Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, 2021

Course: Safety in Drilling (HSFS 7008) **Semester: II**
Program: M.Tech HSE & M.Tech HSE Spl in DM
Time: 03 hrs. **Max. Marks: 100**

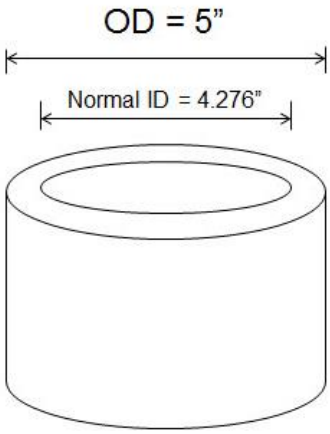
Instructions: Please read all the questions before giving answers

SECTION A

S. No.		**CO**
Q 1	Compare Open Hole and closed hole well completion?	**CO3**
Q 2	State the importance of drilling mud. In what respect it is used to control solids in a Drilling fluid?	**CO2**
Q 3	Suggest the importance of draw-works and Blow out preventer in drilling operations.	**CO2**
Q 4	Illustrate and explain the relevant components in drilling operation.	**CO1**
Q 5	Calculate the True vertical depth in ft. Given that Mud weight=12ppg, Pressure=1000psi	**CO2**
Q 6	Discuss in brief SHUT IN procedure and compare Hard SHUT IN and Soft SHUT IN?	**CO3**

SECTION B

Q 7	Compare Primary & Secondary Cementation processes in detail. Give significance relevance of Squeezing technique? Explain the term high, low pressure squeezing & balance plug method? Identify all the application of squeezing in cementation. OR Calculate the Drill collar weight in a deviated well of inclination 30degrees.Take the safety factor for the bit to be 50% and it is given the planned mud weight to be 15ppg.Also explain the relation between stress and strain in terms of yield strength.	**CO4** **CO3**
Q 8	State various types of well control. Give the significance of SIDPP, SICP and SHUT IN Process? Illustrate different types of kill procedures?	**CO2**
Q 9	Given that a API,4 inch S-135 ,Class New drill pipe having minimum yield strength of 125000psi.Calculate the Tensile capacity considering 80% well thickness?	**CO2**



Q 10	Analyze the safety, health & environmental issues in Drilling. What do understand by the term squeezing and plugging with suitable examples? Also discuss the operation of BOP in well control.	**CO4**
Q 11	A company ABC desired to increase the density of 800 bbl of 18-lbm/gal mud to 20-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. Evaluate the volume of old mud that should be discarded and the mass of API barite to be added. Reference Table:	**CO4**

Material	Specific gravity	Density	
		lbm/gal	lbm/bbl
attapulgite	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
CaCl2	1.96	16.3	686
NaCl	2.16	18	756

OR

	FATAL ACCIDENT AT WORKOVER RIG DUE TO FAILURE OF CASING LINE Introduction An incident of failure (breaking) of casing line occurred at chartered hired workover rig. As a result, travelling block fell down on the derrick floor, injuring three persons (2 rig man and 1 helper). After first aid they were sent to hospital for further treatment, where one of the injured succumbed to injury. Loss due to Accident: 1. Fatality of one person 2. Damage to property 3. Delay in the completion/servicing of well leading to loss of Hydrocarbon production Brief description: • Scrapper running in job was going on after cement drilling job, on 29.03.2011 morning. • After running in of 7" scrapper with 1 single and 39 doubles of 2 7/8" drill pipe, travelling block was moving up to take another stand of drill pipe. • At 05.15 hrs, when the travelling block was near monkey board, suddenly casing line broke and travelling block fell down on the derrick floor injuring three persons. After first aid they were sent to hospital for further treatment where one of the injured succumbed to injury on 30.03.11 at 1200 hrs. Observations: i) Assistant shift incharge who was operating the brake at the time of incident was doing extra duty from 1900 hrs to 0700 hrs. His actual duty period was from 0700 hrs to 1900 hrs. on the previous day. Retaining him on extra duty was without the knowledge of the rig coordinator. ii) Apparently crown-o-matic device (a safety device meant to control the movement of travelling block) did not function; as a result travelling block moved up and hit the crown block, where the casing line (wire rope) got entrapped between crown block and travelling block that resulted in the breaking of casing line. 2 iii) Damage observed on the crown block members, monkey board, travelling block and derrick floor area. iv) Derrick floor was very congested with number of equipment lying there. v) Standard operating procedures (SOPs) for the rig operation were not available. vi) No record or system to carry out daily inspection of rig mast / structure and hoisting equipment as per OISD-STDs-190 & 203 respectively was available. vii) Rig In charge and Asst.shift in charge were not having well control certificate. viii)Pre work over safety meeting and pre job tool box meetings records were not available. ix) Mock drill records were not available. x) Records of testing of various activities (BOP pressure test, casing line inspection etc.) are not being signed by company representative xi) Dedicated rig coordinator was not there and the visit of the coordinator to the rig was also not regular due to shortage of manpower as informed. xii) Though instruction register was available, time gap was observed in the instructions given. xiii) Bridging document for interface management was not available. Infer the root causes and recommendation for the above mentioned accident case study?	**CO3**
SECTION-C		
Q 12	Formulate 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 V2=V1 +Vb+V,.where V1 is the initial volume V2 is the final volume ,Vb is the volume of API Barite to be added and Vw is the volume fresh water to be added. Calculate the mass of barite and the volume of fresh water to be added.	**CO5**