Name: Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: Drilling Process Design and Optimization **Semester: V**
Program: B. Tech (APE-Upstream) **Time : 03 hrs.**
Course Code: CHCE 3021P **Max. Marks: 100**

Instructions:
1. **Answer all the questions**
2. **Assume suitable data if missing**

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Discuss derrick load due to external forces like wind, waves etc.	4	CO5
Q 2	Discuss importance of Torque and Drag in drilling	4	CO3
Q 3	Estimate the efficiency factor for a hoisting system employing 8 stung lines. Assume the value of K to be 0.975.	4	CO4
Q 4	Describe the designing and selection of Drill pipes based on collapse and burst	4	CO3
Q 5	Describe briefly about derrick load and substructure	4	CO4
SECTION B **(4Qx10M= 40 Marks)**			
Q 6	List out various types of drilling operations and describe about rotary drilling systems	10	CO1
Q 7	Describe drillstring design in case of directional wells	10	CO6
Q 8	Discuss drill pipe design and selection based on tension, collapse pressure in drill pipes	10	CO3
Q 9	A diesel engine gives an output torque of 1740 ft-lbf at an engine speed of 1200 rpm. If the fuel consumption rate was 31.50 gal/hr, what is the output power and overall efficiency of the engine? Data: Diesel density = 7.20 lbm/gal; heating value: 19000 Btu/lbm	10	CO4
SECTION-C **(2Qx20M=40 Marks)**			
Q 10	a. Describe the dog leg severity based on bending stresses b. A grade E drillstring has a tension load of 190000 lb at 4,500 ft. Determine the maximum permissible dogleg that will not cause fatigue damage. The 4.50 in. drill pipe weighs 16.60 lb/ft (3.826-in. ID)	20	CO 2

Q 11	Design and selection of drilling rig components: Derrick or mast and substructure, power and prime movers and hoisting components	**20**	**CO5**