Roll No												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester III - 2021
Course Code : PET2024
Course Name : Sem III - PET2024 - Wellbore Problems and Mitigation
Program : B.Tech. Petroleum Engineering

Date : 18-JAN-2023
Time : 1.00PM - 4.00PM
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.

PART A

ANSWER ALL THE TEN QUESTIONS **10 X 2 = 20M**

1. Write down the mechanism of pipe sticking in mobile formation.
(CO1) [Knowledge]

2. List the types of losses caused by lost circulation.
(CO2) [Knowledge]

3. Define stuck string.
(CO1) [Knowledge]

4. Define fishing in drilling.
(CO1) [Knowledge]

5. Define cavernous formation.
(CO2) [Knowledge]

6. Discuss Osmosis in the context of abnormal pressure.
(CO3) [Knowledge]

7. Discuss Normal Pressure.
(CO3) [Knowledge]

8. Discuss about Anticline Reservoir.
(CO3) [Knowledge]

9. List the suitable time to calculate kick tolerance being a drilling engineer.
(CO4) [Knowledge]

10. Write about Kick Tolerance.
(CO4) [Knowledge]

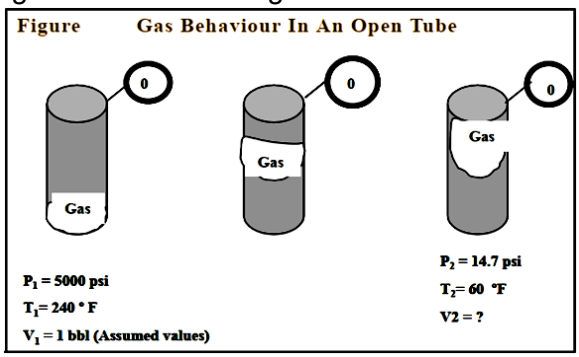
PART B

ANSWER ALL THE FOUR QUESTIONS **4 X 10 = 40M**

11. Elucidate key seating problem in drilling operation along with the preventive measures that may be adopted to minimise the chances of pipe sticking due to key seating.

(CO1) [Comprehension]

12. In the following figure, a gas has entered an open tube. The stages of gas traveling in mud have been shown in the figure. Parameters at the entry of gas and when gas reaches to the top of the tube are given figure. Explain change in volume of the gas when it reaches the surface.



(CO4) [Comprehension]

13. The RFT (Repeat Formation Tester) is a wireline run tool designed to measure formation pressures and obtain fluid samples from permeable formations. Elucidate the statement with respect to the calculation of abnormal pressure along with the limitations of this technique.

(CO3) [Comprehension]

14. 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.

(CO3) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS **2 X 20 = 40M**

15. As following are the data available for an offshore well: Water Depth= 500 ft; RKB/MSL (Kelley Bushing or drilling floor/Mean Sea level) = 65 ft; Specific gravity of sea water= 1.04 gm/cc; Rock density= 1.9 gm/cc from seabed to 1000 ft, and 2.1gm/cc from 1000-3000 ft. Determine the overburden gradient of the formations: At 500 ft, 1000 ft and at 3000 ft below seabed.

(CO3) [Application]

16. Being a drilling engineer, you are provided with the following parameters of a well: 9 5/8" casing =14,500 ft; Next TD = 17000 ft; Fracture Gradient (FG) at 9 5/8" shoe = 16 ppg; Temperature gradient = 0.02 F°/ft; Max. mud weight for next hole =14.5 ppg; Max formation pressure at next hole= 14 ppg; Assume next hole 8 ½" and there is 5" drillpipe from surface to TD. Also, assume gas pressure gradient (G) = 0.1 psi/ft; Surface Temperature = 60 F°. Calculate

a. Volume of the kick fluid (V2) at casing shoe.
b. Kick tolerance volume by neglecting the effect of temperature.
c. Kick tolerance volume with considering temperature gradient.
d. Comment on the values of kick tolerance volume (i.e. by considering temperature and neglecting the temperature gradient)

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(CO4) [Application]