



**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**MAKE UP EXAMINATION – JAN 2023**

**Winter Semester:** 2022 - 23

**Course Code:** PET 2001

**Course Name:** Drilling Fluids and Cements

**Program** : B.Tech - PET

**Date:** 24-01-2023

**Time:** 1.00 PM to 4.00 PM

**Max Marks:** 100

**Weightage:** 50%

**Instructions:**

- (i) Read the all questions carefully and answer accordingly.
- (ii) Question paper consist of three parts, PART A, B & C
- (iii) All questions are mandatory

**Part A [Memory Recall Questions]**

**Answer the Question. Each question carries THIRTY marks.**

**(1Qx 30M= 30M)**

1. Answer the following question [Each question carry 3 marks]

- I. Name any three international Oil company where you want to work in future.
- II. Draw the classification of HPHT well.
- III. What are the any three causes of KICK?
- IV. What is clay swelling and what are the different types? Suggest one mud suitable for clay sensitive formation.
- V. How we express mud cake thickness and filtrate volume? What is Spurt loss?
- VI. Write any two difference between Desander and Desilter. Why Hydrocyclone is replaced by Mud cleaner for weighted mud?
- VII. What can go wrong if drilling fluid doesn't have sufficient of the following: Yield Point, Gel Strength and Plastic Viscosity?
- VIII. Define Flocculation and Aggregation with one rough sketch.
- IX. Write any three limitation of Aqueous based Drilling Fluid.
- X. Give any three example of any three Mud thinners with one limitation of each.

(C.O.No. 1, 2, 3, 4, 5) [Knowledge]

## Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks.

(4Qx10M=40M)

2. Draw a neat and clear diagram with pencil showing all the layers formed around a clay particle is suspended in solution. Label all the layers and regions present and define different potential generated due to presence of the various ions. (C.O.No. 2) [Comprehension]
3. Discuss the following functions of drilling fluid with proper explanation and diagram
  - (a) Counter balance formation pressure
  - (b) Form a thin, low permeability filter cake which seal pores and other openings in formation penetrated by the bit (C.O.No. 3) [Comprehension]
4. "Recovering Drilling Muds and Drill Cuttings for Reuse"-Discuss how drilling fluid is recycled and reused with a block diagram of the entire set up. (C.O.No. 4) [Comprehension]
5. Water-Based mud (WBM) and Oil-Based mud (OBM) are the most common drilling fluids currently used and both have several characteristics that qualify them for High Pressure High Temperature (HPHT) purposes. Write a comparison of both types of mud with ten relevant point. Make two column.columns (C.O.No. 5) [Comprehension]

## Part C [Problem Solving Questions]

Answer all the Questions. Each question carries TEN marks.

(3Qx10M=30M)

6. Determine the quantity of barite required to change the density of mud from 12.53 ppg to 16.7 ppg. Calculate the increase in pit volume due to the addition of such a quantity of barite for an initial mud volume of 63 bbl. (C.O.No. 3) [Application]
7. Determine the density of a water-base mud containing 5% bentonite by weight. The density of bentonite is 20.8 ppg. (C.O.No. 4) [Application]
8. A final volume of 1,750 bbls of drilling mud was planned to be prepared. An existing mud having a mud weight of 10.2 ppg will be used. It is needed to increase its density to 10.5 ppg by adding clay of 2.52 gm/cc density. Calculate the volume of the old mud to be taken and the amount of clay required in tons to get the desired mud weight. (C.O.No. 5) [Application]