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**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, May 2018**

**Program: B-Tech: Applied Petroleum Engineering - Upstream**  
**Subject (Course): Well Log Analysis and Well Testing**  
**Course Code : PTEG323**  
**No. of page/s: 4**

**Semester – VI**  
**Max. Marks : 100**  
**Duration : 3 Hrs**

**Instructions:** Use of books, handouts, calculators is allowed but Cellphone, Internet, is NOT ALLOWED.

**Section-A**

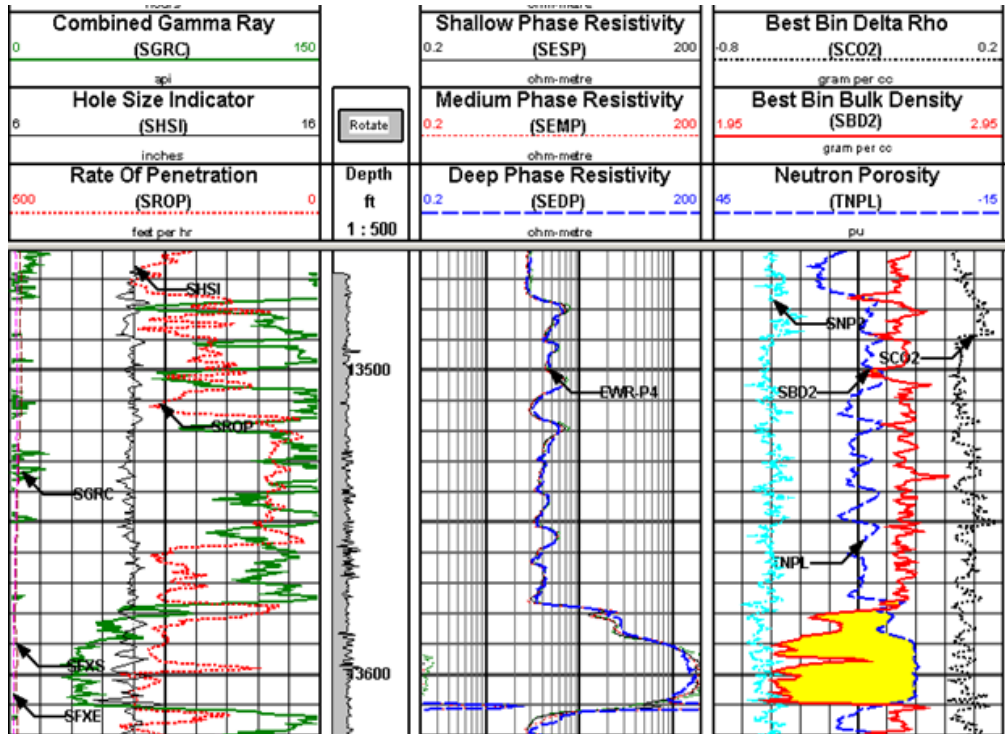
5X4=20

1. Why are Array PL Tools needed for doing Production Logging in Horizontal Wells? (4)
2. In NMR, when would one use Dual Tw Activation and when Dual Te Activation? (4)
3. Apart from finding Dips and Faults (geological features) what are the other two main petro-physical applications of Electrical Imaging Logs like XRMI, FMI etc. (4)
4. Briefly describe the use of a Horner Plot (4)
5. What is the exact reason behind the use of Cross Dipole Acoustic Tool (4)

