Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Winter 2022 - 23 Examination

Semester: 3 **Date:06/10/2022**
Subject Code: 203120203 **Time: 02:00 pm to 04:30 pm**
Subject Name: Drilling Engineering-I **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) **(15)**

1. The following objectives are set for mud engineering. Which one is not the correct answer?
a) Reach the target depth
b) Minimize well cost
c) Maximize the rate of penetration
d) Enhance the oil production

2. If the formation pressure is greater than the mud pressure, there is the possibility to have a .
a) Oil
b) Kick
c) Gas
d) None of the above

3. The normal industry practice is to keep the overbalance pressure at around
a) 200–300 psi
b) 100–200 psi
c) 100–500 psi
d) 300–500 psi

4. Generally, fracture pressure increases as.
a) The depth increases
b) The pore pressure decreases
c) The overburden pressure decreases
d) b and c

5. Which of the following is a direct indication of having an overpressured zone
a) Decrease in mud pit levels
b) Increase in mud weight of the return mud
c) Decrease in mud flow rate
d) Decrease in mud weight of the return fluid

6. Downhole equipment use to provide WOB is _____
7. As the pore pressure increases, the fracture pressure_____
8. Abnormal pressured formation is the formation that has pressure gradient_____ that of normal pressured formation.

9. Low ROP and high WOB mainly indicate _____ Formation
10.Presure gradient of water is _____ Psi/ft
11.How do you define Plastic viscosity of drilling fluid?
12.What do you mean by BOP?
13.What is minimum yield strength of grade S drill pipe ?
14. What is WOB?
15. What is WOC ?

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) What do you mean by drill string ? Write a short note on any two components of drill string

B) How many tons of Bentonite should be added to water to prepare 750 *bbls* of drilling mud? The mud weight is recorded as 9.5 PPG and the density of Bentonite is 2.6 *gm/cc*.

C) Draw a graph between ROP Vs WOB With respect to Hydraulic horsepower of drill bit.

D)What are indicating signs of Kick in wellbore ?

Q.3 A) What do you mean by Drill bit. Write types of drill bits and write a detailed note on any one type of Bit. **(07)**

B) Write a note on GTO. **(08)**

OR

B) An intermediate section in a well is planned to be cemented using 500 bbls of class G cement slurry with 35% by weight of silica flour. Cement slurry is designed to have mud weight of 15.83 ppg and water is 55% of cement weight. Determine the volume of water and the amount of cement and silica to be mixed in order to prepare the above cement slurry volume. **(08)**

Q.4 A) What do you mean by Pump factor? Derive the equation of pump factor for single acting and double acting pump. **(07)**

OR

A) A well was drilled to a depth of 11,500 ft using 11.0 ppg drilling mud. The drillstring has a float valve at the bottom of the string. When new drilling mud was pumped to a depth of 6,500 ft, collapse pressure at the bottom was calculated to be 500 psi. What was the density of the new mud? **(07)**

B) How do you define Cementing? Describe various equipment use in cementing operation **(08)**