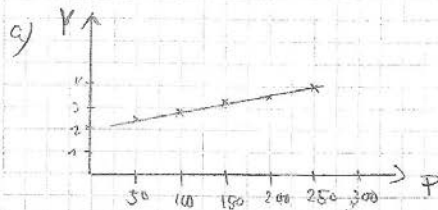


Oppgave 1.

①



$P_b = 253.3 \text{ bar}$

Léneamittel  $\Rightarrow P_b$  bestemt villig.

b)  $P_i = 450 \text{ bar}$

①  $(B_o)_i = 0.9693 \frac{\text{m}^3}{\text{m}^3} \cdot 1.340 \frac{\text{m}^3}{\text{m}^3} = 1.2989 \frac{\text{m}^3}{\text{m}^3}$   
 $\approx 1.30 \frac{\text{m}^3}{\text{m}^3}$

②  $\text{IOIP} = \frac{H_{CPV}}{(B_o)_i} = \frac{2 \times 10^5}{1.30} = 1.5385 \times 10^5 \text{ Sm}^3$

$H_{CPV} = 10^2 \cdot 0.25 (1 - 0.20) = 2 \times 10^5 \text{ m}^3$

c)  $(B_o)_b = 1.340 \frac{\text{m}^3}{\text{m}^3}$

$\text{IGIP} = (G_{OK})_{\text{tot}} \cdot \text{IOIP} = 126.1 \cdot 1.5385 \times 10^5 = 19.419 \times 10^6 \text{ Sm}^3$   
 126.1

$\frac{\text{IOIP}}{V_{STO}} = \frac{H_{CPV}}{(B_o)_i} - \frac{H_{CPV}}{(B_o)_b} = \frac{2 \times 10^5}{1.2989} - \frac{2 \times 10^5}{1.340}$   
 $= (1.5398 - 1.4925) \times 10^5 = 4.722 \times 10^3 \text{ Sm}^3$

$\text{IGIP}$   
 $V_g = (G_{OK})_{\text{tot}} \cdot V_{STO} = 126.1 \cdot 4.722 \times 10^3$

$V_g = 5.954 \times 10^5 \text{ Sm}^3$

d)

$$(\gamma_g)_{av.} = \frac{73.7 \cdot 0.682 + 31.1 \cdot 0.716 + 21.3 \cdot 1.048}{73.7 + 31.1 + 21.3}$$

$$= 0.4507$$

$$M_g = \gamma_g \cdot M_L = 0.4507 \cdot 28.96 = \underline{21.74}$$

e)

$$\rho_{STO} \approx \gamma_{STO} = 0.865 \text{ g/cm}^3$$

$$\text{API} = \frac{-141.5}{0.865} - 131.5 = \underline{32.08}$$

From Vol Cap. 2.:

$$\text{App. viscosity at sep. gas: } (\rho_g^L)_{app} \approx \frac{24.5 \frac{\text{lb}}{\text{ft}^3}}{62.43} = 0.392 \text{ g/cm}^3$$

$$= \underline{392 \text{ kg/m}^3}$$

Basis is 1 sm<sup>3</sup> STO:

$$\Rightarrow V_{STO} = 1 \text{ sm}^3 ; m_{STO} = 865 \text{ kg}$$

$$m_g = \frac{(GOR)_{int}}{V_m} \cdot M_g = \frac{124.1}{23.6447} \cdot 21.74$$

$$m_g = \underline{115.94 \text{ kg}}$$

$$V_g^L = \frac{m_g}{(\rho_g^L)_{app}} = \frac{115.94}{392} = \underline{0.2958 \text{ sm}^3}$$

$$(\rho_o)_{int} = \frac{m}{V} = \frac{m_{STO} + m_g}{V_{STO} + V_g^L}$$

PS!!!

③

$$\begin{aligned}(\rho_o)_{app} &= 757.01 \text{ kg/m}^3 \\ &= 0.75701 \text{ g/cm}^3 \\ &= 47.26 \text{ lb/ft}^3\end{aligned}$$

Vedlegg 3:

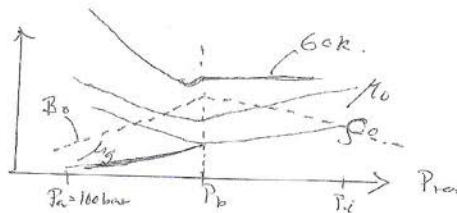
$$P_{sc} \rightarrow 253.3 \text{ bar} = 3723.5 \text{ psi} \quad \Delta\rho = +1.05$$
$$\rho = 47.26 + 1.05 = 48.31 \text{ lb/ft}^3$$

Vedlegg 4:

$$T_{sc} \rightarrow 80^\circ\text{C} = 176^\circ\text{F} \quad \Rightarrow \Delta\rho = -2.95$$
$$\Rightarrow (\rho_o)_b = 48.31 - 2.95 = 45.40 \text{ lb/ft}^3$$
$$(\rho_o)_b = \underline{727.2 \text{ kg/m}^3}$$

Gitt fra tabell:  $732 \text{ kg/m}^3$   
D: det stemmer godt overens.

f)



**PS!! Ved sensurering ble delspørsmål (e) vektet dobbelt sammenlignet med de andre delspørsmålene på grunn av mer arbeid.**