Exam Date & Time: 13-Jul-2022 (09:00 AM - 12:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

VI Semester End Semester Examination (Makeup) July 2022 OGRE (CHE 4052)

OIL AND GAS RESERVOIR ENGINEERING [CHE 4052]

Marks: 50

Duration: 180 mins.

Descriptive Questions Section Duration: 180 mins Answer all the questions. 1) Explain the following reservoir drive mechanism along with neat sketch (a) water drive (b) Gas-expansion (4)A) B) How do you calculate the stock tank oil initially in place (STOIIP)? Write used notations clearly (3) C) How do you determine the PVT parameters in the laboratory? (3) 2) Derive radial flow basic equation of a single phase, compressible fluid through porous and permeable rock. Write the used notations clearly

A)

(5) $\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial p}{\partial r}\rho\right) = \frac{\varphi\mu c_t}{k}\rho\frac{\partial p}{\partial t}$

B) Derive

(3)

$$\rho_{sc} = 0.0763 \gamma_g$$

and

$$E = 35.37 \frac{P}{ZT}$$

Note: Working of the problem to be clearly shown

$$q = \frac{kh(\overline{p} - p_{wf})}{141.2 \times 10^{3} \overline{B}_{g} \overline{\mu} \left[\ln \left(\frac{0.472r_{e}}{r_{w}} \right) + s + Dq \right]}$$
⁽⁴⁾

- B) Calculate the pressure gradient of a gas in psi/ft at 4200 psia and 100° F (Z = 0.912, $\gamma_g = .885$). (2)
- C) Define following (a) Reservoir (b) Klinkenberg effect (c) Gas-Oil Ratio (GOR) (d) Darcy's Law (4)

4) List out well-stimulation methods and discuss any two methods in detail.

(4)

A)

	B)	Discuss the significance of apparent gas in place, Ga.	(3)
	C)	A pressure test was conducted at a depth of 9400 ft in a well, the measured pressure is 4150 psia and the calculated water gradient is 0.43 psi/ft. The Gas Water Contact (GWC) exists at 9000 ft and gas gradient is 0.09 psi/ft. Determine water and gas pressure line equations.	(3)
5)		List the differences between pressure build-up and pressure drawdown testing.	(2)
	A)		
	B)	Draw and explain the pressure versus radius (radial flow) profiles for following cases (a) Semi-steady/pseudo steady state (b) Steady state along with respective boundary conditions.	(4)
	C)	Explain the types of reservoir fluids based on PT plots.	(4)

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