Answer on Question #44663 – Math – Geometry

Question

The silo on a farm is a composite figure. What two shapes make up the silo? Choose an answer from below.

A. Prism and Sphere
B. Prism and Hemisphere
C. Cylinder and Sphere
D. Cylinder and Hemisphere

To the nearest pound, how much grain with the silo hold if the height of the ladder is 40 feet and the radius is 6 feet? (1 cubic foot = 62.43 pounds)

Answer

The correct answer is **D.** Cylinder and Hemisphere.

Given

R = 6 feet – radius of the silo
H = 40 feet – height of the ladder
d = 62.43 pounds/cubic foot – packed density of the grain

Solution

Total volume of the silo is equal to the sum of volumes of its cylindrical part and its hemispherical part:

$$V_{silo} = V_c + V_{hs}$$

Volume of the cylindrical part of the silo:

$$V_c = \pi R^2 H = 3.14 \cdot (6\ feet)^2 \cdot 40\ feet = 4522\ cubic\ feet$$

Volume of the hemispherical part of the silo:

$$V_{hs} = \frac{2}{3}\pi R^3 = \frac{2}{3} 3.14 \cdot (6\ feet)^3 = 452\ cubic\ feet$$

Total volume of the silo:

$$V_{silo} = 4522 + 452 = 4974\ cubic\ feet$$

Mass of the grain hold in the silo:

$$m = V_{silo} \cdot d = 4974\ cubic\ feet \cdot 62.43 \frac{pounds}{cubic\ foot} = 310526.82\ pounds$$

Answer: 310526.82 pounds