MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

SURFACE AREA AND VOLUME OF A SPHERE

Others

1. A solid sphere of radius 3cm is melted and then cast into small sphereical balls each of diameter 0.6 cm. Find the number of balls thus obtained.

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

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3. A measuring jar of internal diameter 10cm is partially filled with water. Four equal spherical balls of diameter 2cm each are dropped in it and they sink down in water completely. What will be the change in the level of water in the jar?

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4. A hemisphere of lead of radius 7 cm is cast into a right circular cone of height 49cm. Find

the radius of the base.

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5. The diameter of the moon is approximately one fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?

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6. A cube of side 4cm contains a sphere touching its side. Find the volume of the gap in between.

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7. A cube of side 4 cm contains a sphere touching its side . Find the gap in between them .

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8. The dome of a building is in the form of a hemisphere. Its radius is 63dm. Find the cost of painting it at the rate of Rs. 2 per sq.m.

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9. Assuming the earth to be a sphere of radius 6370 km, how many square kilometres is area of the land, if three-fourth of the earth's surface is covered by water?

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10. A storage tank consists of a circular cylinder with a hemisphere adjoined on either end. If the external diameter of the cylinder be 1.4m and its length be 8m, find the cost of painting it on the outside at the rate of Rs. 10 per m^2.

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11. The diameter of the moon is approximately one fourth of the diameter of the earth. Find

the ratio of their surface areas.

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12. A hemispherical bowl is made of steel 0.5 cm thick. The inside radius of the bowl is 4cm. find volume of steel

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13. The volume of the two spheres are in the ratio 64:27. Find the difference of their surface

areas, if the sum of their radii is 7.

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14. A cylinder of radius 12cm contains water to a depth of 20cm. A spherical iron ball is dropped into the cylinder and thus the level of water is raised by 6.75 cm. Find the radius of the ball. $\left(use\pi = \frac{22}{7}\right)$

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15. A vessel in the form of a hemisphereical bowl is full of water. The contents are emptied into a cylinder. The internal radii of the bowl and cylinder are respectively 6cm and 4cm. Find the height of water in the cylinder.

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16. A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of Rs. 498.96. If the cost of white-

washing is Rs. 2.00 per square metre, find the inside surface area of the dome and volume of the air inside the dome.

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17. Twenty seven solid iron spheres, each of radius r and surface area S are melted to form a sphere with surface area S'. Find the radius r of the new sphere. ratio of S and S.

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18. A wooden toy is in the form of a cone surmounted on a hemisphere. The diameter of the base of the cone is 5cm and its height is 4cm. Find the cost of painting the toy at the rate of Rs. 5 per $1000cm^2$.

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19. A toy is in the shape of a right circular cylinder with a hemisphere on one end and a cone on the other. The height and radius of the cylindrical part are 13cm and 5cm

respectively. The radii of the hemispherical and conical parts are the same as that of the cylindrical part. Calculate the surface area of the toy if height of the conical part is 12cm.

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20. Three solid spheres of iron whose diameters are 2cm, 12cm and 16cm, respectively, are melted into a single solid sphere. Find the radius of the solid sphere.

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21. How many spherical lead shots each 4.2 cm in diameter can be obtained from a rectangular solid of lead with dimensions 66cm, 42cm, 21cm. $\left(use\pi = \frac{22}{7}\right)$.

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22. A sphere of diameter 6cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12cm. If the sphere is completely submerged in

water, by how much will the level of water rise in the cylindrical vessel?

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23. A solid lead ball of radius 7cm was melted and then drawn into a wire of diameter 0.2cm. Find the length of the wire.

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24. A sphere, a cylinder and a cone are of the same radius and same height. Find the ratio of their curved surface.

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25. Find the surface area and total surface area of a hemisphere of radius 21cm.

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26. Find the surface area of a sphere of radius 7cm.

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27. The internal and external diameters of a hollow hemispherical vessel are 24cm and 25cm respectively. The cost to paint $1cm^2$ the surface is Rs. 0.05. Find the total cost to paint the vessel all over. $\left(use\pi = \frac{22}{7}\right)$

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28. The internal and external diameters of a hollow hemi-sphereical vessel are 24cm and 25cm respectively. The cost of paint one sq. cm of the surface is 7 paise. Find the total cost to paint the vessel all over. (ignore the area of edge).

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29. A right circular cylinder just encloses a sphere of radius r as shown in figure. Find the

: surface area of the sphere curved surface area of the cylinder ratio of the area obtained in (i) and (ii)

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30. Show that the surface area of a sphere is the same as that of the lateral surface of a right circular cylinder that just encloses the sphere.

