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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Examination, July 2020

Programme: M. Tech Petroleum Engineering   **Semester: II**

Course Name: Formation Evaluation and Well Logging   **Max. Marks: 100**

Course Code: PEAU7005   **Attempt Duration: 2 Hrs. for sect A**
No. of page/s: 07

Note:

1. Read the instruction carefully before attempting.
2. This question paper has two section, Section A and Section B.
3. There are total of seven questions in this question paper. **One** in **Section A** and **six** in **Section B**

4. **Section A** consist of multiple choice based questions and has the total weightage of 60%.
5. **Section A** will be conducted online on BB Collaborate platform
6. **Section B** consist of long answer based questions and has the total weightage of 40%.
7. The maximum time allocated to **Section A** is two Hrs.
8. **Section B** to be submitted within 24 hrs from the scheduled time (*exceptional provision due extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas*).
9. No submission of **Section B** shall be entertained after 24 Hrs.
10. **Section B** should be attempted after **Section A**
11. **The section B** should be attempted in blank white sheets (hand written) with all the details like programme, semester, course name, course code, name of the student, Sapid at the top (as in the format) and signature at the bottom (right hand side bottom corner)
12. Both section A & B should have questions from entire syllabus.
13. The COs mapping, internal choices within a section is same as earlier

MCQs
[2X30=60MARKS]

1. GR Log is to measure Electrical resistivity

RADIOACTIVITY   RESISTIVITY   POROSITY   DENSITY

2. Which of the following well logs help you see whether the water in the well is fresh or salty

RESISTIVITY   SP   NMR   NONE

3. Well log is a non continuous record of a geophysical property along a borehole with repect to
   DEPTH, TIME
   TEMPERATURE,
   ALL

4. High resistivity is always indicator of
   OIL, WATER,CLAY,ALL

5. Induction resistivity tool is preferred over latero type tool in
   CONDUCTIVMUD,
   CONDUCTIVE
   MUD   both   none

6. Density log is basically
   RESISTIVITY. CONDUCTIVITY, POROSITY,LITHOLOGY

7. Positive SP is developed against reservoir section when salinity of formation water is more than
   RESISTIVITY, POROSITY,CONDUCTIVITY, LITHOLOGY

8. Dipmeter is based upon measurements of
   FORMATION ROCK, MUD FILTRATE, BOTH,NONE

9. Neutron porosity (PHIN) increases with presence of
   RESISTIVITY,GAMMA,DENSITY,POROSITY

10. LLD log measures resistivity of
    GAS, WATER, TIGHT ZONE, NONE

11. Gamma ray value is higher in shaley sand than
                    transition zone,   flash zone,   none
    formation fluid

12. which value in a clean formation is
    related to the chemical activities (a, and a,$ of the formation
    water and mud filtrate
    (a) Coal,
    (b) carbonaceous shale,
    (c) sand,
    (d) none

13. The formation density log is a porosity log that measures
    (a) SSP
    (b) SP
    (c) NGS
    (d) NMR

14. We measure the Mud cake thickness using
   (a) Electron density od formation

(b) porosity
(c) lithology
(d) all

15. SP Logging rate is approximately
  (a) Acoustic
  (b) Caliper
  (c) NMR
  (d) SP

16. SP log is usually run with
  (a) 1500m/hr,
  (b) 2000m/hr
  (c) 500m/hr
  (d) 200m/hr

17. In sand B, the SP deflection is less
  than in sand A, indicating a fresher
  formation water in sand
  (a)caliper
  (B) GR
  © GR and Caliper
  (e) all

18. Three porosity logs are: porosity, acoustic and
  (a)NEUTRON
  (b) resistivity
  © LLD
  (e) LLS

19. If the saturation exponent in Archie's Equation is 2 (n=2) , Then By what factor _____ the bu
                                                                                to fully water saturated forma
  (a) 4
  (b) 3
  (c) 2
  (d) 1

20. When the density neutron log is recorded with a photo electric curve, it is often called as
  (a) Porosity
  (b) Lithology
  (c) FMI
  (d) Dipmeter

21. NMR technique allows the determination of characteristics such as
  (a) Porosity
  (b) Permeability
  (c) Wettability
  (d) all

22. The most important mechanism affecting NMR relaxation is

  (a) Grain surface relaxation
  (b) Density
  (c) Porosity
  (d) none

23. Free fluid index (FFI) of a formation is estimated from
  (a) NMR
  (b) FMI

(c) Pe
(d) neutron

24. The log measures the photoelectric absorption factor, Pe, which is defined as (Z/10) 3.6, where Z
   (a) Atomic number
   (b) Coefficient
   (c) Both
   (d) None

   TRUE OR FALSE

25. The effect of Diagenesis may Enhanced or Degrade Reservoir quality.

26. Biogenic Theory fellow that oil and gas come predominantly from the remains of microscopic pla

27. The study of prehistoric life including organism evolution and interaction with each other and thei

28. Rock Thermal MATURITY is a function of TIME and depth of burial

29. The spontaneous potential log measures the natural or spontaneous potential differences that exists between the borehole and the surface in the absence of any artificially applied current.

