Name:

Enrolment No:

UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Basics of Drilling Technology **Semester: 5**

Programme: B.Tech CSE –OGI **Code:** GIEG 332

Time: 03 hrs. **Max. Marks: 100**

Instructions: Scientific calculator usage is allowed

SECTION A

S. No.		Marks	CO
Q 1	Compare the formation fluid pressure gradient under (a) normal, (b) abnormal and (c) subnormal conditions: -	4	CO1
Q 2	Explain the following terms: (a) Spurt loss (b) Underbalanced drilling	4	CO2
Q 3	List the controlling factors of the drill bit rate of penetration (ROP)	4	CO3
Q 4	Identify the classes of cement used against their well depth	4	CO3
Q 5	List the equipment's used in directional drilling	4	CO4

SECTION B

Q 6	Explain in detail the classification of drilling fluid: -	10	CO2
Q 7	What are early indicators of kick? Analyze the trend of three of them with time and explain its implications?	10	CO5
Q 8	A 10 lbs/gal drilling mud is flowing at 500 gpm through a jet bit. Compare the hydraulic horsepower generated across the bit for each of the following nozzle sets: • 9-9-9. Note that nozzle sizes (diameters) are expressed in 32nds of an inch. Assume $C_d = 0.95$ for nozzle set.	10	CO2
Q 9	Using the following data, for different bits with their respective drilling performance perform the cost analysis and recommend the bit for efficient drilling. Operating cost of the rig is \$12,000/day, Trip time is 10 hours Connection time is 1 minute per connection. Bit performance table:	10	CO6 or CO3

Bit	Bit Cost (\$)	Rotating time (hrs.)	Connecting time (hrs.)	Rate of penetration (ft/hr.)
A	7,000	15	0.1	14
B	21,000	35	0.2	13
C	28,000	45	0.3	10
D	31,500	65	0.3	11

	OR Explain in detail mud rheology with focus on Newtonian and non-Newtonian fluids:-		
SECTION-C			
Q 9	Following data is given for a directional offshore well drilled as J-profile: Origin (O): 0 ft. Kick-off point (K) = 1000' Build Rate (BUR) = 2.5^0/100' <u>Target data</u> True vertical depth = 9500' Northings (D_n) = +3507' Eastings (D_e) = -1752' **Find the following:** 1. Horizontal Departure 2. Azimuth of the well 3. Final inclination of the well 4. End of build at TVD 5. End of build at departure 6. Measured depth at end of build 7. Total measured depth at the target	**20**	**CO4**
Q 10	Explain in detail the two well control methods used in drilling when a kick is taken: -	**20**	**CO5**

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Name of Examination (Please tick, symbol is given)	:	**MID**		**END**	☒	**SUPPLE**	
Name of the School (Please tick, symbol is given)	:	**SOE**		**SOCS**	☒	**SOP**	
Programme	:	**B.Tech CSE -OGI**					
Semester	:	**5**					
Name of the Course	:	**Basics of Drilling Technology**					
Course Code	:	**GIEG 332**					
Name of Question Paper Setter	:	**Amit Verma.**					
Employee Code	:	**40001668**					
Mobile & Extension	:	**9452 9595 51**					
Note: Please mention additional Stationery to be provided, during examination such as Table/Graph Sheet etc. else mention "NOT APPLICABLE": **Not applicable**							

FOR SRE DEPARTMENT		
Date of Examination	:	
Time of Examination	:	
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Note: - Pl. start your question paper from next page

Model Question Paper (Blank) is on next page

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SECTION A

S. No.		Marks	CO
Q 1	State the type of pumps used in mud circulation system: -	**4**	**CO1**
Q 2	Explain the following terms: (a) Alkalinity of drilling mud (b) Kelly	**4**	**CO2**
Q 3	List the controlling factors of the drill bit rate of penetration (ROP)	**4**	**CO3**
Q 4	Identify the classes of cement used against their well depth	**4**	**CO3**
Q 5	With neat diagram state the type of vibrations though which drill pipe undergoes: -	**4**	**CO4**

SECTION B

Q 6	Explain in detail the classification of drilling fluid: -	**10**	**CO2**
Q 7	What are early indicators of kick? Analyze the trend of three of them with time and explain its implications?	**10**	**CO5**
Q 8	A 10 lbs/gal drilling mud is flowing at 500 gpm through a jet bit. Compare the hydraulic horsepower generated across the bit for each of the following nozzle sets: • 9-9-9. Note that nozzle sizes (diameters) are expressed in 32nds of an inch. Assume $C_d = 0.95$ for nozzle set.	**10**	**CO2**
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OR

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	SECTION-C		
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Q 10	Explain in detail potential drilling problem and their solutions: -	**20**	**CO5**