

Name:
Roll No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Sem Examination, January-2021

Programme Name: M. Tech, Petroleum Engineering.
Course Name: Drilling Engineering.
Course Code: PEAU 7001

Semester: I
Time: 03 hrs
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.
- Write the answers on an A4 sheet with your name and roll number mentioned on each page. Write clearly, scan and upload properly.

SECTION A (5x6=30 Marks)
All Questions are compulsory

S. No.		Marks	CO
Q1	Define Duplex and triplex pumps?	05	CO1
Q2	Define PDC Bits and major components of PDC bit design?	05	CO2
Q3	Differentiate between primary cementing and squeeze cementing?	05	CO3
Q4	Distinguish between MWD & LWD and define ERD well?	04+01	CO4
Q5	Define BOP and their types?	05	CO5
Q6	Define retrievable packers and selection criteria for the production tubing?	2.5+2.5	CO6

SECTION B (50 Marks)
All the questions are compulsory

Q 7	List and describe the functions of each of the component parts of the hoisting system on a conventional land drilling rig?	10	CO1
Q 8	a) Explain in detail about different types of drilling fluids? b) Mention any 6 properties of a drilling fluid and explain their importance?	5+5	CO2
Q 9	Explain in detail about the procedure of killing a well using following methods: a) Driller's Method b) Wait and Weight Method	5+5	CO5

	OR		
	Differentiate between primary, secondary and tertiary well control methods?	10	CO5
Q 10	a) Summarize different considerations needed while planning a directional well? b) List out the different deflection tools used in directional drilling? Explain whip stock tool types with their advantages and disadvantages?	5+5	CO4
Q11	Explain types of well completions with diagram and their advantages & disadvantages?	10	CO6

SECTION-C (20 Marks)
All the questions are compulsory

Q 12	<p>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:</p> <p>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)</p> <p>b) The volume of mixwater required for each stage.</p> <p>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)</p> <p>d) The displacement volume for each stage.</p> <p>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.</p> <p>17 1/2" open hole Depth : 7030 ft. Stage Collar Depth : 1500 ft. Shoetrack : 60 ft.</p> <p>Cement stage 1 (7000-6300 ft.) Class 'G' Density : 15.9 ppg Yield : 1.18 ft³/sk Mixwater Requirements : 0.67 ft³/sk</p> <p>Cement stage 2 (1500-1000 ft.) Class 'G' + 8% bentonite Density : 13.3 ppg Yield : 1.89 ft³/sk Mixwater Requirements : 1.37 ft³/sk</p>	20	CO3
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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

OR

- a) Differentiate between single stage cementing operation and multi-stage cementing operation?
- b) Discuss about the various types of casings and their functions with neat diagram.

10+10

CO3

All The Best !!