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31. A cone, a hemisphere and a cylinder stand on equal bases and have the same height. Show that their volumes are in the ratio 1:2:3.

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32. The larges sphere is carved out of a cube of side 10.5 cm. Find the volume of the sphere.

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33. If the radius of a sphere is doubled, what is the ratio of the volume of the first sphere to that of the second sphere?

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34. A spherical ball of lead 3cm in diameter is melted and recast into three spherical balls. If the diameters of two balls be $\frac{3}{2}cm$ and 2cm, find the diameter of the third ball.

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35. Find the surface area of a sphere of radius 7cm.

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36. Find the surface area and total surface area of a hemisphere of radius 21cm.

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37. The radius of a spherical balloon increases from 7cm to 14cm as air is being pumped into it. Find the ratio of surface areas of the original balloon to the resulting new balloon.

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38. A sphere, a cylinder and a cone are of the same radius and same height. Find the ratio of their curved surface.

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39. Show that the surface area of a sphere is the same as that of the lateral surface of a right circular cylinder that just encloses the sphere.

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40. A hemispherical bowl is made of steel, 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl.

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41. The internal and external diameters of a hollow hemispherical vessel are 24cm and 25cm respectively. The cost to paint $1cm^2$ the surface is Rs. 0.05. Find the total cost to paint the vessel all over. $\left(use\pi = \frac{22}{7}\right)$

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42. The internal and external diameters of a hollow hemispherical vessel are 24cm and

25cm respectively. The cost to paint $1cm^2$ the surface is Rs. 0.05. Find the total cost to paint the vessel all over. $\left(use\pi = \frac{22}{7}\right)$

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43. A storage tank consists of a circular cylinder with a hemisphere adjoined on either end. If the external diameter of the cylinder be 1.4m and its length be 8m, find the cost of painting it on the outside at the rate of Rs. 10 per m^2.

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44. A wooden toy is in the form of a cone surmounted on a hemisphere. The diameter of the base of the cone is 5cm and its height is 4cm. Find the cost of painting the toy at the rate of Rs. 5 per $1000cm^2$.

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45. The diameter of a sphere is decreased by 25%. By what per cent does its curved surface

area decrease?

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46. Find the surface area of a sphere of radius:

10.5 cm (ii) 5.6 cm (iii) 14 cm

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47. Find the surface area of a sphere of diameter: (i) 14 cm (ii) 21 cm (iii) 3.5 m

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48. Find the total surface area of a hemisphere of radius 10 cm

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49. The surface area of a sphere is $5544\,cm^2$, find its diameter.

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50. A hemispherical bowl made of brass has inner diameter 10.5cm. Find the cost of tinplating it on the inside at the rate of Rs. 4 per $100\ cm^2$

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51. The dome of a building is in the form of a hemisphere. Its radius is 63dm. Find the cost of painting it at the rate of Rs. 2 per sq.m.

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52. Assuming the earth to be a sphere of radius 6370 km, how many square kilometres is area of the land, if three-fourth of the earths surface is covered by water?

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53. A cylinder of same height and radius is placed on the top of a hemisphere. Find the curved surface area of the shape if the length of the shape by 7cm.

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54. A wooden toy is in the form of a cone surmounted on a hemisphere. The diameter of the base of the cone is 16cm and its height is 15cm. Find the cost of painting the toy at $Rs.7\ per\ 100\ cm^2$.

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55. A storage tank consists of a circular cylinder with a hemisphere adjoined on either end. If the external diameter of the cylinder be 1.4m and its length be 8m, find the cost of painting it on the outside at the rate of Rs. 10 per m^2.

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56. The diameter of the moon is approximately one fourth of the diameter of the earth. Find

the ratio of their surface areas.

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57. Find the volume of a sphere of radius 7cm.

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58. Find the volume of hemisphere of radius 3.5cm.

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59. A hemispherical bowl is made of steel 0.5 cm thick. The inside radius of the bowl is 4cm.

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60. A hemispherical bowl has inner diameter 11.2cm. Find the volume of milk it can hold.

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61. Find the volume of a sphere whose surface area is 154 cm^2

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62. The volume of the two spheres are in the ratio 64:27. Find the difference of their surface areas, if the sum of their radii is7.

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63. Find the volume and the total surface area of a hemisphere of radius 3.5 cm. $\left(Use\ \pi = \frac{22}{7}\right)$

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64. A solid sphere of radius 3cm is melted and then cast into small spherical balls each of diameter 0.6cm. Find the number of balls thus obtained.

