Reg. No.

## MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

## VI SEMESTER B.TECH. END SEMESTER MAKE-UP EXAMINATIONS JUN 2018

SUBJECT: OIL & GAS RESERVOIR ENGINEERING [CHE 4002] REVISED CREDIT SYSTEM

## (20/06/2018)

Time: 3 Hours

(20/06/2018)

MAX. MARKS: 50

	Instructions to Candidates: ☑ Answer ALL the questions. ☑ Assume any missing data suitably.									
1A.	How to you calculate the stock tank oil initially in place (STOIIP).									4
1B.	Describe the ways to determine the Z as a function of pressure.									6
2A.	i) Calculate the density of the gas at standard conditions whose composition is listed below:									
	Component	Methane	Ethane	Propane	Butane	Pentane	Hexane	CO <sub>2</sub>	Nitrogen	
	mole fraction	0.847	0.0586	0.022	0.0093	0.0052	0.0104	0.013	0.0345	
	ii) For the above gas what is the pressure gradient in the reservoir at 2000 psia and $180^{\circ}$ F (Z =									
	.865)									
2B.	Derive the material balance equation for volumetric depletion gas reservoirs which includes the									
	effects of connate water expansion and pore volume reduction.									
3A.	The oil and gas rates, measured at a particular time during the producing life of a reservoir are x									
	stb oil/day and y scf gas/day.									
	i) What is the corresponding underground withdrawal rate in reservoir barrels/day?									
	ii) If the average reservoir pressure at the time the above measurements are made is 2400 psia,									
	calculate the daily underground withdrawal corresponding to an oil production of 2500 stb/day									
	and a gas rate of 2.125 MMscf/day. Field PVT parameters are given below.									
		F	Pressure, p	sia B <sub>o</sub> , rb,	/stb R <sub>s</sub> , s	scf/stb B	<sub>g</sub> , rb/scf			
		2	2400	1.182	2 352	.0	0119			
	iii) If the density of the oil at standard conditions is 52.8 lb/cu.ft and the gas gravity is 0.67 (air =									
	1), calculate the oil pressure gradient in the reservoir at 2400 psia.									
3B.	Explain the surface recombination sampling.									2
4.	Derive the Schilthuis material balance equation for a hydrocarbon reservoir which includes the									
	effects of all reservoir drive mechanisms.									10
5A.	How do you determine the PVT parameters in laboratory and convert these to field parameters.									5
5B.	Derive the expression for productivity index of a reservoir in Darcy units for radial steady state									
	inflow conditions.									5

\*\*\*\*\*\*\*\* END \*\*\*\*\*\*\*