



ROLL NO:

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Weightage: 20 %

Max Marks: 20

Max Time: 1 hr.

Saturday, 22nd September, 2018

TEST – 1

Odd Semester 2018-19

Course: **PET 209 Reservoir Engineering - I**

V Sem. Petroleum

Instruction:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

Part A

(3 Q x 2 M = 6 Marks)

1. What information of rock can be obtained by RCAL and SCAL?
2. Define absolute porosity and write its equation in terms of interconnected, dead-end and isolated pores.
3. Write Darcy's equation for inclined or a dipping flow system with its notations.

Part B

(2 Q x 4 M = 8 Marks)

4. Define the following
 - a. Critical Point
 - b. Cricondentherm
 - c. Cricondenbar
 - d. Shrinkage
5. Write a short notes on black oil and draw P-T diagram of it.

Part C

(1 Q x 6 M = 6 Marks)

6. A 10 cP viscosity oil is being produced from a 150 acre drainage area where the pressure at drainage radius is 1800 psi. The radius of the wellbore is 11.43 cm, the thickness of the pay zone is 6.096 m, and the bottom hole flowing pressure is 1250 psi. The formation permeability is 100 mD. Calculate oil flow rate for a positive skin effect of 5, assuming steady state radial flow. (1 acre = 43560 ft²)



**PRESIDENCY UNIVERSITY,
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TEST 2

Odd Semester: 2018-19

Course Code: PET 209

Course Name: Reservoir Engineering - I

Branch & Sem: PET & V Sem

Date: 24 November 2018

Time: 1 Hour

Max Marks: 20

Weightage: 20%

Instructions:

- (i) Read *the* question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **two** marks. (3x2=6)

1. Define sampling and where it can be done.
2. Describe gas formation volume factor and express its equation in terms of barrels
3. State Coefficient of isothermal compressibility and List out the three groups into which reservoir fluids are classified based on isothermal compressibility.

Part B

Answer **all** the Questions. **Each** question carries **four** marks. (2x4=8)

4. Discuss the usual experiments and calculations done in the complete PVT analysis for oil.
5. Using the Meyer and Garder relationships, calculate the critical oil flow rate for the following data.

A vertical well is drilled in an oil reservoir overlaid by a gas cap. The related well and reservoir data are given below:

Absolute permeability, i.e., $k_h, k_v = 110$ md

Oil relative permeability, $k_{ro} = 0.85$

Oil density, $\rho_o = 47.5$ lb/ft³

Gas density, $\rho_g = 5.1$ lb/ft³

Oil viscosity, $\mu_o = 0.73$ cp

Oil formation volume factor, $B_o = 1.1$ bbl/STB

Oil column thickness, $h = 40$ ft

Perforated interval, $h_p = 15$ ft

Depth from GOC to top of perforations, $D_t = 25$ ft

Wellbore radius, $r_w = 0.25$ ft

Drainage radius, $r_e = 660$ ft

Part C

Answer the Question. Question carries **six** marks.

(1x6=6)

6. Describe any three regular injection patterns. Sketch those three regular injection patterns and also their invert patterns with notations.

8. Compute initial oil in place and magnitude of each of the driving mechanisms and their contribution for the combination drive reservoir.

Reservoir Data:

The current reservoir pressure 2000 psi.

Volume of the bulk oil zone = 200000 ac-ft

Volume of bulk gas zone = 40000 ac-ft

PVT Data

PROPERTY	INITIAL RESERVOIR CONDITION	CURRENT RESERVOIR CONDITION
p, psi	2500	2000
Bo, bbl/STB	1.25	1.22
Rs, scf/STB	650	550
Np, MMSTB	0	5
Gp, MMMscf	0	5.5
Bw, bbl/STB	1	1
We, MMbbl	0	3.6
Wp, MMbbl	0	0.6
Bg, bbl/scf	0.0012	0.0016
cf, cw	0	0