



PRESIDENCY UNIVERSITY

BENGALURU

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End - Term Examinations – May/June 2026

Date: 18-05-2026

Time: 01:00pm – 04:00pm

School: SOE	Program: B.Tech.-PET	
Course Code: PET3003	Course Name: Offshore Drilling and Petroleum Production Practices	
Semester: VI	Max Marks: 100	Weightage: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	14	22	22	6	36

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	List the key factors that influence the stability of a floating body.	2 Marks	L1	CO1										
2.	State the functions of spud cans in jack-up rigs.	2 Marks	L1	CO2										
3.	Distinguish between semisubmersibles and drillships in terms of heave motion.	2 Marks	L1	CO3										
4.	Match the following with the correct options. <table border="1"><thead><tr><th>Column A (Platform Type)</th><th>Column B (Feature)</th></tr></thead><tbody><tr><td>1.Semisubmersible</td><td>a. Vertically moored, restrained vertical movement</td></tr><tr><td>2. Drillship</td><td>b. Multi-legged, low heave motion</td></tr><tr><td>3. FPSO</td><td>c. High mobility, large heave response</td></tr><tr><td>4. Tension Leg Platform (TLP)</td><td>d. Oil storage and offloading; no drilling</td></tr></tbody></table>	Column A (Platform Type)	Column B (Feature)	1.Semisubmersible	a. Vertically moored, restrained vertical movement	2. Drillship	b. Multi-legged, low heave motion	3. FPSO	c. High mobility, large heave response	4. Tension Leg Platform (TLP)	d. Oil storage and offloading; no drilling	2 Marks	L1	CO4
Column A (Platform Type)	Column B (Feature)													
1.Semisubmersible	a. Vertically moored, restrained vertical movement													
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4. Tension Leg Platform (TLP)	d. Oil storage and offloading; no drilling													
5.	Identify the correct option: I. _____ platform is an offshore drilling unit that remains afloat by means of semi-submerged pontoons and columns, using buoyancy and weight balance to maintain stability in deep water. <i>[Jack-up platform/Semi-submersible platform/Fixed platform/Spar platform]</i>	2 Marks	L1	CO4										

	II. A _____ system automatically controls a vessel's position and heading exclusively by means of active thrust, without the use of anchors. <i>[Mooring system/Jack-up system/Dynamic positioning system/Anchoring system]</i>			
6.	List the equipment used in glycol absorption dehydration.	2 Marks	L1	C05
7.	Name the essential systems vital to offshore oil and gas production.	2 Marks	L1	C01
8.	Distinguish between absorption and adsorption methods for gas dehydration.	2 Marks	L1	C05
9.	List any two of the functions of a subsea manifold.	2 Marks	L1	C05
10.	Outline the critical need for gas dehydration in offshore operations.	2 Marks	L1	C04

Part B

Answer the Questions.

Total Marks 80M

11.	a.	Demonstrate the concept of a jacketed platform in offshore oil and gas exploration. Explain its design, the different types of jacketed platforms, and the various materials and elements used in the construction of the structure.	10 Marks	L3	C02
	b.	Illustrate the key differences between fixed-type offshore platforms and compliant platforms. Discuss how the selection of a platform is influenced by environmental conditions and water depth.	10 Marks	L3	C02

Or

12.	a.	Interpret the causes, consequences, and mitigation measures associated with the "punch through" phenomenon in jack-up rigs.	10 Marks	L3	C02
	b.	Classify independent leg and mat-supported jack-up rigs, outlining the advantages and disadvantages of each. Discuss the conditions under which each type is most suitable.	10 Marks	L3	C02

13.	a.	Examine the advantages of drillships and semi-submersibles in deepwater drilling, focusing on their mooring and positioning systems and the key benefits of each type.	10 Marks	L3	C03
	b.	Illustrate the structure and function of a spar platform, including how it maintains stability. Discuss the key advantages of using a spar platform compared to other offshore structures.	10 Marks	L3	C03
Or					

14.	a.	Illustrate Floating Production Storage and Offloading (FPSO) units, focusing on their applications, operational challenges, and advantages in offshore oil and gas production.	10 Marks	L3	C03
	b.	Demonstrate the concept of oil storage in offshore structures, detailing how various platforms, such as FPSOs and gravity-based structures, store oil. Discuss the risks associated with offshore oil storage.	10 Marks	L3	C03

15.	Classify the various methods used for gas dehydration in offshore facilities, highlighting their differences. Explain the glycol dehydration process in offshore natural gas processing and include a labeled flow diagram depicting the key stages of the glycol dehydration unit.	20 Marks	L3	C05
Or				
16.	Illustrate the major components and processes involved in offshore production systems. Explain the two-stage separation process in offshore facilities and outline the purpose of each stage.	20 Marks	L3	C05

17.	a.	Interpret the influence of environmental forces acting on a drilling vessel. A vessel is exposed to: Wind velocity = 35 knots Projected area = 1000 ft ² $C_s = 1.0$ $C_h = 1.2$ Current velocity = 4 ft/s Underwater area = 800 ft ² $C_s = 1.1$ Calculate both wind and current forces	10 Marks	L2	C01
	b.	Describe the concept of subsea technology used in offshore drilling and production operations by classifying the various subdivisions of subsea systems from the wellhead to subsea flow lines.	10 Marks	L2	C05
Or					
18.	a.	A rectangular metal block measuring 3 m × 2 m × 1.2 m floats horizontally in water. The block has a unit weight of 8.0 kN/m ³ , while water has a unit weight of 10 kN/m ³ . Describe how the volume of water displaced, depth of immersion, and position of the centre of buoyancy can be determined for this block.	10 Marks	L2	C01
	b.	Describe produced water in offshore oil and gas operations. Describe the sources, key constituents, and the importance of its treatment before disposal or reinjection.	10 Marks	L2	C05