INDIAN SCHOOL AL WADI AL KABIR

Department of Mathematics

Class X Topic-wise Practice for Board Examination

Surface areas and Volumes

08-01-2023

Questions of 1 mark each

Q.1. Two cubes each of edge 12 cm are joined end to end. The surface area of the new cuboid is

A 140 cm^2 B 1440 cm^2 C 144 cm^2 D 72 cm^2

Q.2. If volume and surface area of a solid hemisphere are numerically equal, then the diameter of the hemisphere is

A 9 units B 18 units C 4 units D 6 units

Q.3. The radii of two cylinders are in the ratio 2:3 and their heights are in the ratio 5:3, then the ratio of their volumes is

A 4: 9 B 20: 27 C 25: 9 D 4: 25

Q.4. If a spherical marble of radius 2.1 cm is put into a cylindrical cup full of water of radius 5cm and height 6 cm, then the volume of water that flows out of the cylindrical cup is

A 38.8 cm^3 B 55.4 cm^3 C 19.4 cm^3 D 47.1 cm^3

Q.5. The volume of the largest right circular cone that can be cut out from a cube of edge 4.2 cm is

A 9.7 cm^3 B 77.6 cm^3 C 19.4 cm^3 D 58.2 cm^3

Q.6. If the volume of two spheres are in the ratio 27: 8, then the ratio of their surface areas is

A 4: 9 B 2: 3 C 3: 2 D 9: 4

Q.7. If a solid metallic hemisphere of diameter 21cm is melted and recast into a number of smaller cones, each of diameter 7cm and height 9cm, then the number of cones so formed is

A 14 B 42 C 21 D 28

Q.8. If a solid sphere of radius r is melted and recast into the shape of a solid cone of height r, then the radius of the base of the cone is

A r B 2r C 3r D 4r

Q.9. A mason constructs a wall of dimensions 270 cm x 300 cm x 350 cm with the bricks each of size 22.5 cm x 11.25 cm x 8.75 cm and it is assumed that $\frac{1}{8}$ space is covered with mortar. Then the number of bricks used to construct the wall is

A 11100 B 11300 C 11000 D 11200

Q.10. **DIRECTION:**

In the given question, a Statement of Assertion (A) is followed by a Statement of Reason (R). Choose the correct option.

Statement A (Assertion): Total surface area of the cylinder having radius of the base 14 cm and height 30 cm is 3872 cm^2.

Statement R(Reason): If r be the radius and h be the height of the cylinder, then total surface area is 2πrh + $2\pi r^2$.

(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). (B) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(C) Assertion (A) is true but reason (R) is false.

(D) Assertion (A) is false but reason (R) is true.

Questions of 2 marks each

Q.11. A solid iron is a cuboid of dimensions 30 cm x 30 cm x 42.6 cm. It is melted and cubes each of side 3 cm are moulded from it. Find the number of cubes formed.

Q.12. A cone of height 24cm and radius of base 6cm made up of modelling clay is reshaped in the form of a sphere. Find the radius of the sphere.

Q.13. A tent is in the shape of a cylinder surmounted by a conical top with same radius 2 m. The cylindrical part is 3.5 m high and conical part has slant height 4.2 m. Find the area of canvas used to make the tent. [Use $\pi = \frac{22}{7}$]

Questions of 3 marks each

Q.14. 504 cones, each of diameter 3.5 cm and height 3 cm are melted and recast into a metallic sphere. Find the diameter of the sphere and hence find it surface area [Use $\pi = \frac{22}{7}$]

Q.15. Two spheres of same metal weigh 1 kg and 7 kg. The radius of the smaller sphere is 3 cm. The two spheres are melted to form a single big sphere. Find the diameter of the new sphere.

Q.16. A metallic cylinder has radius 3 cm and height 5 cm. To reduce its weight, a conical hole is drilled in the cylinder. The conical hole has a radius of $\frac{3}{2}$ cm and depth $\frac{8}{9}$ cm. Calculate the ratio of the volume of metal left in the cylinder to the volume of metal taken out in conical shape.

Q.17 The sum of the radius and height of a solid right circular cylinder is 37 cm. If the total surface area of the solid cylinder is 1628 cm^2, find the volume of the cylinder. [Use $\pi = \frac{22}{7}$]

Questions of 5 marks each

Q.18. A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6cm. Find the height of each bottle, if 10% liquid is wasted in this transfer.

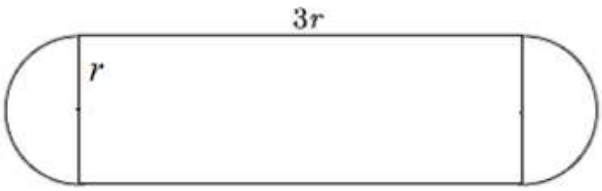
Q.19. A cylindrical tub, whose diameter is 12 cm and height 15 cm is full of ice-cream. The whole ice-cream is to be divided into 10 children in equal ice-cream cones, with conical base surmounted by hemispherical top. If the height of the conical portion is twice the diameter of the base, find the diameter of the conical part of the ice-cream cone.

Q.20. A well of diameter 4 m is dug 21 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 3 m to form an embankment. Find the height of the embankment.

Q.21 Water is flowing at the rate of 15 km/hr through a pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time the level of water in the pond rise by 21 cm?

Case study-based (4 marks)

Q.22. Rajesh has been given the task of designing a boiler for NTPC. Boiler consist of a cylindrical part in the middle and two hemispherical part at its both ends. The cross section of boiler is given below. Length of cylindrical part is the 3 times of radius of hemispherical part.



(i) Find the expression for the total surface area of the boiler? (1m)

(ii) Find the expression for the ratio of volume to the surface area of the boiler? (1m)

(iii) If r = 3 m, what is the volume of boiler? (2m)

ANSWERS							
Q.1	B	**Q.2**	A	**Q.3**	B	**Q.4**	A
Q.5	C	**Q.6**	D	**Q.7**	C	**Q.8**	B
Q.9	D	**Q.10**	A	**Q.11**	1420	**Q.12**	6 cm
Q.13	70.4 m^2	**Q.14**	21 cm, 1386 cm^2	**Q.15**	12 cm	**Q.16**	133: 2
Q.17	4620 cm^3	**Q.18**	5.4 cm	**Q.19**	6 cm	**Q.20**	4 m
Q.21	2 hours	**Q.22.**	(i) 10 πr^2		(ii) $\frac{13\,r}{30}$		(iii) 117 πm^3