فصل الربيع 2016/2015	كلية الهندسة – جامعة مصراتة	القســـم/ الهندسة النفطية
الامتحان النهائي لمقرر / خواص صخور المكمن (هـ ن 321)		الزمـن / 2.5 ساعات
التاريخ / 22 / 05 /2016 م		أستاذ المادة / أ. ماجد النفيص
أسم الطالب:	رقم الطالب:	

Question 1: **(15 points)**

A 2-mile wide reservoir consists of several layers as shown below. An incompressible liquid with 1.5 cp viscosity flows through the reservoir at steady-state. Compute the flow rate (bbl/day) of the liquid through the layer with k = 200 md.

P = 750 Psia

k = 140 md	k = 250 md	h = 50 ft
	k = 120 md	h = 30 ft
	k = 200 md	h = 60 ft
	k = 70 md	h = 10 ft

P = 2300 Psia

L = 2.4 miles L = 3.6 miles

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Question 2: **(15 points)**

The table below gives the flow rate and saturation data for a steady-state test to estimate effective permeability. The pressure drop across the core sample was constant throughout the test.

S_w (%)	q_o (cc/min)	q_w (cc/min)
100	0.000	11.425
79.5	0.000	7.890
73.9	0.023	5.050
70.0	0.089	3.560
60.0	0.573	1.170
50.1	1.680	0.207
40.2	3.570	0.004
36.3	4.570	0.000

μ_o = 2.5 cP

μ_w = 1.0 cP

a. Estimate S_{wi} and S_{or} .

b. Compute and plot the relative permeability curves for this core. The absolute permeability is k_o @ S_{wi} Note: you don't need to compute k_o and k_w individually

c. What is the water and oil saturations and relative oil permeability at with the relative permeabilities of oil and water are equal.

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Question 3: **(8 points)**

A core, 2.54 cm long and 2.54 cm in diameter has a porosity of 22%. It is saturated with oil and water, where the oil content is 1.5cm3.

a) What is the pore volume of the core?

b) What are the oil and water saturations of the core?

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Question 4: **(12 points)**

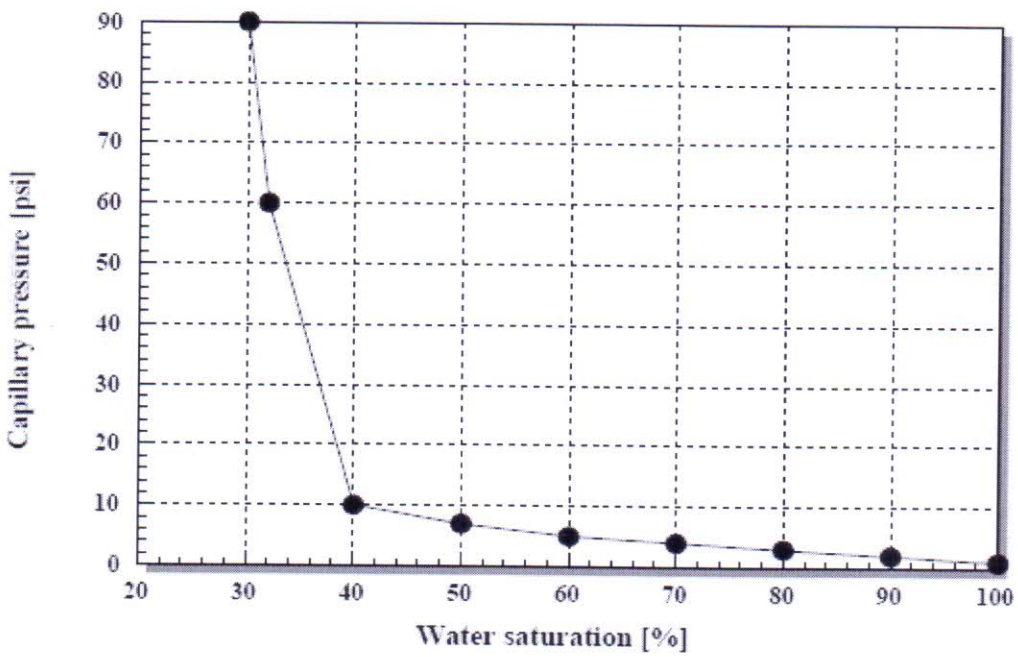
Use the air - water capillary pressure curve for laboratory conditions, below, to calculate the saturations; S_o and S_w at the reservoir level (height) 120 ft above the oil-water contact (assume $P_c = 0$ at this level).

Laboratory: $\sigma_{w/air} \text{Cos}\, \Theta_{wa} = 72$ dyn/cm

Reservoir: $\sigma_{w/o} \text{Cos}\, \Theta_{wo} = 25$ dyn/cm

$\rho_o = 53$ lb/ ft^3

$\rho_w = 68$ lb/ ft^3



Good Luck