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

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66. How many spherical lead shots each 4.2 cm in diameter can be obtained from a rectangular solid of lead with dimensions 66cm, 42cm, 21cm. $\left(use\pi = \frac{22}{7}\right)$.

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67. Three solid spheres of iron whose diameters are 2cm, 12cm and 16cm, respectively, are melted into a single solid sphere. Find the radius of the solid sphere.

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68. A solid lead ball of radius 7cm was melted and then drawn into a wire of diameter 0.2cm. Find the length of the wire.

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69. A solid sphere of radius 1cm is melted to stretch into a wire of length 100 cm. Find the radius of the wire.

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70. A sphere of diameter 6cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is

12cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel?

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71. A hemisphereical bowl of internal diameter 36cm contains a liquid. This liquid is to be filled in cylindrical bottles of radius 3cm and height 6cm. How many bottles are required to empty

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72. The largest sphere is carved out of a cube of a side 7cm. Find the volume of the sphere.

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73. A hemisphere of lead of radius 8cm is cast into a right circular cone of base radius 6cm. Determine the height of the cone, correct to two places of decimal.

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74. A spherical cannonball 28 cm in diameter is melted and cast into a right circular cone mould, whose base is 35 cm in diameter. Find the height of the cone.

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75. A cylindrical container of radius 6 cm and height 15 cm is filled with ice-cream. The whole ice-cream has to be distributed to 10 children in equal cones with hemispherical tops. If the

height of the conical portion is four times the radius of its base, find the radius of the ice-cream cone.

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76. 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.

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77. Twenty seven solid iron spheres, each of radius r and surface area S are melted to form a sphere with surface area S'. Find the (i) radius r' of the new sphere, (ii) ratio of $S\ and\ S'$.

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78. Find the volume of a sphere whose radius is: 2cm (ii) 3.5cm (iii) 10.5 cm

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79. Find the volume of a sphere whose diameter is: 14cm (ii) 3.5 dm (iii) 2.1 m

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80. A hemispherical tank has inner radius of 2.8m. Find its capacity in litres.

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81. A hemispherical bowl is made of steel, 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl.

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82. How many bullets can be made out of a cube of lead whose edge measures 22 cm, each bullet being 2 cm in diameter? (a) 1347 (b) 2541 (c) 2662 (d) 5324

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83. A shopkeeper has one laddoo of radius 5cm. With the same material, how many laddoos of radius 2.5cm can be made.

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84. A spherical ball of lead 3cm in diameter is melted and recast into three spherical balls. If the diameters of two balls be $\frac{3}{2}cm$ and 2cm, find the diameter of the third ball.

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85. A sphere of radius 5cm is immersed in water filled in a cylinder, the level of water rises $\frac{5}{3}cm$. Find the radius of the cylinder.

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86. If the radius of a sphere is doubled, what is the ratio of the volume of the first sphere to that of the second sphere?

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87. A cone and a hemisphere have equal bases and equal volumes. The ratio of their heights is

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88. A vessel in the form of a hemisphereical bowl is full of water. The contents are emptied into a cylinder. The internal radii of the bowl and cylinder are respectively 6cm and 4cm. Find the height of water in the cylinder.

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89. A cylinder whose height is two thirds of its diameter, has the same volume as a sphere of radius 4cm. Calculate the radius of the base of the cylinder.

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90. A vessel in the form of a hemisphereical bowl is full of water. The contents are emptied

into a cylinder. The internal radii of the bowl and cylinder are respectively 6cm and 4cm. Find the height of water in the cylinder.

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91. A cylindrical tub of radius 16cm contains water to a depth of 30cm. A spherical iron ball is dropped into the tub and thus level of water is raised by 9cm. What is the radius of the ball?

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92. A cylinder of radius 12cm contains water to a depth of 20cm. A spherical iron ball is dropped into the cylinder and thus the level of water is raised by 6.75 cm. Find the radius of the ball. $\left(use\pi = \frac{22}{7}\right)$

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93. 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, find its diameter.

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94. A cylindrical jar of radius 6 cm contains oil. Iron spheres each of radius 1.5 cm are immersed in the oil. How many spheres are necessary to raise the level of the oil by two centimetres?

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95. A measuring jar of internal diameter 10cm is partially filled with water. Four equal spherical balls of diameter 2cm each are dropped in it and they sink down in water completely. What will be the change in the level of water in the jar?

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96. The diameter of a sphere is 6cm. It is melted and drawn into a wire of diameter 0.2 cm. Find the length of the wire.

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97. The radius of the internal and external surface of a hollow spherical shell are 3cm and 5cm respectively. If it is melted and recast into a solid cylinder of height $2\frac{2}{3}cm$. Find the diameter of the cylinder.