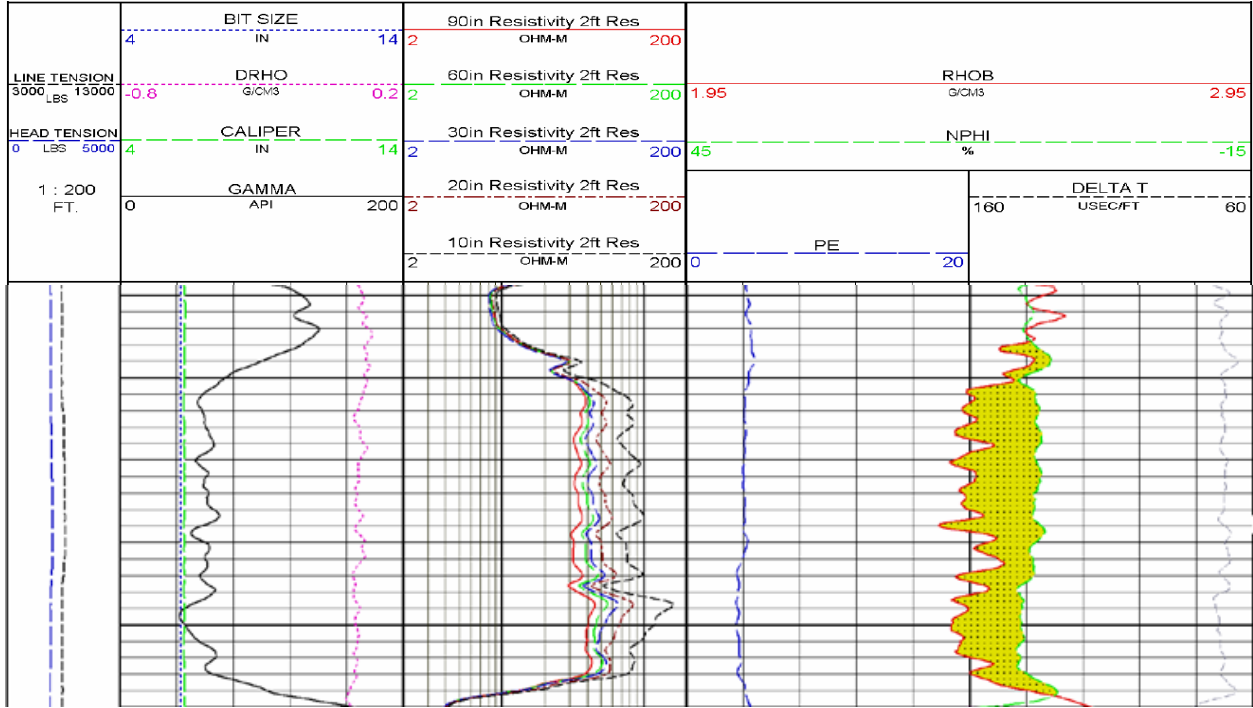
**Section-B**

5X8=40

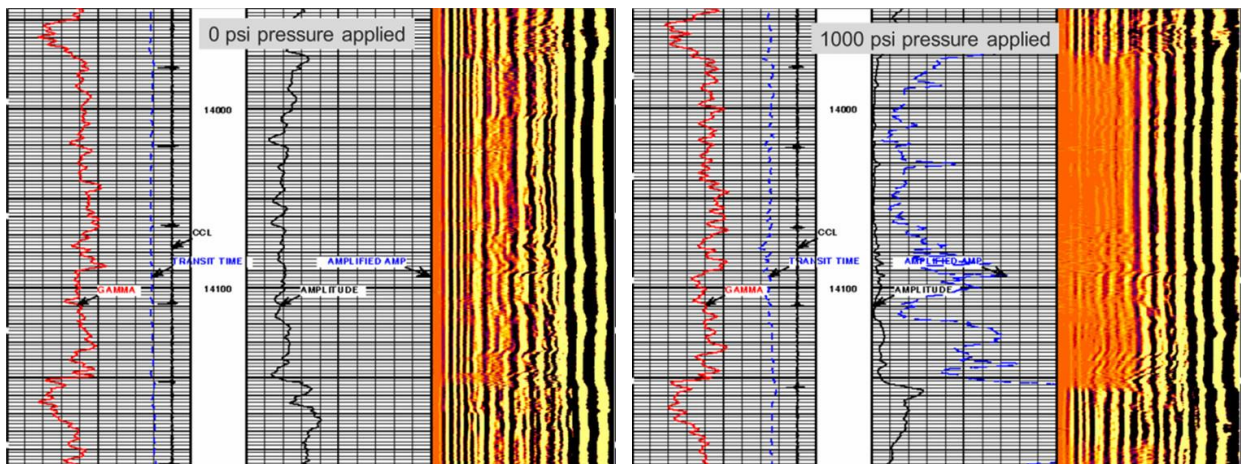
6. In the LWD Triple Combo Log given below,
  - a. Why are GR (SGRC) and ROP (SROP) Correlating Well? (4)
  - b. What is the formation fluid most likely at the zone around 3600 ft (shaded) (2)
  - c. What is the meaning of Best Bin Bulk Density (2)



