

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Course: Drilling Engineering & Well Completion (PTEG 211)

Semester: V

Programme: B.Tech GSE, GIE

Time: 03 hrs.

Max. Marks: 100

Instructions:

SECTION A

S. No.	Question	Marks	CO
Q1	Describe the properties of a completion fluid	4	CO3
Q2	Explain the term Magnetic Declination. Given Magnetic Declination = 3° West. Measured Azimuth is S 45° W. Calculate the True Azimuth.	1+3	CO4
Q3	List main components of cement? Discuss their contributions?	2+2	CO3
Q4	While drilling a well section with 80 pcf mud at 10000 ft well, the following data are recorded. DPSIP = 300 psi CSIP = 500 psi Calculate the formation pressure of that section and the kill mud weight.	4	CO4
Q5	Given, $I_1=15^\circ$, $I_2=19^\circ$ $A_1=320^\circ$, $A_2=310^\circ$ and length of interval between the survey points is 200ft. Calculate the dog leg severity if the following data are noted	4	CO4

SECTION B

Q6	In order to change the hole direction from N40E to N55E, determine the required orientation of deflection tool. Use graphical method in resolving the problem? Additional data given: The hole inclination is 7.5° and maximum dog leg severity is 3°/100ft.	10	CO4
Q7	Give all the 3-types of deflection tools for performing directional drill? Discuss any one among them?	3+7	CO4
Q8	Describe any one Kill method in well killing operations? (OR) Elaborate Lost Circulation. Describe briefly two surveys to detect a lost circulation zone.	10	CO3

Q9	<p>Given information: During drilling of an 8 1/2 inches hole at 8000 ft, a complete loss of circulation was observed. Drilling was stopped and the mud level in the annulus was observed to fall rapidly. The well was filled with water of 62 pcf density until the annular level remained stationary. If the volume of water used was 65.7 bbl and mud density was 75 pcf, Determine</p> <ol style="list-style-type: none"> Formation pressure? and the new mud weight required to balance the formation pressure? <p>Assume the intermediate casing to be 9 in ID 40 # set at 6000 ft. Drillpipe is Grade E, 5 in OD. List Kill Methods?</p>	10	CO3
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SECTION-C

Q10	<p>Primary Cementing of 7 inch Production Casing: Hole Depth = 13900 ft Hole Size = 8 1/2 “ Casing shoe = 13891 ft Mud Weight = 87 pcf Casing Dimensions = OD/ID = 7 in/6.184in; Grade C95 29# <u>Cement Details:</u> Cement Column should be 6562ft long as follows: From shoe to 656 ft use API Class G cement from 656 ft to 6562 ft Use API Class H cement with 2 % Bentonite and 0.3 % HR-4 To prevent contamination of cement by mud 30 bbls of fresh water should be pumped ahead of cement. Allow 15 mins for plug release Shoe track : 80ft Mix cement at 25 sacks/min and displace cement at 300 gpm</p> <table border="1" data-bbox="203 1306 1232 1459"> <thead> <tr> <th></th> <th>Class G Cement</th> <th>Class H Cement</th> </tr> </thead> <tbody> <tr> <td>Slurry Weight</td> <td>118 pcf</td> <td>115 pcf</td> </tr> <tr> <td>Slurry Volume</td> <td>1.15 ft³/sack</td> <td>1.22 ft³/sack</td> </tr> <tr> <td>Mix water</td> <td>5 gal/sack</td> <td>5.49 gal/sack</td> </tr> </tbody> </table> <p>Calculate:</p> <ol style="list-style-type: none"> Quantity of Cement of each class; Volume of Mix Water Total Time for the job Pressure Differential prior to bumping the Plug. Annular Velocity during Chase. 		Class G Cement	Class H Cement	Slurry Weight	118 pcf	115 pcf	Slurry Volume	1.15 ft ³ /sack	1.22 ft ³ /sack	Mix water	5 gal/sack	5.49 gal/sack	20	CO3
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Q11	<p>A) During Drilling of an 8.5inch hole at 10,000ft, a kick was encountered. The well was shut in and the pressure recorded on both drillpipe and annulus were: DPSIP = 200psi CSIP= 400psi</p> <p>Other relevant data include:</p> <p>Last casing = 9 5/8 inch, N80, 43.5 lbm/ft, ID = 8.755 inch Casing Setting Depth= 8600ft Drill Collars: 8inch / 3 inch , 500ft Drill Pipe = standard D/P Circulation pressure (normal) = 2000psi at 60 strokes per minute Circulation Pressure at 30 spm = 500 psi Present mud weigh = 75 pcf Pupm Displacement = 0.1 bbl/stroke Casing Burst pressure = 5930 psi</p> <p><i>Calculate the time taken to kill the entire well.</i></p> <p>(OR)</p> <p>B) Classify well completions and discuss in detail</p>	20	CO4
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