Name:

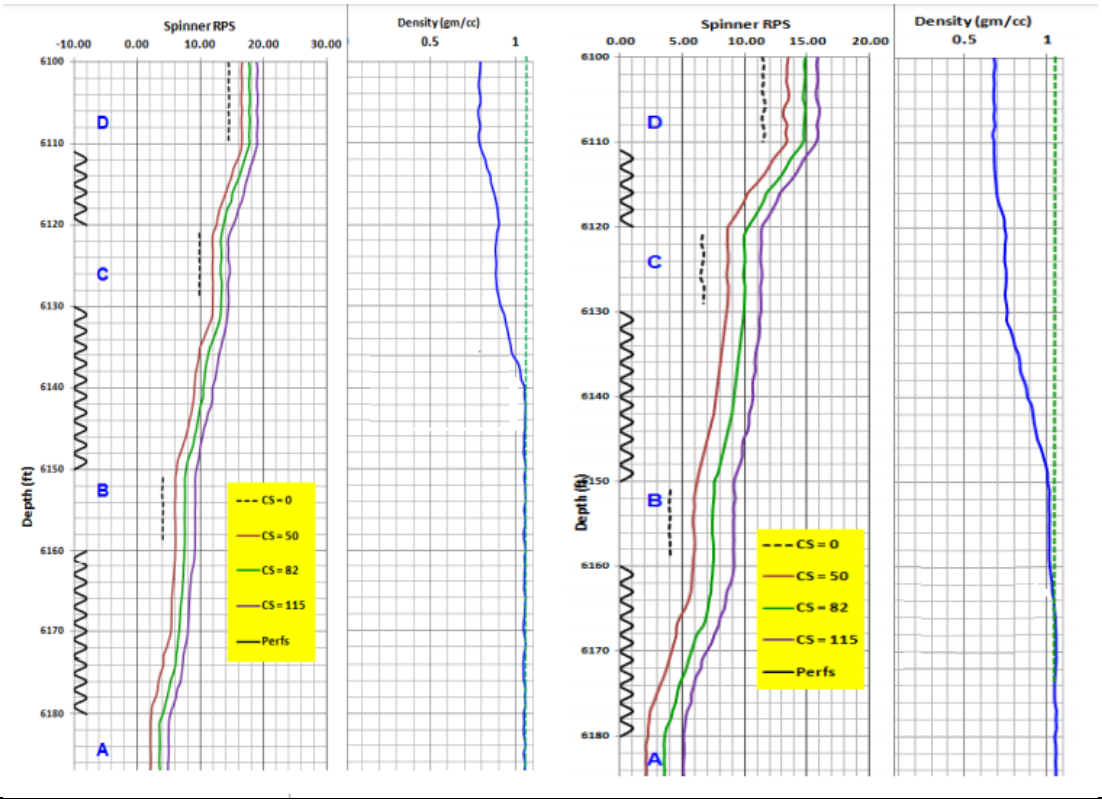
Enrolment No:

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

Course: Production Logging — **Semester: VIII**
Programme: B.Tech APE Spz (Upstream) — **Time: 03 hrs.**
Course Code: GSEG 413 — **Max. Marks: 100**
Instructions: In brief, to the point and provide relevant diagram wherever necessary.

SECTION A

S. No.		Marks	CO
Q 1	State four types of coring operations.	4	CO1
Q2	Illustrate a case of improper cement job.	4	CO2
Q3	Write four sensors embedded in a typical production log tool.	4	CO3
Q4	State four challenges encountered while logging high angle wells.	4	CO4
Q5	Explain with the help of a suitable diagram, the concept of a *wrap-around*.	4	CO5
	SECTION B		
Q 6	Discuss the procedure to collect samples for mudlogging. Write five applications of mudlogging.	5+5 = 10	CO1
Q7	Explain the working of an induced gamma ray tool.	10	CO2
	OR		
	Explain the working of Borehole compensated sonic tool.		
Q8	State four exclusive applications of Production Logging.	10	CO3
Q9	Discuss the procedure to calculate porosity using neutron-density *cross plotting.* State trigger points used to identify zone of interest.	10	CO5
	OR		
	Discuss the procedure to identify lithology using sonic-density *cross-plotting*. Suggest ways to improve readability of the log.		
	SECTION-C		
Q 10	a) Explain the working and utility of a spinner tool for production evaluation, b) Differentiate the two surveys as provided in the log sheet below. c) Identify the following: i. Perforation Intervals ii. Type of fluid entering wellbore	10+4+6 = 20	CO3

