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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**Make-Up Examinations, July 2024**

**Winter Semester**: 2023 - 24

**Course Code**: PET2001

**Course Name**: Drilling Fluid and Cements

**Program & Sem**: B.Tech. (Petroleum)

**Date**: 03/July/2024

**Time**: 01:30 PM – 04:30 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

**Part A [Memory Recall Questions]**

**Answer any three Questions. Each question carries ten marks. (3Qx 10M= 30M)**

1. Write the functions of Drilling fluid for successful drilling operation (C.O.No.1) [Knowledge]

2. Classify drilling fluid with suitable flow chat. (C.O.No.1) [Knowledge]

3. Write a short note on:

(a) Electrostatic double layer

(b) Cation exchange capacity (C.O.No.2) [Knowledge]

4. State various particle association method in colloidal drilling fluid suspension along with suitable diagram. (C.O.No.2) [Knowledge]

5. List out the various cementing accessories along with their functions used in oil well cementing job. (C.O.No.3) [Knowledge]

**Part B [Thought Provoking Questions]**

**Answer any two Questions. Each question carries fifteen marks. (2Qx15M=30M)**

6. Elucidate primary cementing job with suitable diagram. (C.O.No.5) [Application]

7. Explain Squeeze cementing and Cement plugging job. (C.O.No.5) [Application]

8. Draw a layout of the mud circulatory system and briefly mention the function of each component of the system. (C.O.No.3) [Application]

**Part C [Problem Solving Questions]**

**Answer any two Questions. Each question carries twenty marks. (2Qx20M=40M)**

9. 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.2) [Application]

10. It is required to reduce mud weight from 25.1 ppg to 22.6 ppg in order to combat a lost circulation problem. Calculate the volumes of water and oil required to bring about this reduction. Also, if oil is used, what is the percentage of oil in mud if the initial volume of mud is 629 bbl. The density of oil is 6.87 ppg. [1bbl=42 gal] (C.O.No.5) [Application]

11. It is required to balance 100 sacks of Class G neat cement in an 8t in open hole by use of a 3t in OD/3.068 in ID, 8.9lb/ft tubing. The hole depth is 6000 ft and 10 bbl of water is to be used as preflush ahead of the cement slurry.

Calculate:

(i) Total slurry volume, annular volume and tubing volume;

(ii) Height of the balanced plug;

(iii) Volume of water to be used as a spacer behind the cement;

(iv) Volume of mud chase (or displacement volume);

(C.O.No.5) [Application]