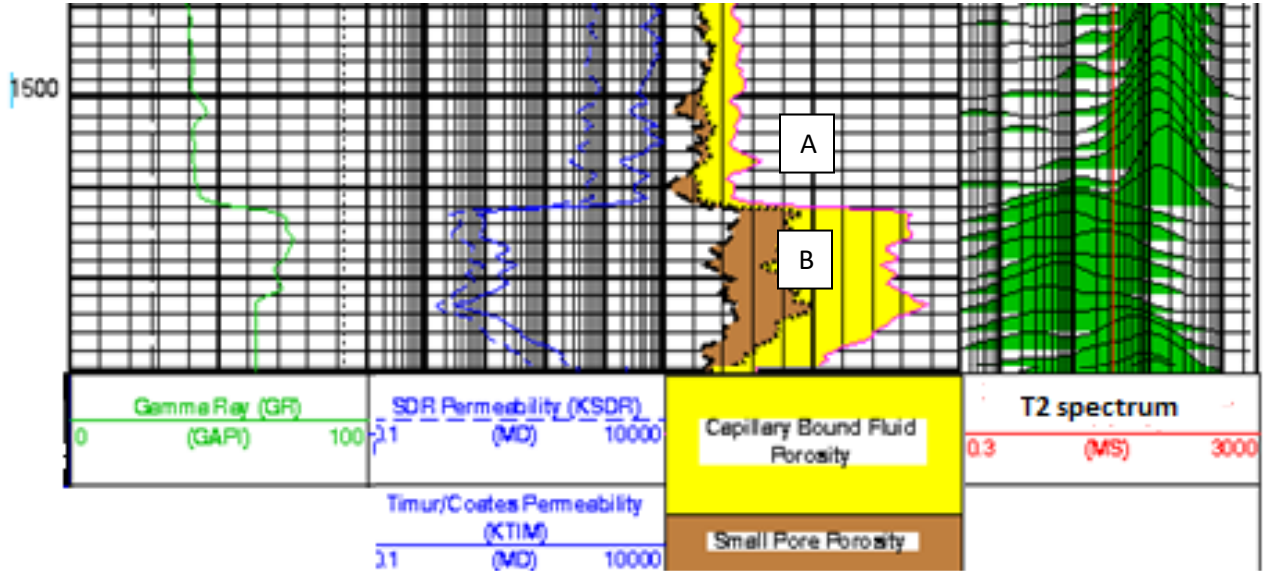
7. In the Quad Combo Log below there is a Zone shown (in shading). Mud is OBM
- What is the Lithology of the Zone? (2)
  - What is the Fluid in the shaded area? Why? (4)
  - Is the zone porous and permeable? Support your answer (2)



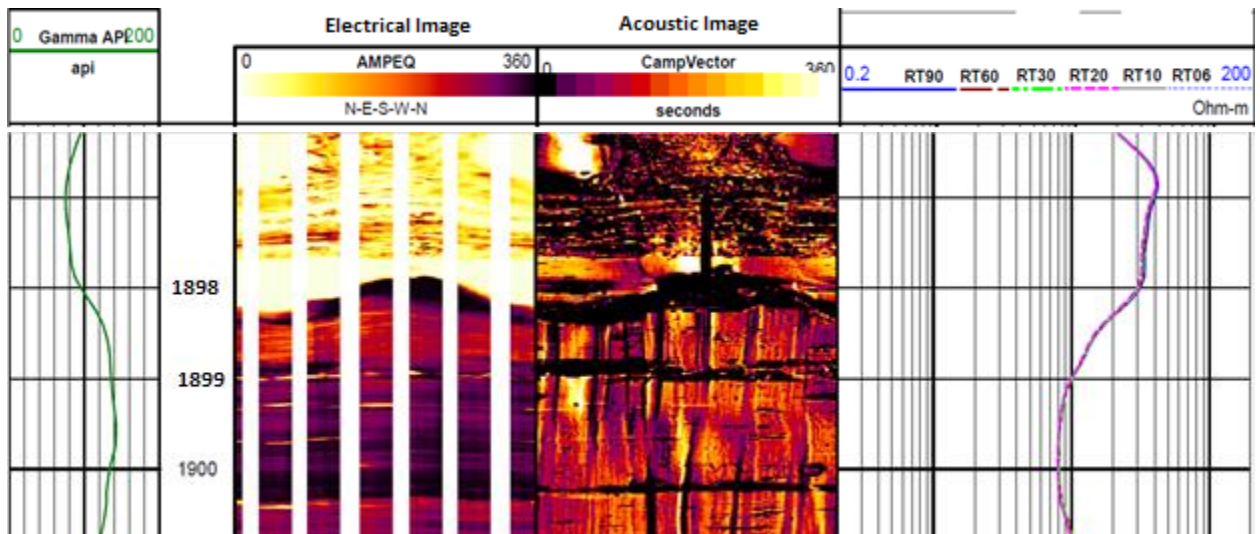
8. Two runs were made to record a Cement Bond Log in same well, first without pressure and next with 1000 psi surface pressure.
- Why application of pressure is causing the Amplitude curve and VDL to change (2)
  - How many Casing Pipes are affected? (2)
  - What can be said about the Thick Dark and White lines on the extreme right of VDL? What kind of arrivals are these (Casing, Cement or Formation)? Why? (4)



