Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, Dec 2021

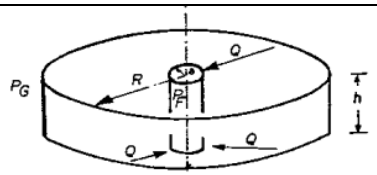
Programme Name: B.Tech., APE Gas **Semester :** V

Course Name : Reservoir Engineering **Time :** 03 hrs

Course Code : PEAU 3009 **Max. Marks :** 100

Nos. of page(s) : 1

Instructions: 1. Assume any data missing.
2. Maintain a minimum of three decimal accuracy.

SNo	SECTION A (5*4=20M)	Marks	CO
Q 1	Define a reservoir	**4**	**CO1**
Q 2	Define effective porosity and mention its significance	**4**	**CO1**
Q 3	Define permeability and list various types of permeabilities based on the fluids phases	**4**	**CO2**
Q 4	Define fluid potential	**4**	**CO3**
Q 5	Define oil formation volume factor and solution gas oil ratio	**4**	**CO4**
	SECTION B (4*10=40M)		
Q 6	Explain with a neat diagram the saturation method for estimating the pore volume and hence the porosity of a rock sample	**10**	**CO1**
Q 7	A core is 3 in. long and 2 cm in diameter. When the core is maintained at an upstream pressure was 29.4 psia and downstream pressure was 14.7 psia, a flow rate of 10 cm^3/sec of air (μ = 0.018 cp) was recorded at downstream pressure. Calculate the permeability of the core in darcys.	**10**	**CO2**
Q 8	Derive an expression for radial flow rate Q of compressible gas with a viscosity of μ_g, flowing to a well bore of radius r_w under steady-state condition through a cylindrical geometry formation of permeability κ_g as in figure 	**10**	**CO3**
Q9	Elaborate with a neat diagram the multi-component phase diagram of petroleum reservoir fluids	**10**	**CO4**
	SECTION-C (2*20=40M)		
Q10	Explain the various factors impacting the flow of fluids through porous hydrocarbon reservoirs	**20**	**CO3**
Q11	a. Demonstrate with a neat diagram the differential liberation test to characterize the reservoir fluids **10M** b. A PVT cell initially contain oil at its bubble point of 180^{0}F & 2000 psi and the Hg was at 280 CC. 18.8 CC Hg was removed from the cell and the pressure dropped to 1600 psi. The Hg was then injected at constant pressure & temperature and 0.129 SCF of gas was removed leaving 263.5 CC of oil. Some more quantity was removed from the cell until the pressure was reduced to 14.7 psi & 60^{0}F. At that condition 0.388 SCF of gas is removed and 205.9 CC of oil remained in the cell. Then determine i. B_o and GOR at bubble point condition ii. B_o, B_t and GOR at 1600 psi and 180^{0}F **10M**	**20**	**CO4**