UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019
Course: APPLIED GEOLOGY   Semester: V
Programme: B. Tech Geoscience and Geoinformatics [GSE&GIE]
Time: 03 hrs.   Max. Marks: 100
Instructions:

SECTION A   [5x4=20 marks]

S. No.		Marks	CO
Q 1	Explain the five applications of remote sensing in geological mapping	5	CO1
Q 2	Differentiate between anomaly and background in geochemical prospecting.	5	CO2
Q 3	Describe the principle and application of radiometric survey.	5	CO3
Q 4	Illustrate the applications of magnetic survey in petroleum application.	5	CO3

SECTION B [10x4=40 marks]

Q 5	Explain the scheme of exploration of oil and gas deposits by geochemical method.	5+5=**10**	CO2
Q 6	(a) Explain the concepts of transgression and regression. (b) Discuss hydrocarbon promising depositional systems in marine environment with reference to sequence stratigraphy.	5+5=**10**	CO4
Q7	A source rock with 3wt % of TOC releases 0.05mgHC/g Rock free gases, 6.3mgHC/g Rock HC gases and 0.45 mg CO2/g Rock CO_2 gases at 422ºC, 467ºC and 570ºC temperature respectively. Estimate the source rock in terms of oil/gas generation efficiency.	3+2+5=**10**	CO3
Q8	(a) Describe the principles of natural gamma log and spontaneous potential log. (b) Explain how Natural Gamma log can be used as lithology indicator.	5+5=**10**	CO5
	OR		
Q8	System tracts are associated with seismic stratigraphy and eustacy. A system tract is an indicator of the deposition sequences that would be present within a sea level cycle. Elaborate different types of system tracts.	**10**	CO

SECTION-C [20x2=40 marks]

Q 9	The following data are given for the Hout Oil Field: *[Area = 26,700 acres Net productive thickness = 49 ft Porosity = 8% Average Sw = 45% Initial reservoir pressure, pi = 2980 psia Abandonment pressure, pa = 300 psia Bo at pi = 1.68 bbl/STB Bo at pa = 1.15 bbl/STB Sg at pa = 34% Sor after water invasion = 20%]* Calculate the following:	10+5+5=**20**	CO6
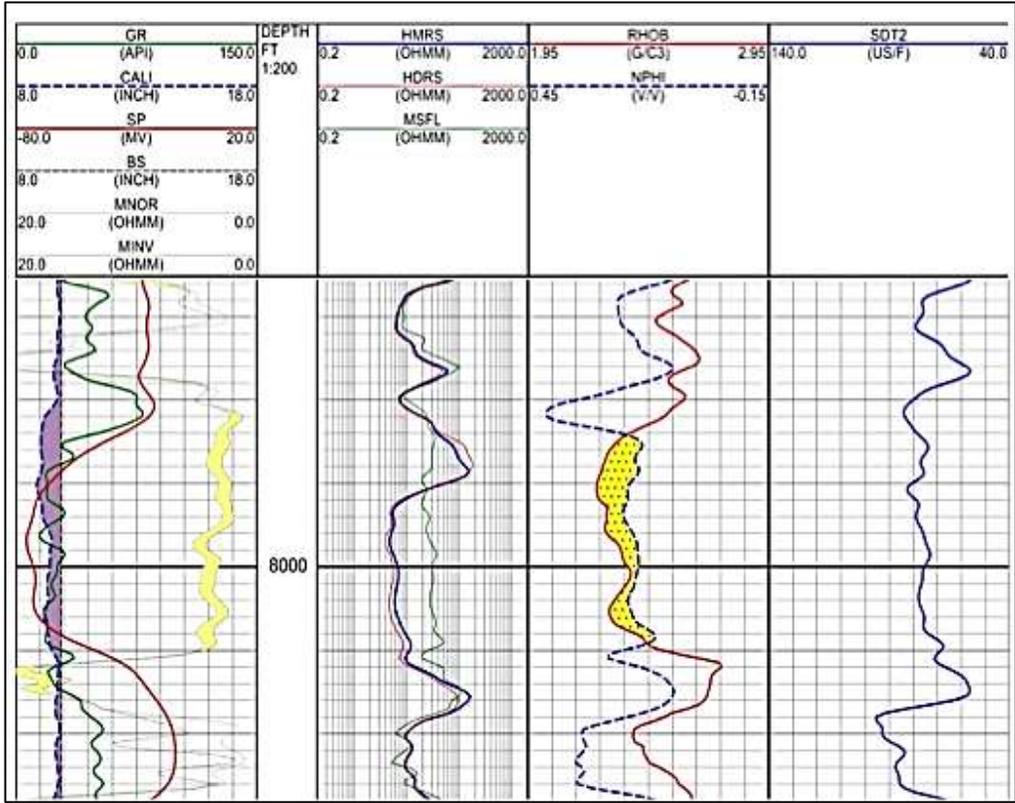
	1) Initial oil in place 2) Oil in place after volumetric depletion to abandonment pressure 3) Oil in place after water invasion at initial pressure. Discuss your answers		
Q10	(a) Analyse the Petrophysical parameters of reservoir rock and their control on hydrocarbon exploration. (b) In a clean sandstone formation, ρb is the measured bulk density 2.15 gms/cc, φe is porosity in fraction, ρf is fluid density in gm/cc and ρma is matrix density for appropriate lithology. If we assume ρf to be equal to 1gm/cc for water, then by measuring bulk density of clean water bearing formations derive the porosity of the rock.	**10+10=20**	CO5
	OR		
Q10	(a) Explain how geological parameters can be evaluated using well logs. Interpret the logs below and analyse the fluid present in the reservoir. (b) Describe when gas replaces oil in a clean sandstone, explain how will be the Density Neutron log separation and why.	**10+10=20**	CO5