	3  		
Q11	Discuss one Casing Inspection tool mentioning its diagram, principle, working, log interpretation, utility and limitations. Suggest improvements to the tool to remove any one limitation. OR Explain in details the NMR logging principles. Brief about the complications and solutions to record log run in high angle wells.	**15+5= 20**	**CO4**

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SECTION A

S. No.		Marks	CO
1	Write four applications of mudlogging.	**4**	**CO1**
2	State the different types of coring operations.	**4**	**CO1**
3	Brief RFT with schematic diagram.	**4**	**CO2**
4	Explain the NMR logging principles.	**4**	**CO2**
5	State the challenges encountered while logging horizontal wells.	**4**	**CO4**

SECTION B

6	Enumerate the application of production logging.	**10**	**CO3**
7	Describe the five production logging tools.	**10**	**CO2**
8	Differentiate between CBL & VDL. Explain Bond Index.	**8+2 = 10**	**CO2**
9	Discuss the procedure to calculate porosity using neutron-density *cross plotting.* State trigger points used to identify zone of interest.	**7+3 = 10**	**CO5**
	OR		
	Discuss the procedure to identify lithology using sonic-density *cross-plotting*. Suggest ways to improve readability of the log.		

	SECTION-C		
10	Well: 24-1X Depth Range: 2900 – 3250 m Lithology: Variable **Figure 1** The enclosed log sheet shows the results from a simple two arm caliper tool. (a) Indicate where likely mud-cake occurs by shading between the caliper and the bit size curves. (b) Divide the log into sections which you believe to be of the same, or approximately the same lithology. (c) Indicate the possible lithology down the right hand side of the log. (d) Indicate, if present, zones of caving. (e) Calculate the mean mud-cake thickness in the intervals 2980 m to 3035 m, and 3082 m to 3145m. **OR** Answer the following questions marking the log (**Figure 2**) with construction lines where appropriate and showing full working for numerical questions. (a) Identify the main lithology throughout the log. (b) Shade the difference between the caliper log and the bit size. (c) Comment briefly upon the likely cause of the shape of the gamma ray log in the interval 2635 m and 2645 m. (d) Calculate the mud-cake thickness at 2590 m. (e) Calculate the shale volume (*Vsh*) at 2550 m from the gamma ray log.	**20**	**CO2**
11	Discuss one Casing Inspection tool mentioning its diagram, principle, working, log interpretation, utility and limitations. Suggest improvements to the tool to remove any one limitation.	**20**	**CO4**

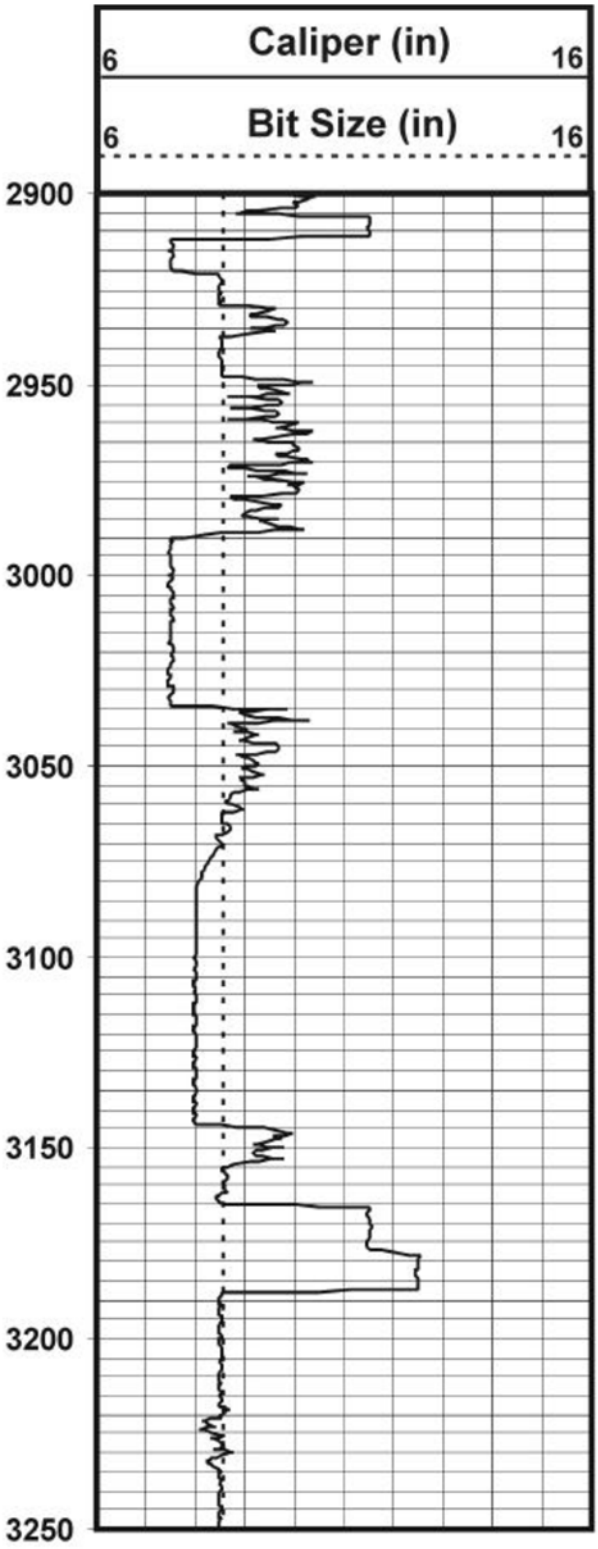
Caliper (in)
6
16
Bit Size (in)
6
16
2900
2950
3000
3050
3100
3150
3200
3250

