Name:

Enrolment No:

UPES

End Semester Examination, December 2024

Course: Well logging & Formation Evaluation **Semester: III**

Program: M.Sc. Petroleum Geoscience **Time: 03 hrs.**

Course Code: PEGS8020 **Max. Marks: 100**

Instructions:

I. All questions are compulsory.
II. Read question carefully and write appropriate answer.
III. Write correct unit in numerical after calculation.
IV. Draw neat diagram with proper labeling to explain the answer

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Illustrate the significance of Natural Gamma ray and SP logging tools	**4**	**CO1**
Q 2	Discuss tools used for well logging into Open & Cased hole.	**4**	**CO1**
Q 3	Illustrate any four applications of Neutron –Density cross plot analysis.	**4**	**CO2**
Q 4	What is the Importance of examination of well cuttings and core analysis	**4**	**CO2**
Q 5	In sand A, Rw is less than Rmf; i.e., formation water is saltier than the mud filtrate. Is it true? justify your answer.	**4**	**CO3**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Discuss the working principles and applications of Dual Latero log [LL9] with neat sketch.			**10**	**CO3**
Q 7	Calculate formation resistivity factor "F" from a resistivity log data as given below.			**10**	**CO4**
		Sandstone	Carbonate		
	a	0.82	1		
	m	2	2		
	porosity	20%	25%		
Q 8	Draw and explain resistivity profiles for three versions of fluid distributions in the vicinity of borehole			**10**	**CO3**
Q 9	Explain with schematic elaboration the processes of gamma ray scattering and absorption in radioactive logging			**10**	**CO4**

SECTION-C (2Qx20M=40 Marks)			
Q 10	Explain the process of Shaly Sand analysis and its different steps, each step should be accomplished in specific order. Determine the effective water saturation (Sw) with the help of various methods	**20**	**CO3**
Q 11	What is Neutron log? Explain it with the help of its principle, neutron interaction with matter, neutron energy classification; and draw a rough neutron curve for hydrocarbon bearing sandstone formation that is sandwiched by shale. OR a. Calculate the porosity and oil saturation if Bulk density, matrix density and fluid density is observed from a well : 2.5 gm/cc, 2.7 gm/cc and 0.95 gm/cc respectively. m=2, n=2, a=1, Rw =0.08 ohmm and Rt = 150 ohmm b. In a clean hydrocarbon-bearing sandstone formation, the neutron and density logs read 10 and 38 sandstone porosity units, respectively. The shallowest resistivity reading is 10 ohm-m across the hydrocarbon-bearing formation and the resistivity of mud filtrate at the temperature of the formation is 0.075 Ohm-m. The residual hydrocarbon saturation in the flushed zone is 0.65. b. What is the in situ hydrocarbon density? Estimate the effective porosity of the formation. Assume that a=0.81, m and n = 2 in Archie's equation. (b) Calculate the porosity and oil saturation if Bulk density, matrix density and fluid density is observed from a well : 2.5 gm/cc, 2.7 gm/cc and 0.95 gm/cc respectively. m=2, n=2, a=1, Rw =0.08 ohmm and Rt = 150 ohmm.	**20** **OR** **10+10**	**CO4**