Name:

Enrolment No:

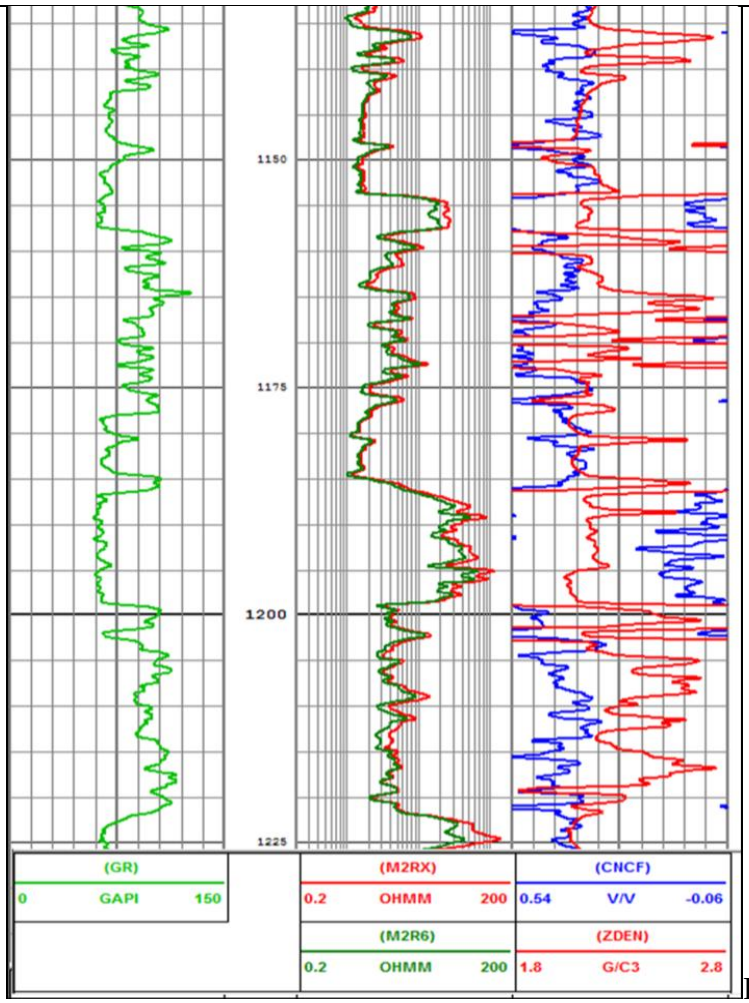
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: B. Tech Geoscience Engineering **Semester: VIII**
Programme: Advance Petro-physical analysis **Course code:** PEGS4013P
Time: 03 hrs. **Max. Marks: 100**

Instructions: Students will attach the interpreted log image (fig 1) along with answer sheet.
All questions are compulsory for section A

SECTION A [20marks]

S. No.		Mark	CO
Q 1	Discuss the application of NGS logs	**4**	CO2
Q 2	Porosity logs the header indicates that the logs are recorded on a "limestone matrix" and fluid density is 1.0 g/cc. The density porosity reading is 15% and the neutron porosity reading is 8%. Identify the most likely lithology of the formation. Justify your answer.	**4**	CO1
Q3	Find formation temperature at 7800ft, when bottom hole depth is 14,000ft; bottom hole temperature is 200°F; annual mean temperature is 80°F.	**4**	CO2
Q4	Explain about Archie's principle.	**4**	CO3
Q5	Discuss the special core analysis techniques for petrophysical properties evaluation	**4**	CO4
	SECTION B [40marks]		
Q 5	(a) Enumerate different parameters monitoring during mud logging. (b) Explain how mud logging information helps in formation evaluation	**5+5=10**	CO3
Q6	Describe gamma ray log with reference to principle, tools, log interpretation, depth of investigation and quantitative applications.	**10**	CO3
Q7	Describe Neutron log with reference to the principle, unit of measurement and application.	**10**	CO4
Q8	Discuss the application of machine learning in prediction of petrophysical model and data gap.	**10**	CO4
	OR		
Q8	(a) 'The response of the gamma ray tool is unaffected by the presence of hydrocarbons." Justify the comment. (b) Discuss the main difference between Gamma Ray and Spectral Gamma Ray. (c) From micro-normal and micro-inverse curves, how can we detect the presence of mud cake or a permeable zone?	**4+4+6=10**	CO4
	SECTION-C [40 marks]		
Q 9	Refer the log image and answer the following questions:	**10+10=20**	CO6

	 Fig 1 (a) Identify lithology and mark in the log section below. (b) Interpret the hydrocarbon bearing zone and assess the reservoir quality based on shaliness		
Q 10	(a) Discuss the reason behind Bell Shaped or Funnel shaped Spontaneous Potential (SP) curve seen on some thick reservoir. (b) Evaluate production logging and its implementation in your own words	**12+8=20**	
	OR		
Q 10	(a) 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. Assess 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) An interval transit time of 90 µsec/ft was measured in a sandstone reservoir. The acoustic velocity of the matrix was 18000 ft/sec. Calculate the interval transit time of the matrix	**12+8=20**	