PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - NOV 2023

Semester : Semester V - 2021

Course Code : PET3004

Course Name : Sem V - PET3004 - Advanced Well Engineering

Program : B. TECH

Date : 3-NOV-2023

Time : 11:30AM - 1:00PM

Max Marks : 50

Weightage : 25%

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 1 = 5M)

1. Name the types of loading conditions that is subjected to drill pipe.

(CO1) [Knowledge]

2. State the four major components of drill strings.

(CO1) [Knowledge]

3. There are basically three methods for detecting and measuring pore pressure. Name the theree methods.

(CO2) [Knowledge]

4. The rate of penetration is affected by numerous parameters. State any two parameters.

(CO2) [Knowledge]

5. Write down mathematical expression for overburden pressure gradient.

(CO2) [Knowledge]

PART C

ANSWER ALL THE QUESTIONS (3 X 5 = 15M)

6. "The Hydrocarbon Exploration and Licensing Policy is a framework that governs the process of oil and gas exploration and the granting of licenses for these activities." Briefly explain the function of Hydrocarbon Exploration and Licensing Policy.

(CO1) [Comprehension]

7. In the provided diagram, the response of shale interval time in relation to depth is illustrated. It is evident that there is a noticeable deviation of the observed trend line from the typical or expected trend. Identify the logging method employed to generate this trend. As a drilling engineer, analyze the data point at location "A" and specify the nature of pressure present at this point. Substantiate your response with a well-reasoned explanation.

Figure   Response Of Shale Point Acoustic Transit Time To Abnormal Pressure
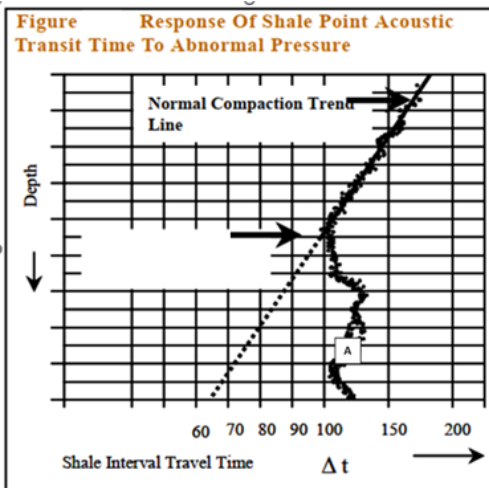
(CO2) [Comprehension]

8. Tectonic activity can result in the development of abnormal pore pressure as a result of a variety of mechanisms including salt diaparism, folding, faulting and uplift. Explain the statement.

(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS   (2 X 15 = 30M)

9. In the composition of a drill string, there are 600 feet of drill collars with dimensions of 8.25 inches X 2.8125 inches, and the remaining portion is made up of 5-inch diameter drillpipe with a weight of 19.5 pounds per foot, Grade X95. The required Maximum Overpull (MOP) is set at 100,000 pounds, and the mud weight stands at 75 pounds per cubic foot (equivalent to 10 pounds per gallon). Calculate the maximum drilling depth achievable under two scenarios: (a) when using new drillpipe with a yield strength of 501,090 pounds and (b) when employing Class 2 drillpipe with a yield strength (Pt) of 394,600 pounds.

(CO1) [Application]

10. Determine the overburden pressure variation at different depths for an offshore well, taking into account the following details: The water depth extends to 500 feet, the vertical distance from the drilling floor to Mean Sea Level (MSL) is 65 feet. Additionally, the seawater has a specific gravity of 1.03 grams per cubic centimeter, and the rock density is 1.9 grams per cubic centimeter within the first 1000 feet below the seabed, transitioning to 2.1 grams per cubic centimeter from 1000 to 3000 feet. Calculate the overburden pressure for formations located at depths of 500 feet, 1000 feet, and 3000 feet below the seabed.

(CO2) [Application]