UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Course: Well site Geology and Formation Evaluation Semester: III
Programme: M.Sc. Petroleum Geoscience   Course Code: PEGS 8005
Time: 03 hrs.   Max. Marks: 100
Instructions:
- *Section A (Short answer type from Q1 to Q5, 4 marks each)*
- *Section B (Short notes type from Q6 to Q9, 10 marks each)*
- *Section C (Q10 and Q11, Long answer type)*
- *An internal option is given in questions 9 & 11.*

SECTION A
(Short answer)   (5Q x 4M = 20 Marks)

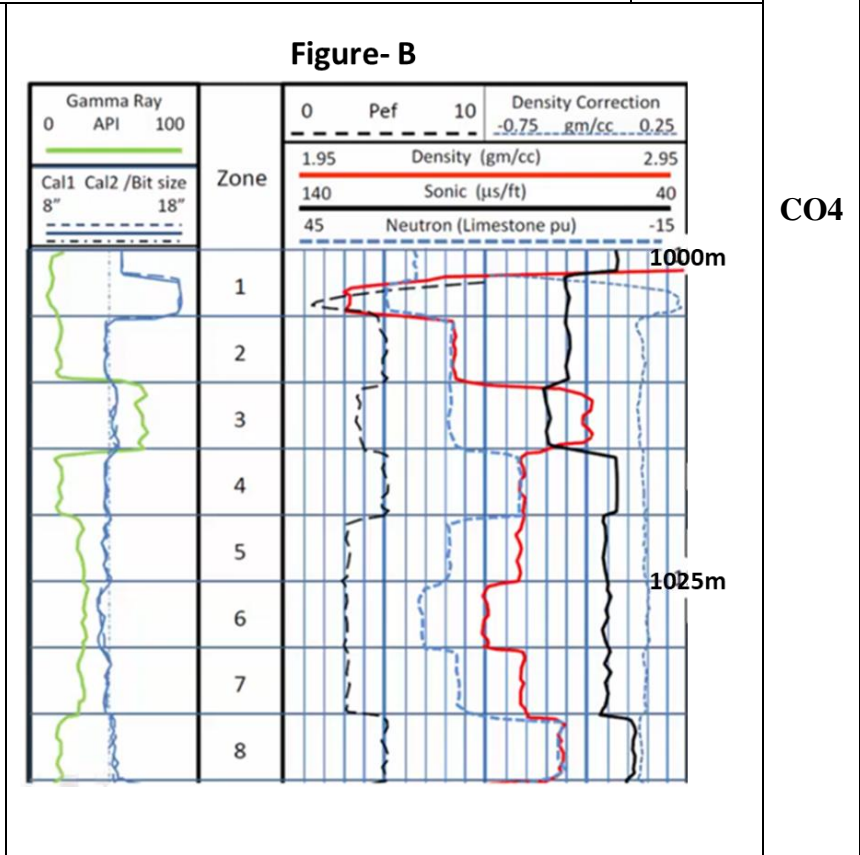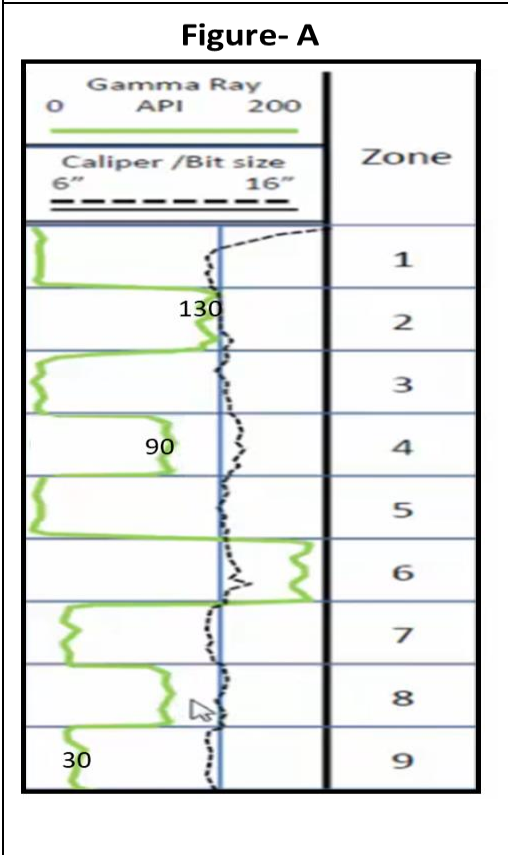| S.N.		Marks	CO
Q 1	Define the Laterolog.	**4**	**CO1**
Q.2	Describe a note on 'Mud logging'.	**4**	**CO2**
Q.3	Explain the Drill Stem Test (DST) and its application in E&P.	**4**	**CO2**
Q.4	Define the PEF log and explain its four quantitative applications.	**4**	**CO1**
Q.5	**Identify True or False from the given statements-** a) A coring tool used for soft rock is only known as percussion SWC. b) Resistivity logs are always plotted on a linear scale. c) The HI, type of fluid & matrix and volumetric concentration do not affect neutron porosity measurements. d) Greater permeable formations build up mud cake more effectively and quickly compared to a less permeable formation.	**4** **(1 mark each)**	**CO3**

