

Misurata University
Faculty of Engineering
Petroleum Engineering Department

Final Examination of Enhanced Oil Recovery Course.

2013-2014

Date: 30/01/2014. Time: (3) hrs.

Total Marks (60).

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Answer all questions:

Question No.1

I- Show oil and gas reserves classifications & E.OR target, and what are the basic methods of enhanced oil recovery? (5marks)

II-Define producing reserves by energy source criteria, and explain the of a reservoir's life cycle? (5marks)

Question No.2

A field is expected to produce (G) = 817 BSCF, and the cumulative production (Gp), had been 659 BSCF. The initial rate is estimated to be 80 MMSCFD and the economic rate = 20 MMSCFD. Determine the life of the field and calculate the annual production. (10 marks).

Question No.3

I- Why the water flooding called secondary recovery method, and the secondary recovery methods are not enough to recover hydrocarbon remaining in the reservoir? (4 Marks)

III- Write all the steps to estimate the daily injection rate for pressure maintenance , and estimate the average daily injection rate of (2) injection wells as following data:-

Sector NO.	Oil (STBOPD)	GAS ,MMSCFD	Water ,STBOPD	Inj. Water, BBLs/D
1	9540	10972	5824	18610
2	7844	9116	9289	16788

Oil FVF = 1.58 RB/ST, reservoir pressure = 2000 psia, reservoir temperature = 130 °F.Z = 0.828, B_w= 1.00 RB/STB, & RS = 897 SCF/STB. (6 marks)

Question No.4

I- How can be monitoring performance of the water injection? (3 marks)

II- What are the tertiary recovery methods? (2 marks)

III-The following data are available to calculate the water injection rate:- $h=300$ m, $K=100$ md, $\Delta P= 750$ psig, $r_w= 6$ inch, $\mu_o= 5$ cp. Calculate the daily injection rate (BBL/Day) for :1- For direct line drive pattern , spacing area of one well = 10 acres, the inter well distance = constant $d/a = 1$, 2-For five spot, spacing area = 40 acres,3-For seven spot, spacing area = 10 acres, 4-For nine spot, spacing area = 20 acres, where the corner well are produced at 1.5 time the producing rate of the side wall. (5marks)

Question No.5

I-Explain all the steps to design of CO₂ flood project, and what are the properties of heavy oil crude? (4 marks)

II- List and describe all the types of the thermal recovery methods? (6marks)

Question No.6

I-Explain the options of solutions to improve well productivity of gas condensate reservoirs? (2marks)

II- Why the volume of oil left behind following primary or secondary recovery is rather large in offshore reservoirs? (3 marks)

III-A condensate gas reservoir is producing 300 STB/MMSCF of condensate at an API gravity of 50, the separator gas gravity is 0.65. Calculate the two -phase z factor, if the current reservoir pressure is 3000 psia and the temperature is 200 °F. (5 marks)

Good Luck To All