# PRESIDENCY UNIVERSITY

## BENGALURU

### End - Term Examinations – MAY/ JUNE 2025

**Date:** 02-06-2025        **Time:** 01:00 pm – 04:00 pm

| | |
|---|---|
| **School:** SOE | **Program:** B. Tech in Petroleum Engineering |
| **Course Code :** PET3004 | **Course Name:** Advanced Well Engineering |
| **Semester**: IV | **Max Marks**: 100     **Weightage**: 50% |

| CO - Levels | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|
| **Marks** | 10 | 10 | 40 | 40 | NA |

**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**

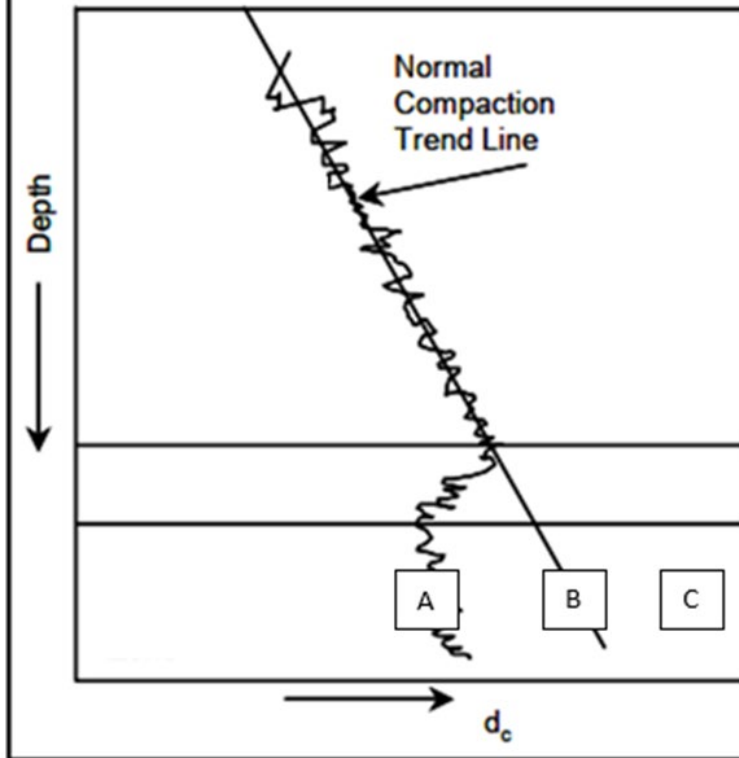| | | | | |
|---|---|---|---|---|
| **1.** | Define Primary well control | 2 Marks | L1 | CO3 |
| **2.** | State the equation used to determine the BHP the BHP in POOH condition. | 2 Marks | L1 | CO3 |
| **3.** | Define Kick and Blowout in an oil well. | 2 Marks | L1 | CO3 |
| **4.** | State the equation to calculate kill mud weight. | 2 Marks | L1 | CO3 |
| **5.** | Define SDIPP & SICP. | 2 Marks | L1 | CO3 |
| **6.** | List the elements of well costing. | 2 Marks | L1 | CO4 |
| **7.** | Define Turn-Key projects**.** | 2 Marks | L1 | CO4 |
| **8.** | Define AFE in well costing. | 2 Marks | L1 | CO4 |
| **9.** | Define MWD and LWD. | 2 Marks | L1 | CO4 |
| **10.** | Define HELP and NELP. | 2 Marks | L1 | CO4 |

## Part B

| 11. | The following data refer to a drill string stuck at the drill collars:<br>Drill pipe: 10000 ft, 5/4.276 in, Grade E 19.5 lbm/ft,<br>Class 2 drill collars: 600 ft, total weight 80000 lb<br>make-up torque for drill pipe tool joints =20 000 lb-ft<br>100% free point = 9900 ft.<br>Solve for the maximum torque that can be applied at the surface without exceeding the minimum torsional yield strength of drill pipe.<br>Take tensile strength of drill pipe (From standard Table) = 311540 lb | 10 Marks | L3 | CO1 |
|---|---|---|---|---|
| | **Or** | | | |
| 12. | Assume that a drill pipe of length 10000ft, having weight 19.5lb/ft and length of drill collar as 600ft and weight of drill collar as 160.4 lb/ft. with a mud weight is 75pcf. Solve for the:<br>    (a) The safety factor during drilling in tension takes yield strength (Pt)=501090 lb<br>    (b) The magnitude of shock loading<br>Safety factor when both tension and shock loading is acting simultaneously. | 10 Marks | L3 | CO1 |

| 13. | Interpret in detail how Depositional Effects can result in the development of abnormal pore pressure in a reservoir. Explain the different factors affecting it. | 10 Marks | L3 | CO2 |
|---|---|---|---|---|
| | **Or** | | | |
| 14. | The figure illustrates the behavior of the corrected drilling exponent (dc) in transition and over-pressured zones, obtained using the D-exponent method. As a drilling engineer, apply your knowledge to analyze the data point at location "A" to determine the type of pressure at that point. Provide a detailed explanation supporting your analysis, considering the deviation of the data from the expected trend line and how it indicates the pressure conditions at the specified depth. | 10 Marks | L3 | CO2 |

Figure    Response Of Corrected dc In Transition And Overpressured Zones

| 15. | Solve for the reduction in hydrostatic pressure when withdrawing a DRY pipe from the wellbore:<br>Number of strands pulled = 20<br>Pipe displacement = 0.0055 bbl/ft<br>Average length per strand = 91 ft<br>Casing capacity = 0.0873 bbl/ft<br>Mud weight = 10.0 ppg | 15 Marks | L3 | CO3 |
|---|---|---|---|---|
| | **Or** | | | |
| 16. | Solve for the hydrostatic pressure decrease when pulling WET pipe out of the hole:<br>Number of strands pulled = 25<br>Pipe displacement = 0.0055 bbl/ft<br>Average length per strand = 91 ft<br>Pipe Capacity = 0.01876 bbl/ft<br>Casing capacity = 0.0873 bbl/ft<br>Mud weight = 12.0 ppg | 15 Marks | L3 | CO3 |

| 17. | Explain the different well killing and well control methods in detail. Explain each one of them in detail. Also explain the role BOP and its types in detail. | 15 Marks | L2 | CO3 |
|---|---|---|---|---|
| | **Or** | | | |
| 18. | Discuss both the warning and positive signs of Kick and the possible remediation technique that you will take to avoid it. | 15 Marks | L2 | CO3 |

| 19. | There are three main elements of the well cost. No matter what service or product is used, it will fall under one of the following three cost elements, namely: 1. Rig costs; 2. Tangibles; 3. Services. Discuss all the types of well cost with respect to petroleum drilling operations and explain each of them. | 15 Marks | L2 | CO4 |
|---|---|---|---|---|
| | **Or** | | | |
| 20. | Service costs encompass any services needed for the well. Identify and state any ten costs that fall in the category of Services while calculating well cost. Explain all the cost in detail. | 15 Marks | L2 | CO4 |

| 21. | In the calculation of drilling costs, risk assessment is articulated in relation to the likelihood of achieving a specific target. There are three levels of risks: (a)P10 Estimate; (b) P50 Estimate; and (c) P90 Estimate. Explain in detail all the types of Risk Estimates in drilling cost calculations. | 15 Marks | L2 | CO4 |
|---|---|---|---|---|
| | **Or** | | | |
| 22. | Explain non-productive time (NPT) in drilling operations and categorize the different types of NPT and discuss each of them in detail. | 15 Marks | L2 | CO4 |