

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: APPLIED GEOLOGY

Semester: V

Programme: B. Tech Geoscience and Geoinformatics [GSE&GIE]

Time: 03 hrs.

Max. Marks: 100

Instructions:

SECTION A [20 marks]

S. No.		Marks	CO
Q 1	Explain the applications of remote sensing in geological mapping	5	CO1
Q 2	Elaborate the significance of unconformity in establishing stratigraphic records.	5	CO2
Q 3	A limestone bed is dipping in a dam site at the rate of 1 in 4 along N15° W. Find its apparent dip along N50° W. Scale 1 unit = 1cm. State Strike.	5	CO3
Q 4	A source rock with 7wt % of TOC releases 0.05mgHC/g Rock free gases, 6.3mgHC/g Rock HC gases and 0.45 mg CO ₂ /g Rock CO ₂ gases at 422°C, 467°C and 570°C temperature respectively. Estimate the source rock in terms of oil/gas generation efficiency.	5	CO4

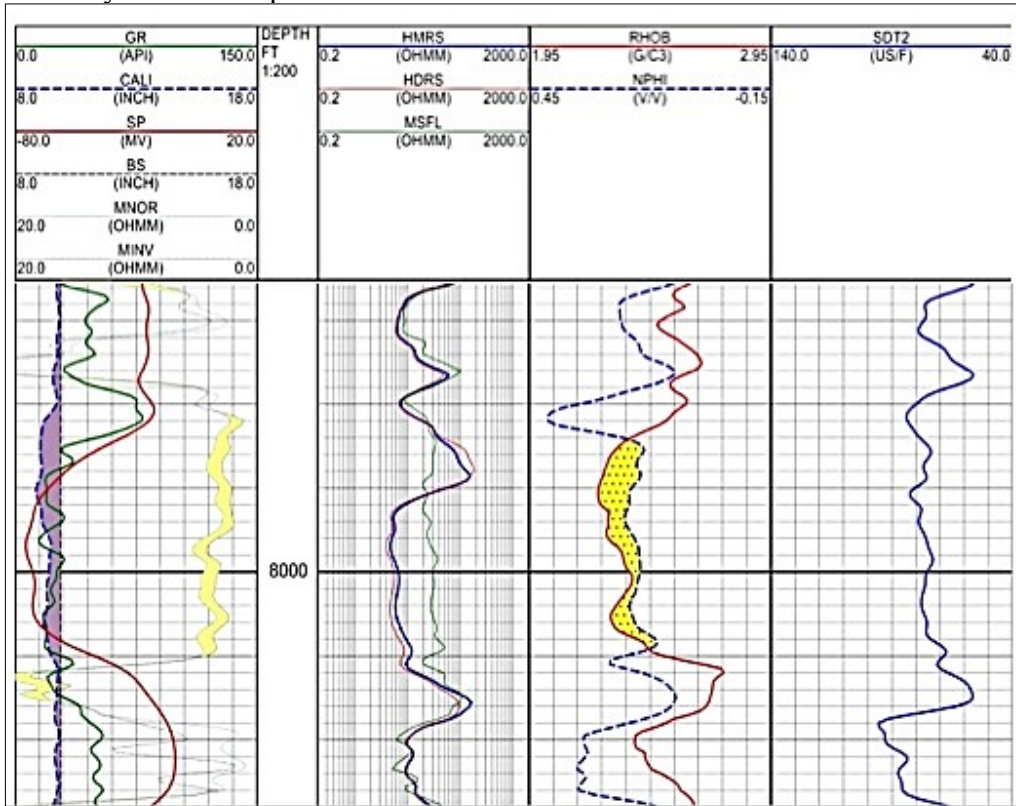
SECTION B [40 marks;]

Q 5	(a) What are the different techniques of micro facies analysis? (b) Illustrate the implication of microfossils in petroleum exploration.	5+5=10	CO2
Q 5	(OR) (a) Explain how aggradation, progradation and retrogradation might occur during relative sea-level transgression (b) Discuss hydrocarbon promising depositional systems in marine environment with reference to sequence stratigraphy.	5+5=10	CO2
Q6	(a) Explain how to quantify reworked organic matter? (b) Explain how the provenance of sediments using geochemical data? (c) Describe the importance of HI and OI. How will you calculate original HI and OI from rock eval data?	3+2+5=10	CO4
Q7	(a) What are the principles of natural gamma log and spontaneous potential log? Explain how Natural Gamma log can be used as lithology indicator. (b) When gas replaces oil in a clean sandstone, explain how will be the Density Neutron log separation and why? (c) The void ratio (in percentage) of sandstone is 25. Calculate its porosity in percentage.	5+2+3=10	CO5
Q8	What are 3P Oil & Gas Reserves and Why are they important? Discuss different methods of hydrocarbon reserve estimation for Original oil in place (OOIP) and	5+5=10	CO6

	original gas in place (OGIP).		
SECTION-C [40 marks]			
Q 9	<p>The following data are given for the Hout Oil Field: <i>[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%]</i></p> <p>Calculate the following: 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</p>	10+5+5=20	CO6
Q10	<p>“A geological model is a spatial representation of the distribution of sediments and rocks in the subsurface.”</p> <p>(a) Write the workflow of Seismic Prestack Simultaneous Inversion in multiattribute analysis.</p> <p>(b) In a clean sandstone formation, ρ_b is the measured bulk density 2.15 gms/cc, ϕ_e is porosity in fraction, ρ_f is fluid density in gm/cc and ρ_{ma} is matrix density for appropriate lithology. If we assume ρ_f to be equal to 1gm/cc for water, then by measuring bulk density of clean water bearing formations derive the porosity of the rock.</p>	10+10=20	CO5

(or) Explain how geological parameters can be evaluated using well logs. Interpret the logs below and analyse the fluid present in the reservoir.

Q10



20

CO5