Figure 1

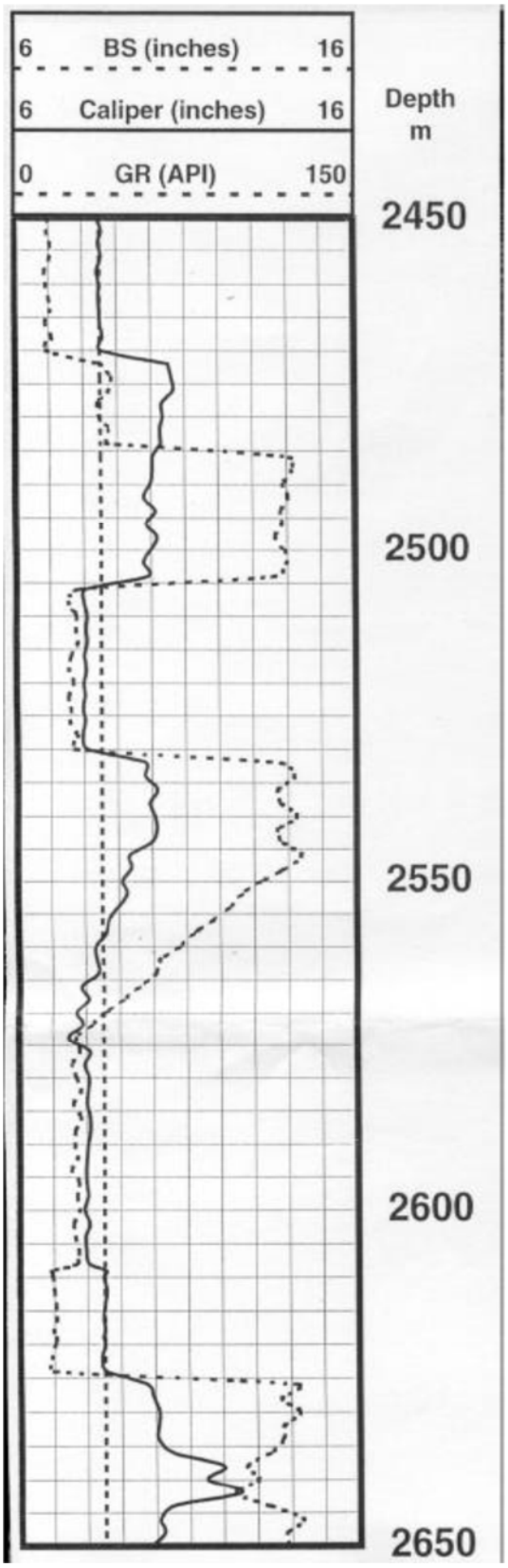
6
BS (inches)
16
6
Caliper (inches)
16
0
GR (API)
150
Depth
m
2450
2500
2550
2600
2650

Figure 2