Area, Surface Area Volume – Question Set

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1. Area of Plane Figures

Q1 Find the area of a triangle with base 9 cm and height 6 cm.

Q2 Calculate the area of a sector with radius 5 cm and angle 120°.

Q3 A trapezium has parallel sides 7 m and 11 m with height 4 m. Find its area.

Q4 A composite garden bed is an L-shape made from rectangles 8 m × 3 m and 5 m × 2 m. Find the total area.

2. Surface Area

Q5 Find the total surface area of a closed cylinder with radius 4 cm and height 10 cm.

Q6 A square-based pyramid has base edge 6 m and slant height 5 m. Find its surface area.

Q7 Calculate the surface area of a right cone with radius 3 cm and slant height 8 cm.

Q8 A rectangular prism measures 12 cm × 7 cm × 5 cm. Find its surface area.

3. Volumes of Prisms Cylinders

Q9 Find the volume of a rectangular tank 2.5 m × 1.8 m × 1.2 m.

Q10 Calculate the volume of a cylinder with diameter 10 cm and height 15 cm.

Q11 A triangular prism has base area 24 cm^2 and length 11 cm. Find its volume.

Q12 A right prism has pentagonal base area 30 m^2 and height 4 m. Find its volume.

4. Volumes of Pyramids, Cones Spheres

Q13 Find the volume of a cone with radius 6 cm and height 14 cm.

Q14 A square-based pyramid has base edge 8 m and height 9 m. Calculate its volume.

Q15 Determine the volume of a sphere with diameter 18 cm.

Q16 A frustum is formed by cutting the top off a cone (heights 12 cm original, 5 cm removed). The original radius is 9 cm. Find the volume of the frustum.

5. Composite Solids

Q17 A cylindrical water tower (radius 3 m, height 10 m) is topped with a hemisphere of the same radius. Calculate its total volume.

Q18 A solid is made by attaching a cone (radius 4 cm, height 9 cm) to the top of a cylinder (same radius, height 12 cm). (a) Find the total volume. (b) Find the total surface area (closed solid).

6. Application Unit Conversion

Q19 A rainwater tank collects 15 mm of rain over a 40 m^2 roof. How many litres of water enter the tank? (1L=1000cm^3).

Q20 Concrete is poured to form a rectangular slab 4 m $\times$ 2.5 m $\times$ 0.12 m. How many cubic metres of concrete are needed?

Q21 A cylindrical pipe has internal radius 50 mm and length 2 m. What is its internal volume in litres?

Challenge Question

Q1 A grain silo consists of a right-circular cylindrical section *and* a conical roof that share the same base radius.

- Base radius $r = 3.0$ m
- Cylinder height $h_{\text{cyl}} = 8.0$ m
- Cone (roof) vertical height $h_{\text{cone}} = 2.5$ m

a) Calculate the total internal volume of the silo in (i) $m^3$and(ii) litres.

b) Grain has a density of 0.78 t/m^3. Find the mass (in tonnes) of grain when the silo is completely full.

c) If grain is removed at a steady rate of 1.8 t/h, how many hours (to the nearest hour) will it take to empty a completely full silo?