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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Petroleum Refinery Engineering) (2013 Batch EL-II) (Sem.-8)

DRILLING AND WELL ENGINEERING

Subject Code : BTPC-803(C)

M.Code : 74324

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- a. In the rock formation, the overburden pressure is supported by which matters?
- b. What is the difference between pore pressure and formation pressure?
- c. Define “porosity”
- d. What is the difference between the absolute permeability and relative permeability?
- e. How the gravity drainage helps in the oil recovery.
- f. What are the objectives of well planning?
- g. What is the function of surface casing?
- h. How rotary drilling bits cut the formation by applying frictional force on the formation?
- i. Define “Formation Damage”.
- j. What do you mean by Differential-pressure Pipe Sticking?

SECTION-B

2. Calculate the makeup loss per joint for 7 inch 26 lb J-55 ST&C casing. Also calculate the loss per thousand ft of casing (as tailed on the pipe rack) and the casing required per thousand feet of made up string.

3. What are the objectives of drilling team?
4. A prospect well in an Indian oil field has its intermediate target zone. Production records indicate that the original bottom hole pressure prior to production from well was 5389 psia at 9890 ft true vertical depth (TVD). Currently, the producing BHP is, 3812 psia and produced fluid is dry gas. A mud weight of 10.7 lb/gal is required to drill the intermediate shale sections contiguous to the oil field. However, a 12.1 lb/gal mud is required to drill the lower target zone at 12050 ft. if the maximum pressure of 2000 psi is established as the upper differential pressure limit. Can the well be drilled with the Concordia sand exposed or must casing be set below the sand before reaching 12,050 ft? (Convert all mud hydrostatic Pressures to absolute pressure by adding 15 psia for atmospheric conditions.)
5. How do we do the surface casing depth selection?
6. What is the “Formation damage” and how it can be prevented?

SECTION-C

7. Calculate for 26 lbs J-55 LT&C casing the average weight for 20 ft casing pipe. Data :

$$d_1 = 6.93175 \text{ in.} \quad d_2 = 6.90337 \text{ in} \quad J = 0.5 \text{ in} \quad L_C = 9.000 \text{ in.}$$

$$L_t = 4.000 \text{ in} \quad L_1 = 0.625 \text{ in} \quad M = 0.704 \text{ in} \quad d_r = 7.094 \text{ in}$$

$$d_c = 7.656 \text{ in} \quad t = 0.362 \text{ in}$$

8. An exploratory well has following casing program to land conductor casing and surface casing.

S.No.	Drilled Depth ft.	Well size Inch	Casing Size inch	Casing	Casing Setting Depth ft.	Mud weight pcf	Formation Fluid Gradient psi/ft
1	0-350	26	20	Conductor	350	65	
2	350-6200	17½	13 3/8	Surface	6200	67	0.465

Determine the net impact of pressure on conductor casing for salt water kick and gas kick conditions. Give design criteria.

9. Explain about the components of drill string.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.