

King Saud University

Petroleum and Natural Gas Engineering

PGE 362: Properties of Reservoir Fluids

Posted: **Sunday, February 21, 2016**

Due: **Sunday, February 28, 2016**

Homework-2

Q1

Calculate the molar volume of an ideal gas at 100 psia and 90° F.

Q2

A pure gaseous hydrocarbon has a density of 0.103 lb/cu ft at 14.7 psia and 100°F. Chemical analysis shows that there are two hydrogen atoms for each carbon atom in each molecule. What is the formula of this molecule? Assume that the hydrocarbon acts like an ideal gas.

Q3

A piece of sandstone with a bulk volume of 1.3 cc is contained in a 5-cc cell filled with helium at 760 mm Hg. Temperature is maintained constant and the cell is opened to another evacuated cell the same volume. The final pressure in the two vessels is 334.7 mm Hg. What is the porosity of the sandstone?

Q4

A cylinder has a volume of 0.5 cu ft and contains a gas at a pressure of 2000 psia and 120°F. The pressure drops to 1000 psia after 0.0923 lb moles of gas are removed. The temperature is constant. The z-factor was 0.90 at 2000 psia. What is the z-factor at 1000 psia?

Q5

The reservoir gas in a wet gas reservoir has a specific gravity of 1.295, a hydrogen sulfide concentration of 20.9 mole percent, and a carbon dioxide concentration of 44.7 mole percent. Determine a value of z-factor for use at reservoir conditions of 5720 psig and 268°F.

Q6

A wet gas has composition as given below. Determine a value of z-factor for this gas at reservoir conditions of 5720 psig and 268°F.

Component	Composition, mole percent
Hydrogen sulfide	20.90
Carbon dioxide	44.69
Nitrogen	1.22
Methane	21.80
Ethane	3.68
Propane	2.05
i- Butane	0.58
n-Butane	1.09
i- Pentane	0.46
n-Pentane	0.56
Hexanes	0.72
Heptanes plus	2.25
	100.00
Properties of heptanes plus	
Specific gravity	0.844
Molecular weight	115 lb/lb mole

Compare your answer with the laboratory measured z-factor of 0.914 at 5720 psig and 268°F for this gas.