

Question # 82372

A core ring with diameter of 4cm and a height of 5cm, the weight of the core ring with the undisturbed soil is 120g. the weight of the core ring with soil after oven drying for 24 hours is 105g. The volume occupied by air (V_a) in the undisturbed soil sample is 16cm³. Taking a particle density of the soil to be 2.65g/cm³, calculate the gravitational volume.

Solution:

In terms of Geotechnical Engineering, there is no term such as gravitational volume [1]. So, probably, here is some typo. This mistake might have occurred in case of the removal of some other information or faulty translation. However, in Geotechnical Engineering there is such term as the specific gravity, which sounds and writes similarly. So, obviously, this term should have been instead of a typo in this question.

To calculate the specific gravity, it is necessary to calculate the unit weight of the soil:

$$V_{ring} = \pi R^2 h = 3.14 * 2^2 * 5 = 62.8 \text{ ml}$$

$$\gamma = \frac{105}{62.8} = 1.672 \text{ g/ml}$$

$$\rho_w = 1.0 \text{ g/ml}$$

$$G_s = \frac{\gamma}{\rho_w} = 1.672$$

Answer:

The specific gravity is equal to 1.672.

Reference:

[1] <https://www.slideshare.net/hronaldo10/class-1-moisture-content-specific-gravity-geotechnical-engineering>

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