Name: **Roll No:**	UPES UNIVERSITY OF TOMORROW

UPES

End Sem Examination, May-2025

Programme Name: B.Tech APE UP **Semester: IV**
Course Name: Advanced Drilling Engineering **Time: 03 hrs**
Course Code: PEAU 2015 **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	Define KOP, inclination angle and azimuth angle.	**04**	**CO1**
Q2	Define MAASP, SIDPP and SICP.	**04**	**CO1**
Q3	List the main components involved in Pozmix cement.	**04**	**CO2**
Q4	Discuss conventional drilling, horizontal drilling, and ERD well drilling	**04**	**CO2**
Q5	Discuss the advantages of Rotary steerable system over mud motor systems	**04**	**CO2**

SECTION B
(4Qx10M=40 Marks)

Q 6	A production casing was planned to be set at 18,000 ft with a drilling mud of 11.2 ppg at the annulus. When inside casing was filled with 13.0 ppg mud, burst safety factor was calculated to be 4.12. Determine the burst rating of the casing. **OR** Discuss the properties of class G & H cement and role of accelerators and retarders in cement slurry additives.	**10**	**CO3**
Q 7	A drilling string consists of 750 ft of Drill Collar with a weight of 90 *ppf* and drill Pipes have weight of 25 *ppf* was used to drill a well to a depth of 16,500 ft using 11.4 ppg drilling mud. If yield strength of drillpipe is 600,000 lb_f, and steel density is 65 ppg. Calculate the safety factor at this situation, and if the maximum overpull	**10**	**CO4**

	that can be applied to the drillstring is 75,000 lb_f,. To what depth can the current drillstring be used to drill this well?		
Q 8	a) Summarize different considerations needed while planning a directional well. b) List out the different deflection tools used in directional drilling. Explain Jetting techniques with their advantages and disadvantages.	**10**	**CO3**
Q 9	Case study-Assam's Baghjan gas well blowout occurred on June 9, 2020 Explain briefly – i. Illustrate the background: The path of tragedy. ii. Discuss the investigations into the incident. iii. Explain the consequences : Ecology , Economics iv. Discuss the Long term & short-term effects on environment. v. Key recommendations: lessons learnt for future from this incident	**10**	**CO3**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	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° 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** For the given below casing information, Calculate the gas kick volume: Casing shoe (9-5/8” casing) at 6,000’ MD/ 6,000’ TVD Predicted formation pressure at TD (10,000’MD/10,000’TVD) = 14.0 ppg Pore pressure uncertainty = 1.0 ppg Planned mud weight = 14.5 ppg (0.754 psi/ft) Gas gradient = 0.1 psi/ft LOT = 16.0 ppg Hole size = 8-1/2” Drill Pipe = 5” BHA + Drill Collar = 7” Length of BHA+Drill Collar = 400 ft Annular capacity between open hole and BHA = 0.0226 bbl/ft Annular capacity between open hole and 5” DP = 0.0459 bbl/ft	**20**	**CO4**

Q 11	The 9 5/8" casing of a well is to be cemented in place with a single stage cementing operation. The appropriate calculations are to be conducted prior to the operation. The details of the operation are as follows: 9 $^{5/8}$" casing is set at : 13,800 ft 12¼" hole : 13,810 ft 13 $^{3/8}$" 68 lbm/ft casing is set : 6,200 ft TOC (top of cement) outside 9 $^{5/8}$" casing : 3,000 ft above shoe Slurry density: 15.9 ppg Assume gauge hole, add 20% excess in open hole The casing is to be cemented with class G cement with the following Additives: 0.2% D13R (retarder) 1.0% D65 (friction reducer) Volumetric capacity of 9 $^{5/8}$" casing and 12¼" hole: 0 3132 ft^3/ft Volumetric capacity of 9 $^{5/8}$" casing and float collar: 0.5050 ft^3/ft Volumetric capacity of 12¼" hole: 0 8185 ft^3/ft Yield of Class G cement for density of 15.9 ppg: 1.14 ft^3/sk. Mixwater requirements: 5 gal/sk	**20**	**CO5**