

الأسئلة: صفحاتتان

أجب عن جميع الأسئلة الآتية

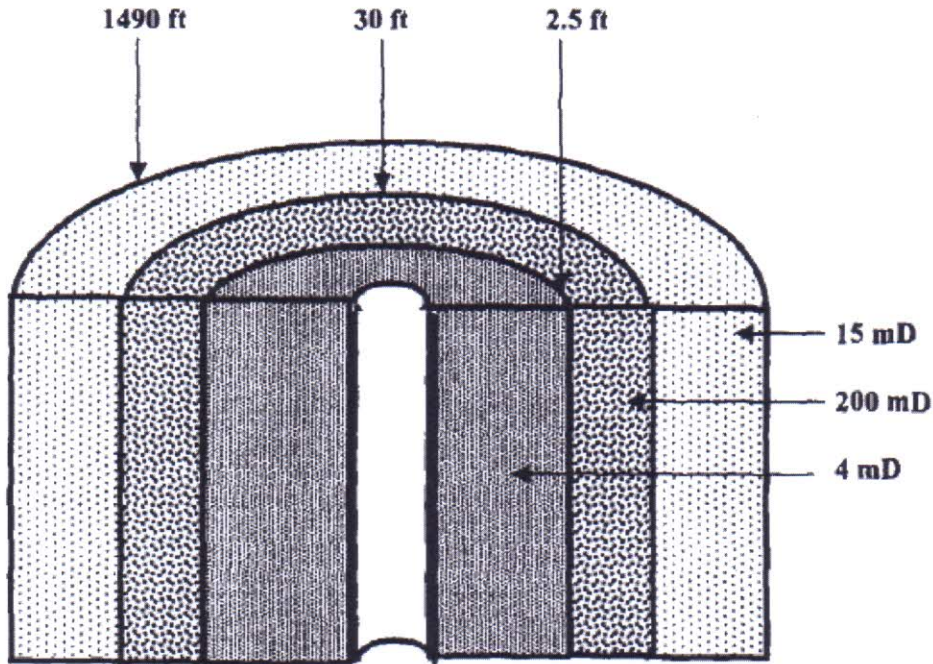
كل سؤال 12 درجة.

ملاحظة: تسلم الأسئلة مع كراسة الإجابة

Q1) a) A clean and dry core sample weighing 425 gm was 100% saturated with a 1.07 specific gravity ( $\gamma$ ) brine water. The new weight is 453 gm. The core sample is 12 cm long and 4 cm in diameter. Calculate the porosity of the rock sample.

b) The fluids in a straight tube have an interfacial tension equal to 32 dyn/cm and exhibit a contact angle of  $80^\circ$  and capillary pressure of 55000 dyn/cm<sup>2</sup>. What is the radius of the tube?

Q2) a) The permeability of a 160-acre light-gas formation drained by a single well is 15 mD. The well was heavily acidized to a permeability of 25 mD and a radius of 30 ft, and then completed. During well completion, a 2-ft thick damaged zone developed in the vicinity of the wellbore. The wellbore radius is 0.50ft. Calculate the average permeability of this drainage area.



b) Compute the ideal mobility for flow rate 183 BLL/Day , of the following well for radial well:

Spacing = 1 well per 40 acres

Sand thickness = 10ft

Static reservoir pressure ,  $P_e = 2000$ psi

Bottom hole production pressure ,  $P_w = 1500$  psi

Well radius = 4 in

Q3) a) The following permeability data were measured on sandstone:

$S_w$ %	0	10	20	30	40	50	60	70	80	90	100
$K_{ro}$	1	1	1	0.94	0.8	0.44	0.16	0.45	0	0	0
$K_{rw}$	0	0	0	0	0.04	0.11	0.30	0.36	0.44	0.68	1.0

Plot a curve relative permeability

- 1) Initial Water Saturation.
- 2) Residual Oil Saturation.
- 3) Connect Water and Oil Saturation.
- 4) IF Absolute Permeability 222 Md at  $S_o = 40\%$  Calculate  $K_o$ .
- 5) Calculate the Mobility Ratio at relative permeability to oil equal the relative permeability to water  $\mu_w = 1cp$ ,  $\mu_o = 3cp$ ,  $k_{absolute} = 200$  Md

b) A hydrocarbon reservoir is characterized by five distinct formation segments that are connected in series. Each segment has the same formation thickness. The length and permeability of each section of the five bed reservoir are given below:

Calculate the average permeability of the reservoir by assuming:

Length, ft	Permeability, md
150	80
200	50
300	30
500	20
200	10

i. Linear flow system

ii) Radial flow system

Q4) a) From the following data :

Capillary rise = 1800 cm

$\rho_{water} = 1.0$  gm/cc

$\rho_{oil} = 0.82$  gm/cc

Calculate: 1) Capillary pressure.

2) For complete wettability compute capillary radius if oil water surface tension is 30 dynes/cm?

b) Water-saturated sample immersed in water

A = Weight of the fluid extracted from the sample = 2.5 gm

A' = Weight saturated sample in air = 22.5 gm

B = weight saturated sample in water at 40°F = 12.5 gm

water = 1 gm/cc

- Calculate:
- 1) Bulk Volume of Rock.
  - 2) Pore Volume.
  - 3) Effective Porosity.

