Name:	
Enrolment No:	

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

Programme/Course: B.Tech. (GSE & GIE)	Semester: 7th
Subject: Well Logging & Formation Evaluation	Time 03 hrs.
Course Code: PTEG 429	Max. Marks: 100
Nos. of page(s) 2	

SECTION A (All questions are compulsory)

S. No.		Marks	CO
Q 1	Write the applications of Neutron –Density cross plot analysis.	4	CO1
Q 2	Define the well logging? Write, the tools use to evaluate the lithology, porosity and resistivity of subsurface rocks.	4	CO1
Q 3	Write the steps of gamma ray tool calibration.	4	CO2

Q 4	The main purpose of <u>Sonic Porosity</u> is to (select the correct answer and provide brief explanation)
	    a. Calibrate Surface Seismic
	    b. To determine if Secondary Porosity exists
	    c. Determine Cement Evaluation after Casing Cementation
	    d. Determine Mechanical Properties of Rocks
	    e. Determine High Pore Pressure zones
		4	CO3

Q 5	Litho-Density Tool gives RHOB, PE, Caliper and DRHO curves. Select all the correct statements below (and write to answer sheet)
	
	    a. RHOB is calculated primarily from Gamma Rays that have done Compton Scattering
	    b. DRHO is the positive for barite weighted muds
	    c. PE is calculated primarily from Gamma Rays that have done Pair Production
	    d. Caliper curve does not provide any information about formation Lithology
	    e. If a Sandstone and Limestone have the same RHOB, then PE can be used to determine lithology
		4	CO2

SECTION B (Attempt any four questions Max 200 words)

Q 6	Describe the process in which Gamma Rays are detected by filling in the blanks and writing the complete answers in your answer sheet- Gamma Rays interact with _____ and produce _____. Energy of Gamma Ray is directly proportional to amount of _____ produced. _____ enter the Photo-Multiplier tube and strike the _____ generating _____ These _____ are multiplied by successive dynodes and ultimately produce a _____ pulse of _____ polarity at the final Anode	10	CO2
Q 7	What are the origins of the SP log? Explain membrane potential.	10	CO2
Q 8	What is the RHOB of a Sandstone Formation, Vsh = 35%, Density of Shale =2.5 gm/cc, Sw = 25%, Density of HC = 0.2 gm/cc	10	CO5

Q 9	Describe the parameters of downhole well environment with their slandered symbols.	**10**	**CO6**

Q 10	Write short Notes (any two)
	
	       I- Invasion Profile
	
	       II- Sonic Porosity
	
	       III- Archie's Equations
		10
		(5*2)
			CO4

	SECTION-C (Q12 is compulsory, attempt any one from Q11 or Q13 - Max 500 words)		
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.	**20** **(5+5+5+5)**	**CO5**
Q 12	**(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. 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** **(10+10)**	**CO4**
Q 13	Describe coring in well logging. How do we handle and preserve it? Differentiate conventional and sidewall coring methods. Explain various data obtain from core analysis.	**20** **(5+5+5+5)**	**CO6**