SECTION B
(Short note type)   (4Q x 10M = 40 Marks)

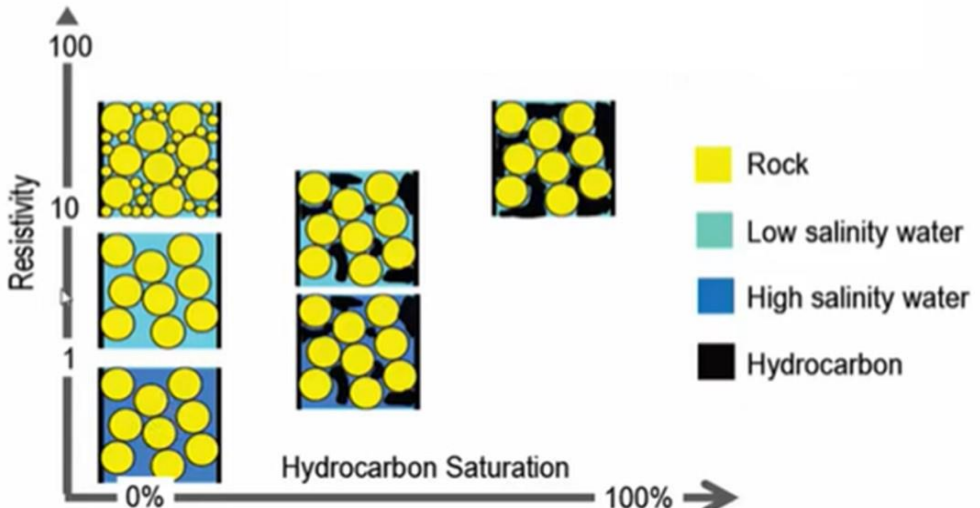| Q.6	Describe quantitative use of resistivity log and different categories of resistivity tools.	**10**	**CO1**
Q.7	a) Illustrate the importance of the Gamma-ray log and its response in different sedimentary sequences (Provide the 3 examples of Gamma-ray patterns and their corresponding depositional environment). b) Explain the Geological interpretation using spectral gamma-ray log.	**5+5**	**CO2**
Q.8	Draw and illustrate in detail about the downhole environment and different saturation states of formation around the borehole. Explain the effects of invasion on resistivity measurement.	**6+4**	**CO4**

Q.9	Explain the following,
	   a) Caliper logs
	   b) SP log
		5+5	CO3

	OR		

	Explain the following,
	   a) Sidewall coring and its applications
	   b) Cross plots and their applications		

SECTION-C		
(Long answer type) **(2Q x 20M = 40 Marks)**		

| Q.10 | **a)** Interpret the logs given in **figure-A** and explain the GR log deflection schemes used in formation evaluation.

b) Draw an equitation for shale volume (Vsh) and calculate Igr for zones 2, 4 and 9 from the given **figure-A**. Explain all the steps in detail.

c) Explain the different tracks and associate logs given in the **figure-B**

d) Explain bulk density. Derived the formula for calculating porosity from log-derived bulk density for zones 2, 4 and 8 **(figure-B)** assuming the lithology is sandstone and filled with water. | 20
(5*4) | |

Figure- A

Figure- B

CO4

Q.11	a) Explain in detail about all the parameters used in Archie Equation. b) Calculate Sw from resistivity logs for sandstone rock with a porosity of 19% and Rw of 1 using Archie Equation. Show stepwise calculation. c) Explain the relation between Rock grains, Resistivity and Hydrocarbon saturation from below the given diagram. 	5+10+5	CO5
	OR		
	a) Describe the principles of the Density log, Its unit of measurement and Geological interpretation. b) Explain the fundamental principle and Quantitative interpretation of the Neutron log. c) Explain the Neutron-Density crossover and its interpretation for various zones of Hydrocarbons.	8+7+5	

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