphere? **2010 II**

(a) 2 : 1 (b) 1 : 2 (c) 3 : 1 (d) 4 : 1

133. The length, breadth and height of a rectangular parallelopiped are in ratio 6 : 3 : 1. If the surface area of a cube is equal to the surface area of this parallelopiped, then what is the ratio of the volume of the cube to the volume of the parallelopiped? **2010 II**

(a) 1 : 1 (b) 5 : 4
(c) 7 : 5 (d) 3 : 2

134. A hemisphere is made of a sheet of a metal 1 cm thick. If the outer radius is 5 cm. What is the weight of the hemisphere (1 cm^3 of the metal weighs 9 g)? **2010 I**

(a) 54 π g (b) 366 π g
c) 122 π g (d) 108 π g

ANSWERS

1. (c)	2. (c)	3. (d)	4. (a)	5. (b)	6. (c)	7. (d)	8. (b)	9. (c)	10. (a)
11. (c)	12. (c)	13. (c)	14. (b)	15. (c)	16. (b)	17. (a)	18. (b)	19. (c)	20. (b)
21. (a)	22. (b)	23. (c)	24. (c)	25. (d)	26. (a)	27. (b)	28. (c)	29. (c)	30. (a)
31. (d)	32. (a)	33. (b)	34. (a)	35. (d)	36. (b)	37. (c)	38. (a)	39. (b)	40. (b)
41. (b)	42. (c)	43. (b)	44. (d)	45. (d)	46. (c)	47. (c)	48. (b)	49. (b)	50. (a)
51. (a)	52. (a)	53. (d)	54. (b)	55. (a)	56. (c)	57. (c)	58. (b)	59. (a)	60. (b)
61. (a)	62. (c)	63. (c)	64. (d)	65. (c)	66. (a)	67. (c)	68. (c)	69. (b)	70. (a)
71. (d)	72. (b)	73. (a)	74. (d)	75. (c)	76. (b)	77. (c)	78. (b)	79. (d)	80. (a)
81. (b)	82. (c)	83. (b)	84. (d)	85. (b)	86. (a)	87. (d)	88. (c)	89. (a)	90. (d)
91. (a)	92. (c)	93. (a)	94. (d)	95. (b)	96. (a)	97. (c)	98. (a)	99. (a)	100. (d)
101. (a)	102. (b)	103. (c)	104. (a)	105. (c)	106. (b)	107. (b)	108. (c)	109. (b)	110. (b)
111. (b)	112. (b)	113. (d)	114. (c)	115. (c)	116. (d)	117. (d)	118. (b)	119. (c)	120. (b)
121. (b)	122. (a)	123. (c)	124. (b)	125. (b)	126. (b)	127. (d)	128. (a)	129. (c)	130. (b)
131. (a)	132. (a)	133. (d)	134. (b)						