Q5) a) A cylindrical core sample of a well consolidated sand is completely saturated with a synthetic brine of 50,000 ppm salinity. At 200°F the resistance of the core is 1000 ohms. The core is 3 1/2 in. in diameter and the formation factor 20.

- i) Calculate the resistivity rock at 100% saturated with salt water.
- ii) Compute its porosity by both the Archie and Humble equation.

b) Given the following core data,

1- calculate the geometric average permeability:

Sample	$h_i$ , ft	$K_i$ , md
1	2.0	80
2	1.5	70
3	1.0	15
4	1.0	50
5	1.5	35

2- If the thicknesses ( $h_i$ ) of all core samples are the same calculate the average permeability.

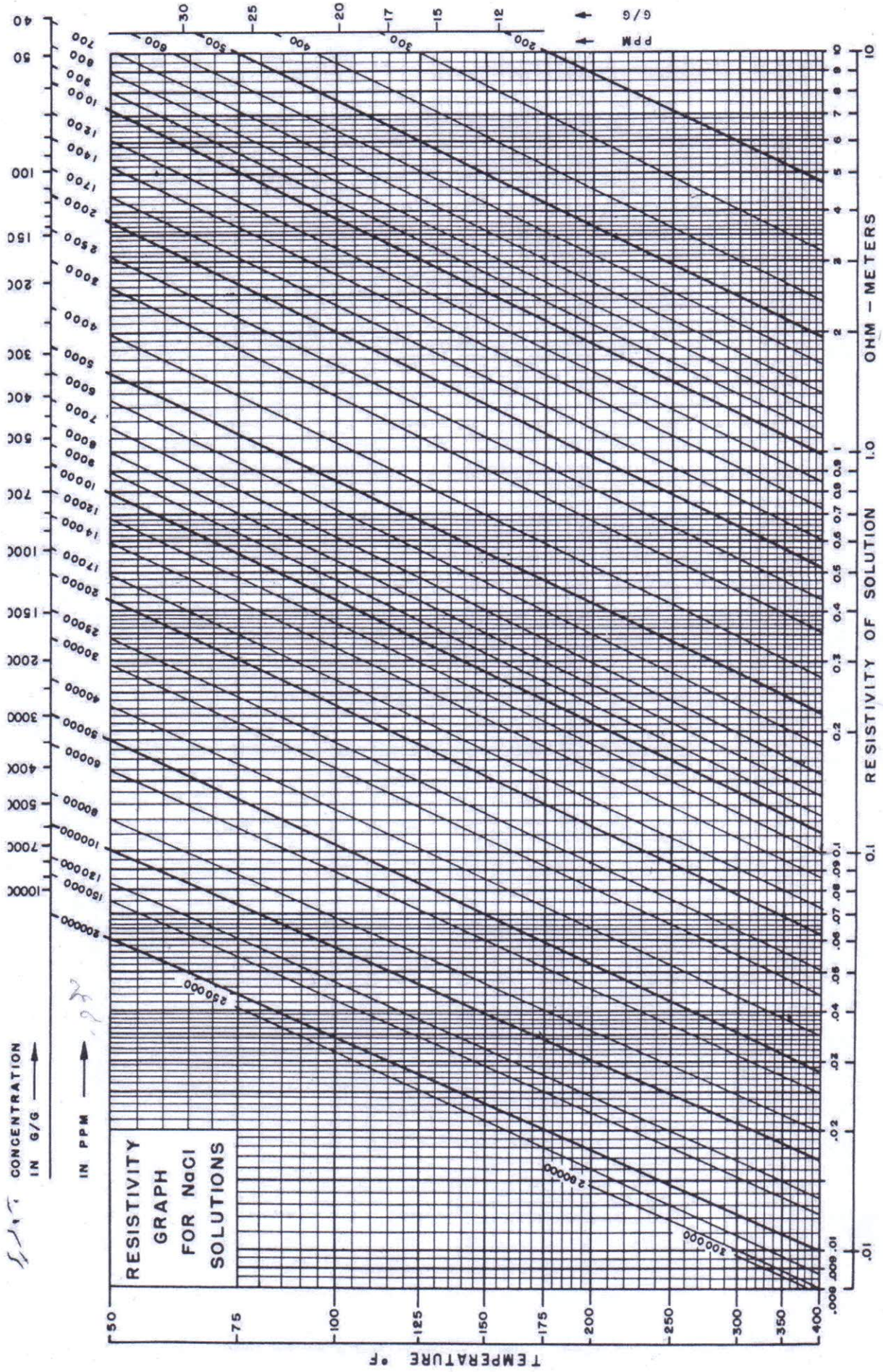


Fig. 11.3. Resistivity of water as a function of salinity and temperature. Salinities are in terms of  $\text{NaCl}$  concentration. Courtesy Schlumberger Well Surveying Corporation.