Procedure to Calculate Porosity Using a Helium Porosimeter:

To find the porosity you need to calculate two parameters:

1. The bulk volume ($V_b$) [cm$^3$]
2. The volume of grain and non-connected pores ($V_g$) [cm$^3$]
The Bulk Volume ($V_b$):

1. Use the digital caliper (ruler) to measure the length and diameter of the core plugs.

2. The bulk volume is given by the formula:

$$V_b = \pi r^2 \times L = \pi \frac{d^2}{4} \times L$$
The Grain Volume (Vg):

To measure the porosity of a dry core plug we usually use a helium porosimeter (Figure 1).

\[ V_1 = \text{Volume of the core holder with the core plug} \ [\text{cm}^3] \]
\[ V_2 = \text{Volume of the empty core holder} \ [\text{cm}^3] \]

The grain volume is given by formula:
\[ V_k = V_2 - V_1 \ [\text{cm}^3] \]

Can now calculate the pore volume (V_p):
\[ V_p = V_b - V_k \]

From that, it is possible to calculate the porosity:
\[ \varphi = \frac{V_p}{V_b} \times 100 \ [%] \]
4. What is the viscosity of the Gullfaks oil (at ambient conditions) [cP]?

5. What is the oil and gas production capacity for the full field expected to be? Circle one

490 000 bbl/day  560 000 bbl/day  660 000 bbl/day

6. Fill in the blank:
   Johan Sverdrup is the ____ largest oil discovery made on the Norwegian Continental Shelf. Circle one.

   2nd  3rd  5th  7th