Name: Roll No:	

UPES

End Sem Examination, May-2023

Programme Name: B.Tech APE UP **Semester: IV**
Course Name: Drilling Engineering and Well Construction **Time: 03 hrs**
Course Code: PEAU 2012 **Max. Marks: 100**
Instructions:

- **All questions are compulsory.**
- **However, internal choice has been provided. You have to attempt only one of the alternatives in all such questions.**

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q1	Discuss the advantages of Rotary steerable system over mud motor systems.	**04**	**CO2**
Q2	Define normal, abnormal & sub-normal pressures considered during well Control.	**04**	**CO1**
Q3	List the main components involved in Portland cement.	**04**	**CO2**
Q4	Distinguish between MWD & LWD.	**04**	**CO2**
Q5	Define KOP, inclination angle and azimuth angle.	**04**	**CO1**

SECTION B
(4Qx10M=40 Marks)

Q 6	List out the different deflection tools used in directional drilling. Explain whip stock tool types with their advantages and disadvantages.	**10**	**CO2**
Q 7	Justify the statement "Wells are designed telescopic". Discuss the functions of each casing with neat diagram.	**10**	**CO3**
Q 8	Explain in detail about the procedure of killing a well using following methods: a) Driller's Method b) Wait and Weight Method	**10**	**CO3**
Q 9	Differentiate between single stage cementing operation and multi-stage cementing operation.	**10**	**CO4**

SECTION-C
(2Qx20M=40 Marks)

Q 10	The 13 3/8" casing string of a well is to be cemented using class 'G'cement. Calculate the following for two stage cementing calculation: a) The required number of sacks of cement for a 1st stage of 700 ft. and a 2nd stage of 500 ft.(Allow 20% excess in open hole) b) The volume of mixwater required for each stage. c) The total hydrostatic pressure exerted at the bottom of each stage of cement (assume a 10 ppg mud is in the well when cementing) d) The displacement volume for each stage. 20" Casing shoe : 1500 ft 13 3/8" Casing 77 lb/ft : 0 - 1000 ft 13 3/8" Casing 77 lb/ft :1000 - 7000 ft. 17 1/2" open hole Depth : 7030 ft. Stage Collar Depth : 1500 ft. Shoetrack : 60 ft. **Cement stage 1** (7000-6300 ft.) Class 'G' Density :15.9 ppg Yield : 1.18 ft^3/sk Mixwater Requirements : 0.67 ft^3/sk **Cement stage 2** (1500-1000 ft.) Class 'G' + 8% bentonite Density : 13.3 ppg Yield : 1.89 ft^3/sk Mixwater Requirements : 1.37 ft^3/sk	**20**	**CO5**

VOLUMETRIC CAPACITIES

	bbls/ft	ft³/ft
Drillpipe		
5" drillpipe :	0.01776	0.0997
Casing		
13 3/8" 72 lb/ft :	0.1480	0.8314
13 3/8" 77 lb/ft :	0.1463	0.8215
Open Hole		
26" Hole	0.6566	3.687
17 1/2" Hole	0.2975	1.6703
Annular Spaces		
26" hole x 20" Casing:	0.2681	1.5053
17 1/2" hole x 13 3/8" Casing:	0.1237	0.6946
30" Casing x 20" Casing:	0.3730	2.0944
20" Casing x 13 3/8" Casing:	0.1816	1.0194

Q 11

In an oil and gas project while designing a deviated well, it has been decided to sidetrack a well from 1500 ft. The sidetrack will be a build and hold profile with the following specifications:

Target Depth	: 10000 ft.
Horizontal departure	: 3500 ft.
Build up Rate	: 1.5^{o} per 100 ft.

Calculate the following:

a. the drift angle of the well.

b. the TVD and horizontal deviation at the end of the buildup section.

c. the total measured depth to the target

OR

Discuss the properties of class G & H cement and also discuss the cement additives. Analyse the role of accelerators and retarders in cement slurry additives.

20 **CO4**

All The Best !!