Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: **Reservoir Engineering I** **Semester: V**
Program: **BT-APEU**
Time: 03 hrs. **Max. Marks: 100**

Instructions:

SECTION A

S. No.		**Marks**	**CO**
Q 1	Explain the factors that must be considered as possible sources of error in determining reservoir permeability in laboratory and how can it be avoided.	**4**	**CO1**
Q 2	Explain the difference between absolute permeability and effective permeability	**4**	**CO1**
Q 3	Explain different methods of estimation of reserve with expected possible errors in each methods of estimation.	**4**	**CO6**
Q 4	Define the different types of flow regimes that may exist in a reservoir to describe the fluid flow behavior.	**4**	**CO4**
Q 5	Explain the capillary hysteresis	**4**	**CO2**

SECTION B

Q 6	A laboratory capillary pressure test was conducted on a core sample taken from a layer that is characterized by an absolute permeability of 80 md and a porosity of 16%. The capillary pressure saturation data are given as follows. S_w / p_c, psi: 1.0 / 0.50 0.8 / 0.60 0.6 / 0.75 0.4 / 1.05 0.2 / 1.75 The interfacial tension is measured at 50 dynes/cm. Further reservoir engineering analysis indicated that the reservoir is better described at a porosity value of 19% and an absolute permeability 120 md. Generate the capillary pressure data for this reservoir.	**10**	CO2
Q 7	A gas reservoir with an area of 3000 acres and thickness 30 ft has porosity 0.15 and water saturation 20%. The initial pressure was observed 2600 psi and reservoir	**10**	CO6

	temperature was 150 ^{o}F. The z factors measured at 2600, 1000 and 400 psi was 0.82, 0.88 and 0.92 respectively. Calculate cumulative gas production at above pressures and recovery factor at 1000 psi		
Q 8	State the primary natural drive indices encountered in a typical petroleum reservoir with explaining the expected production and pressure profile during the producing life of reservoir under different driving indices.	**10**	CO5
Q 9	Derive equations for determining the following parameters of a natural gas • Apparent molecular weight • Specific gravity • Density • Gas formation volume factor, Bg **Or** An ideal gas mixture has a density of 1.92 lb/ft3 at 500 psia and 100°F. Calculate a. Apparent molecular weight of the gas mixture. b. Gas density at 2,000 psia and 150°F c. Specific volume at 2,000 psia and 150°F	**10**	CO3
SECTION-C			
Q 10	A. Derive an expression for the steady state inflow of slightly compressible fluid into a vertical well assuming that only single fluid phase is flowing under isothermal condition. B. A 0.72 specific gravity gas is flowing in a linear reservoir system at 150°F. The upstream and downstream pressures are 2000 and 1800 psi, respectively. The system has the following properties: L = 2000 ft, Width = 300 ft, h = 15 ft, k = 40 md φ = 15%, z factor = 0.78 µg = 0.0173 Calculate the gas flow rate.	**20**	CO4
Q 11	Describe the production decline analysis and its controlling factors. Illustrate in details all types of rate decline behavior and its importance in petroleum industry. **Or** A well with an exponential decline of 1.5 %/month currently produces at 300 STB/day. calculate • Its production rate in 2 years • Its cumulative production in those 2 years • Total cumulative production from the end of year 20 to the end of year 21 • Its production rate in 2 years if decline is hyperbolic and b = 0.6	**20**	CO6