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98. A hemisphere of lead of radius 7 cm is cast into a right circular cone of height 49cm. Find the radius of the base.

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99. A hollow sphere of internal and external radii 2 cm and 4 cm respectively is melted into a cone of base radius 4 cm. Find the height and slant height of the cone.

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100. A metallic sphere of radius 10.5 cm is melted and recast into small right circular cones, each of base radius 3.5 cm and height 3 cm. The number of cones so formed is (a) 105 (b) 113 (c) 126 (d) 135

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101. A cone and a hemisphere have equal bases and equal volumes. Find the ratio of th

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102. A cone, a hemisphere and a cylinder stand on equal bases and have the same height. Show that their volumes are in the ratio 1:2:3.

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103. A cylindrical tub of radius 12 cm contains water to a depth of 20 cm. A spherical ball is dropped into the tub and the level of the

water is raised by 6.75 cm. Find the radius of the ball.

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104. The larges sphere is carved out of a cube of side 10.5 cm. Find the volume of the sphere.

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105. A sphere, a cylinder and a cone have the same radius and same height. Find the ratio of

their volumes.

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106. The diameter of a sphere is decreased by 25%. By what percent its curved surface area decrease?

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107. A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius is 1 m, then

find the volume of the iron used to make the tank

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108. A capsule of medicine is in the shape of a sphere of diameter 3.5 mm. How much Medicine $(\in mm^3)$ is needed to fill this capsule?

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109. The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?

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110. Find the surface area of a sphere of radius 14cm.

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111. Find the total surface area of a hemisphere of radius 10 cm

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112. Find the radius of a sphere whose surface area is $154\ cm^2$

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113. The hollow sphere, in which the circus motorcyclist performs his stunts, has a diameter of 7 m. Find the area available to the motorcyclist for riding.

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114. Find the volume of a sphere whose surface area is 154 cm^2

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

Let the total number of bullets be x

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116. If a sphere of radius $2r$ has the same volume as that of a cone with circular base of radius r, then find the height of the cone.

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117. A metallic spherical shell of internal and external diameters 4 cm and 8 cm respectively is melted and recast into the form a cone of base diameter 8 cm The height of the cone is

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118. The surface area of a sphere of radius 5 cm is five times the curved surface area of a cone

of radius 4 cm. Find the height and volume (correct to two decimal places) of the cone.

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119. In a sphere is inscribed in a cube, find the ratio of the volume of cube to the volume of the sphere.

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120. In a sphere the number of faces is 1

(b) 2 (c) 3 (d) 4

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121. The total surface area of a hemisphere of radius r is πr^2 (b) $2\pi r^2$ (c) $3\pi r^2$ (d) $4\pi r^2$

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122. The ratio of the total surface area of a sphere and a hemisphere of same radius is

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

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123. A sphere and a cube are of the same height. The ratio of their volumes is 3:4

(b) 21:11 (c) 4:3 (d) 11:21

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124. The largest sphere is cut off from a cube of side 6cm. The volume of the sphere will be $27\pi\ cm^3$ (b) $36\pi\ cm^3$ (c) $108\pi\ cm^3$ (d) $12\pi\ cm^3$

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125. A cylindrical rod whose height is 8 times of its radius is melted and recast into spherical balls of same radius. The number of the balls will be

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126. If the ratio of volumes of two spheres is 1:8, then the ratio of their surface area is 1:2 (b) 1:4 (c) 1:8 (d) 1:16

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127. If the surface area of a sphere is $144\pi\ m^2$, then its volume $\left(\in\ m^3 \right)$ is 288π (b) $316\ \pi$ (c) $300\ \pi$ (d) $188\ \pi$

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128. The ratio between the volume of a sphere and volume of a circumscribing right circular cylinder is 2:1 (b) 1:1 (c) 2:3 (d) 1

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129. The ratio of the volume of a cube so that of a sphere which will fit inside the cube is $4:\pi$ (b) $4:3\pi$ (c) $6:\pi$ (d) $2:\pi$

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130. A sphere is placed inside a right circular cylinder so as to touch the top, base and lateral surface of the cylinder. If the radius of the sphere is r, then the volume of the cylinder is $4\pi r^3$ (b) $\frac{8}{3}\pi r^3$ (c) $2\pi r^3$ (d) $8\pi r^3$

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131. A cone and a hemisphere have equal bases and equal volumes the ratio of their heights is 1:2 (b) 2:1 (c) 4:1 (d) $\sqrt{2} : 1$

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132. A cone, a hemisphere and a cylinder stand on equal bases and have the same height. Show that their volumes are in the ratio 1:2:3.

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