9. Look at all the curves of the NMR Log given below and answer
- Which part of the Log has more Free Fluid, above 1512' or below? (2)
  - What is the most likely Lithology of the formation below 1512" marked as B (2)
  - Explain how is Coates Permeability being calculated (4)



10. In the Log below an Electrical Imager and an Ultrasonic Acoustic Image has been run together,
- Why is the Electrical Image mostly whitish above 1898'? (2)
  - Why does the Acoustic Image Log show several vertical features that are being completely missed by the Electrical Image (2)
  - What can be said about the Dark Sine Wave like feature around 1898'? (4)



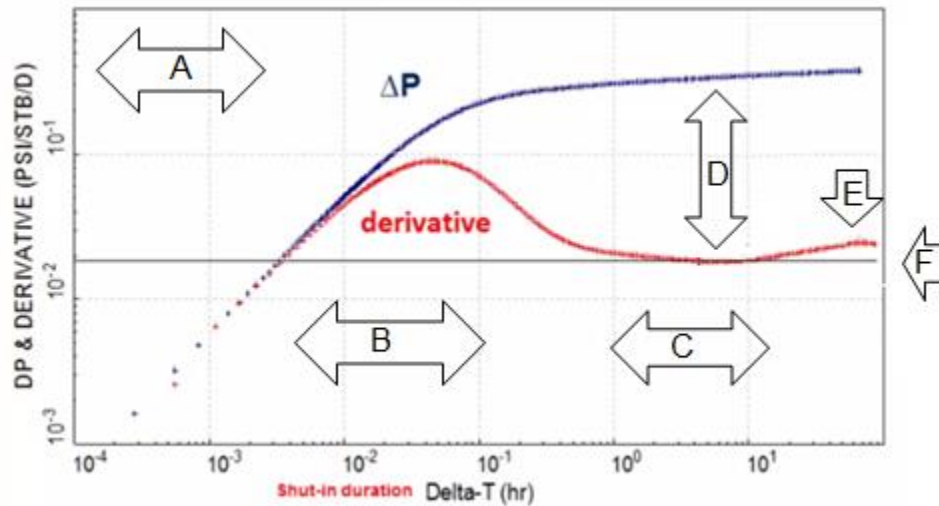
**Section-C**

2X20=40

11. You are required to do only one of the two options below a OR b (both carry same marks)
- a. In Modern Wireline Formation Testers, list any five new features and capabilities compared to first generation tools. Briefly describe each of the new features, its exact purpose, giving examples where needed to clearly explain the advantage (20)
  - b. Draw a Table comparing the five different Conveyance Techniques used in Highly Deviated and Horizontal well logging. Apart from the advantages and disadvantages of the technique the Table should highlight the ideal circumstances when the particular technique is best suited (20)

12. A Well Test Log-Log Plot is shown below. X Axis is Delta Time in Log scale. Y Axis is DeltaP and Derivative also in Log scale

- a. What does each of the time region A, B, C signify? (6)
- b. What can be say about the separation between the  $\Delta P$  and  $\Delta P'$  (derivative) curves as shown by D signify (5)
- c. Is there any Boundary Effect being observed at E? If so, what can you interpret ... please draw on your Answer Book to explain (5)
- d. What is the significance of line F (drawn touching tangentially the Derivative curve) (4)



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