جـــامعة مصـــراتة
خريف 2014-2015
الامتحان النهائي لمقرر/ مبادئ هندسة النفط هـ.ن 210
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كلية الهندسة
قسم هندسة النفط
الزمن : ساعتان ونصف
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ملاحظات: الرجاء تسليم ورقة الامتحان مع كراسة الاجابة

Question 1: *(15 points).*

Define the following terms

1. Petroleum	2. Surface tension	3. Primary Porosity	4. Stuck pipe
5. Interfacial Tension	6. Capillary pressure	7. Permeability	8. Wettability
9. Effective Porosity	10. Traps	11. Flowing Well	12. Reservoir Rock
13. Drilling Contractor (Example)	14. Source Rock	15. P Operating Company (Example)	

Question 2: *(15 Points).*

A. What is the pressure in (psi) and temperature in (F°) at a depth of 13000 ft with a mud weight of 14 lb/gal and a surface temperature =20 C° and a temperature gradient = 0.01 F°/ft?

B. What is the permeability in *Darcy* for a **cylindrical** core sample if length L = *10 cm;* viscosity of fluid μ = *1 cp;* core sample radius r = *2 cm;* flow rate Q = *30* cm^3/min; and pressure drop ΔP = *3.40 atm.*

C. What is the porosity of a rock sample with Bulk volume = *9.9* cm^3; Weight of dry sample in air = *20 gr;* Sand grain density = *2.67* gr/cm^3. Grain volume = 7.5 cm^3.

D. How much oil exists in the field if Area of field = *640 acres;* Average sand thickness = *20 ft;* $\emptyset$ = *20 %;* S_w = *30 %,* Bo = *1.20.*

E. What is the height of a gas in a tube if the gas specific gravity = 0.65, average compressibility factor z =0.8, average temperature = 600 R°, pressure at surface is 14.7 psi and at the bottom of the tube is 15 psi?

F. What is the overburden pressure for a formation at a 10,000 ft depth, fluid density =.9 lb./gal, rock matrix density = 23.1 lb./gal and rock porosity = 17%.

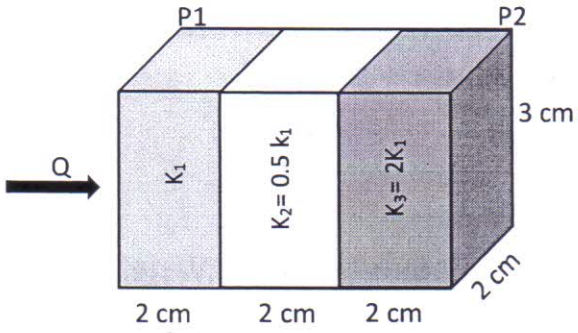
G. Water and oil co-exist in a rock pore; oil droplet pressure = 12 psi and makes 180° angle with the rock surface, while water droplet pressure = 15 psi and makes 30° angle, what is the capillary pressure inside the pore?

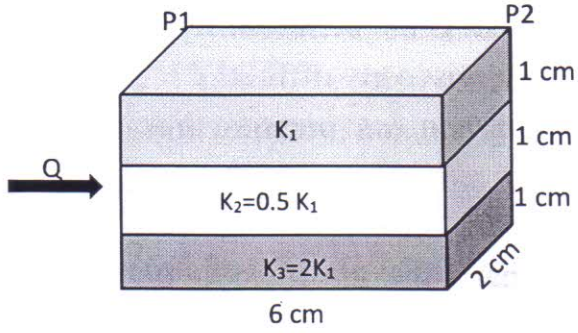
Question 3: *(15 Points).*

A. List the different artificial lift types currently used in the oil and gas Industry.
B. List the most currently used geophysical exploration methods.
C. List the Oil Rig types, Give one examples for each type.
D. List general rock types with one example for each type.
E. List the four recovery stages of an oil/gas reservoirs.

Question 4: *(15 Points).*

An incompressible fluid with a viscosity of (μ = 1 cp) is flowing in a laminar flow pattern at a rate of (Q=10 cm^3/sec) through the rock arrangements shown below, if the pressure drop ($\Delta P = P_1 - P_2$) across both rocks is 5 atm, calculate K_1, K_2 and K_3 in Darcy in both rocks.





Bonus Question: *(5 points).*

A. What is the current average price of crude oil?
B. What is the current average price of natural gas?
C. Which country consumes the highest share of the global oil production?
D. Which country has the largest proven oil reserves?
E. Which country has the highest proven gas reserves?

End of Questions *Good Luck*