

Roll No: -----

**UNIVERSITY OF PETROLEUM
AND ENERGY STUDIES**



End Semester Examination – April, 2017

Program/course: BSc (Petroleum Operations)
Subject: Offshore Operations

Semester – VI
Max. Marks : 100

Code : PTEG 313
No. of page/s: 03

Duration : 3 Hrs

Instructions: All questions are compulsory.

Section-A

Answer all questions

[5X4=20]

1. Which is India's largest offshore oil field? Highlight the key features of it.
2. Differentiate use of azimuthing thruster over anchor.
3. Explain the causes of varying hookload during the offshore drilling operation.
4. Briefly explain the parameters specific to the marine environment.
5. Represent diametrically storage space for crude oil prior to transfer into tankers via a buoy mooring for the following –
 - Concrete gravity base
 - Tension leg platform

Section – B

Answer all questions

[5X12=60]

6. Describe the sequence of subsea control system. Explain offshore drilling events leading up to a blowout, including the following in your description:
 - ✓ Explain what technically constitute a blowout
 - ✓ How is pressure usually controlled in a well
7. Why is it important to disconnect a Tender from a Platform during storms, even when the Tender uses Dynamic Positioning?
8. Draw a detailed neat diagram showing all important components of an offshore oil production system.
9. Corrosion of steel (or any metal) structures in sea water is a natural phenomenon. How is corrosion prevented on offshore steel structures?
10. Explain the connection & stability of riser with the drill ship under sever conditions.

Section – C

Answer all questions

[1X20=20]

11. Case Study : Deep water Horizon

The blowout preventer (BOP) that was intended to shut off the flow of high-pressure oil and gas from the Macondo well in the Gulf of Mexico during the disaster on the Deepwater Horizon drilling rig on April 20, 2010, failed to seal the well because drill pipe buckled for reasons the offshore drilling industry remains largely unaware of, according to a new two-volume draft investigation report released last week by the U.S. Chemical Safety Board (CSB).

The blowout caused explosions and a fire on the Deepwater Horizon rig, leading to the deaths of 11 personnel onboard and serious injuries to 17 others. Nearly 100 others escaped from the burning rig, which sank two days later, leaving the Macondo well spewing oil and gas into Gulf waters for 87 days. By that time the resulting oil spill was the largest in offshore history. The failure of the BOP directly led to the oil spill and contributed to the severity of the incident on the rig.

The CSB report concluded that the pipe buckling likely occurred during the first minutes of the blowout, as crews desperately sought to regain control of oil and gas surging up from the Macondo well. Although other investigations had previously noted that the

Macondo drill pipe was found in a bent or buckled state, this was assumed to have occurred days later, after the blowout was well underway.

The pipe was damaged in such a way that the blowout preventer couldn't cut it and seal it off, the board said. The buckling occurred because of big differences in pressure inside and outside the pipe, which ran through about 5,000 feet of water. The blowout preventer itself punctured the pipe, the board said, allowing oil to start leaking into the Gulf of Mexico close to the seabed. About five million barrels of oil flowed into the gulf before the well was closed off, 87 days later.

Reading the above case answer the following questions-

Q1 What could be the possible reason for that pipe buckling occurred?

Q2 What are the faults from the rig crew side that lead to a blowout?

Q3 Instead of having a shear ram . Why the BOP itself punctured the pipe?

Q4. What was the “root technical cause” of the BP well blowout, according to the chief counsel’s report of the National Commission on the BP Deepwater Horizon Oil Spill?

-----XXX-----