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**PRESIDENCY UNIVERSITY
BENGALURU**

SET A

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024**

Semester : Semester VII - 2020

Course Code : PET3011

Course Name : Well Intervention Technologies

Program : B.Tech.

Date : 0J-JAN-2024

Time : 9:30AM - 12:30 PM

Max Marks : 100

Weightage : 50%

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Question paper consists of 3 parts.

(iii) Scientific and non-programmable calculator are permitted.

(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

5 X 2M = 10M

1. Mention the different components of a coiled tubing unit.

(CO1) [Knowledge]

2. Write down different tool string equipment of slickline unit.

(CO2) [Knowledge]

3. List different types of fracturing fluids used in hydraulic fracturing operation.

(CO3) [Knowledge]

4. List the types of additives used in hydraulic fracturing operation.

(CO4) [Knowledge]

5. Recall the different types of acids used in carbonate and sandstone acidization.

(CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

5 X 10M = 50M

6. Explain with diagram the most significant considerations associated with the use of nitrogen in the activation processes of oil wells for extraction of crude oil.

(CO1) [Comprehension]

7. Discuss different crude oil characterization techniques and their importance in flow assurance studies, ensuring a more comprehensive understanding of fluid behavior under varying conditions and enabling the development of targeted, proactive strategies to mitigate flow-related challenges in oil production systems.

(CO2) [Comprehension]

8. Mechanical methods for solid removal in oil and gas transportation pipelines not only ensure efficient and uninterrupted flow but also minimize equipment wear, considering the trade-offs between effectiveness, operational costs, and environmental sustainability in diverse pipeline systems. Summarize the aspects and technique of mechanical methods for solid removal in pipelines.

(CO3) [Comprehension]

9. Make a comprehensive analytical description of effectiveness and working of different perforating guns used in oil industry.

(CO4) [Comprehension]

10. Various sand control techniques utilized in the oil and gas industry serve as a catalyst for innovative advancements, enabling the development of more sustainable, cost-effective, and adaptable methods to mitigate sand-related challenges in well production and enhance overall reservoir recovery rates. Make a comparative assessment of different sand control techniques.

(CO1) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

2 X 20M = 40M

11. Using the schematic of fracture pressure variation during a hydraulic fracturing operation, analyze different stages of fracture mechanics and pressure dynamics. Considering well depth, rock formation characteristics, and fluid properties, demonstrate how this knowledge informs decision-making for effective fracture propagation and hydrocarbon extraction.

(CO2) [Application]

12. Imagine you are an engineer tasked with enhancing production in a mature carbonate reservoir using acid treatments such as matrix acidization and acid fracturing. Develop a detailed operational plan that integrates both techniques, outlining the selection criteria for each method based on reservoir characteristics, formation type, and existing well conditions. Justify your decisions by explaining how the application of these acid treatments will improve permeability, increase hydrocarbon flow, and extend the economic life of the well.

(CO3) [Application]