30. SP can be recorded for water-base mud.

Section – B (Attempt all the questions) (4 × 10 marks)

31. Find formation temperature at 7800ft, when bottom hole depth is 14,000ft; bottom hole temperature is 200°F; annual mean temperature is 80°F.   [10MARKS]

32. Describe Neutron log with reference to the principle, unit of measurement and application. [10MARKS]

33. (a) Enumerate different parameters monitoring during mud logging. (b) Explain how mud logging information helps in formation evaluation.
   [5+5 MARKS]

34. Refer the log image and answer the following questions: [5+5 MARKS]
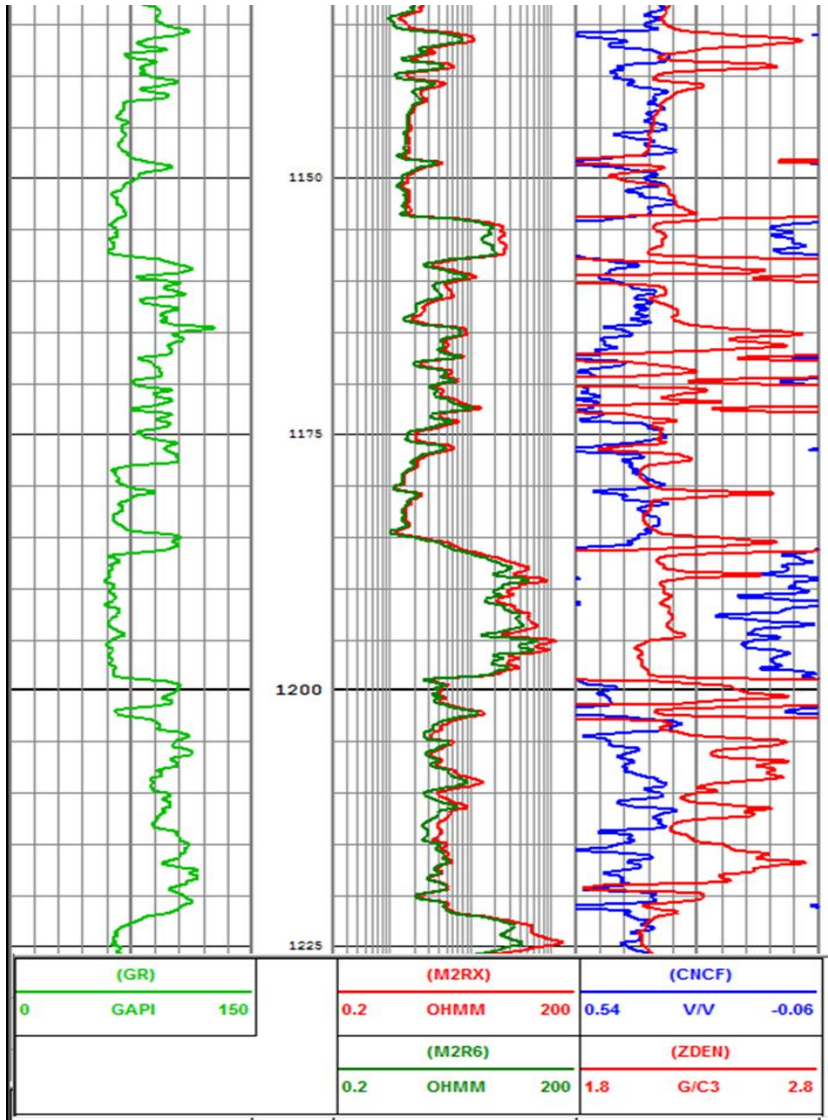
(GR)		
0	GAPI	150

(M2RX)		
0.2	OHMM	200
(M2R6)		
0.2	OHMM	200

(CNCF)		
0.54	V/V	-0.06
(ZDEN)		
1.8	G/C3	2.8

Fig 1

a) Identify lithology and mark in the log section below.
b) Interpret the hydrocarbon bearing zone and assess the reservoir quality based on shaliness

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