

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, April/May 2018**

**Course: Safety in Drilling (HSFS 7008)**  
**Program: M.Tech HSE & M.Tech HSE Spl in DM**  
**Time: 03 hrs.**

**Semester: II**  
**Max. Marks: 100**

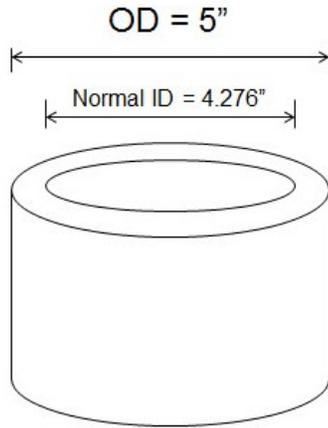
**Instructions: Please read all the questions before giving answers**

**SECTION A**

| S. No. |  | Marks | CO  |
|--------|--|-------|-----|
| Q 1    | What are the advantages and disadvantages of Open hole and closed hole well completion?        | 4     | CO3 |
| Q 2    | What is the purpose of drilling mud? Why it is required to control solids in a Drilling fluid? | 4     | CO2 |
| Q 3    | Explain the importance of circulating system and drilling fluid in drilling operations?        | 4     | CO2 |
| Q 4    | What are the components of a drilling rig?   | 4     | CO1 |
| Q 5    | Calculate the hydrostatic pressure in PSI. Given that Mud weight=12ppg, TVD=10000ft.           | 4     | CO2 |

**SECTION B**

|     |  |    |             |
|-----|--|----|-------------|
| Q 6 | <p>Explain the different types of well control. What do you understand by SIDPP and SICP? What is SHUT IN process? Explain in detail the different types of kill procedures.</p> <p style="text-align: center;">OR</p> <p>Describe various types of Cementation processes in detail. What do you understand by Squeezing technique? What does high and low pressure squeezing means? Describe all the application of squeezing in cementation?</p> | 10 | CO4,C<br>O5 |
| Q 7 | Calculate the Drill collar weight in a deviated well of inclination 30degrees. Take the safety factor for the bit to be 30% and it is also given the planned mud weight to be 15ppg. Also explain the relation between stress and strain?  | 10 | CO3         |
| Q 8 | Given that a API, 5inch S-135, Class New drill pipe having minimum yield strength of 135000psi. Calculate the Tensile capacity considering 100% wall thickness?  | 10 | CO3         |



Q 9 Discuss the safety, health & environmental issues in Drilling ? What do you mean by Fishing and blowout? Discuss the operation of BOP in well control with diagram?

10

CO4

**SECTION-C**

Q 10 Derive the mass of API Barite and the initial volume of the drilling fluid. Given that approximately 1 gallon of water per 100lbm of API barite is usually sufficient to prevent an unacceptable increase in fluid viscosity  
 Given  $V_2 = V_1 + V_b + V_w$ , where  $V_1$  is the initial volume  $V_2$  is the final volume,  $V_b$  is the volume of API Barite to be added and  $V_w$  is the volume fresh water to be added. Calculate the mass of barite and the volume of fresh water to be added.

20

CO3

OR

A company ABC desired to increase the density of 800 bbl of 12-lbm/gal mud to 14-lbm/gal. one gallon of water will be added with each 100-lbm sack of API barite to prevent excessive thickening of the mud. A final mud volume of 800 bbl is desired. Compute the volume of old mud that should be discarded and the mass of API barite to be added.

Reference Table:

| Material               | Specific gravity | Density |         |
|------------------------|------------------|---------|---------|
|                        |                  | lbm/gal | lbm/bbl |
| attapulgate            | 2.89             | 24.1    | 1011    |
| water                  | 1                | 8.33    | 350     |
| diesel                 | 0.86             | 7.2     | 300     |
| bentonite clay         | 2.6              | 21.7    | 910     |
| sand                   | 2.63             | 21.7    | 910     |
| average drilled solids | 2.6              | 21.7    | 910     |
| API barite             | 4.2              | 35      | 1470    |
| CaCl <sub>2</sub>      | 1.96             | 16.3    | 686     |
| NaCl                   | 2.16             | 18      | 756     |

Q 11 Explain the following terms in brief:

- i) Tool Joint
- ii) WOB
- iii) Buoyancy Factor
- iv) Youngs Modulus
- v) Derrick
- vi) Blowout
- vii) SIDPP
- viii) SICP
- ix) ICP
- x) FCP

20

CO1,C  
O2