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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 17 - 01- 2025 **Time:** 09:30 am – 12:30 pm |

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

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

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20Marks** | | | | |
| **1** | Define SDIPP & SICP. | **2 Marks** | **L1** | **CO3** |
| **2** | List the equation to calculate kill mud weight. | **2 Marks** | **L1** | **CO3** |
| **3** | Define Blowout of a well. | **2 Marks** | **L1** | **CO3** |
| **4** | State the equation used to determine the BHP while drilling. | **2 Marks** | **L1** | **CO3** |
| **5** | Define secondary well control. | **2 Marks** | **L1** | **CO3** |
| **6** | Define AFE in well costing. | **2 Marks** | **L1** | **CO4** |
| **7** | List 4 factors which affects the well cost. | **2 Marks** | **L1** | **CO4** |
| **8** | Define MWD and LWD. | **2 Marks** | **L1** | **CO4** |
| **9** | Define Turn-Key projects**.** | **2 Marks** | **L1** | **CO4** |
| **10** | Define Fishing in context of drilling. | **2 Marks** | **L1** | **CO4** |

**Part B**

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| **Answer the Questions. Total Marks 80 Marks** | | | | | |
| **11.** |  | Solve for the weight carried by the top joint of the drill pipe in a drill string consisting of two stands of drill pipe, each with an average length of 27 feet, and one stand of drilling collar with an average length of 31 feet. The nominal weight of the drill pipe is 19.5 pounds per foot (ppf), and the nominal weight of the drilling collar is 22.6 ppf. The mud used in this operation has a density of 9 pounds per gallon (ppg). | **10**  **Marks** | **L3** | **CO1** |
| **or** | | | | | |  | **or** |
| **12.** |  | A drill string consists of 600ft of 8(1/4) in X 2 (13/16) in drill collars and the rest is a 5in, 19.5 lbm/ft Grade X95 drillpipe. If the required MOP is 100 000 lb and mud weight is 75pcf (10ppg), Solve for the maximum depth of hole that can be drilled when (a) using new drill pipe having a yield strength (Pt) of 501090 lb. | **10 Marks** | **L3** | **CO1** |
|  |  |  |  |  |  |
| **13.** |  | Thermodynamic processes may be considered as additional contributory factors, which can cause the abnormal pressure in the reservoir. Interpret the statement and discuss in detail. | **10 Marks** | **L2** | **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, you are tasked with infer 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** | **L2** | **CO2** |

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| **15.** |  | 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** | | | | | |
| **16.** |  | Explain the concept of Swabbing and surging in petroleum drilling operations, and elucidate how surging can potentially result in kicks. Also explain the crucial factor encouraging swabbing. | **15 Marks** | **L2** | **CO3** |

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| **17.** |  | Solve for the reduction in hydrostatic pressure when withdrawing a DRY pipe from the wellbore:  Number of strands pulled = 20  Pipe displacement = 0.0055 bbl/ft  Average length per strand = 91 ft  Casing capacity = 0.0873 bbl/ft  Mud weight = 10.0 ppg | **15**  **Marks** | **L3** | **CO3** |
| **Or** | | | | | |
| **18.** |  | Solve for the hydrostatic pressure decrease when pulling **WET** pipe out of the hole:  Number of strands pulled = 10  Pipe displacement = 0.0055 bbl/ft  Average length per strand = 91 ft  Pipe Capacity = 0.01876 bbl/ft  Casing capacity = 0.0873 bbl/ft  Mud weight = 12.0 ppg | **15**  **Marks** | **L3** | **CO3** |

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| **19.** |  | 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** |
| **Or** | | | | | |
| **20.** |  | 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. Illustrate all the types of well cost with respect to petroleum drilling operations and explain each of them. | **15**  **Marks** | **L2** | **CO4** |

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| **21.** |  | The importance of well costs in the petroleum industry is immense. These expenses play a pivotal role in numerous facets of exploration, drilling, and production operations. State the factors that influence the cost of a well and discuss each of them in detail. | **15**  **Marks** | **L2** | **CO4** |
| **Or** | | | | | |
| **22.** |  | 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** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***