



**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**END TERM EXAMINATION - JAN 2023**

**Semester :** Semester V - 2020

**Course Code :** PET3004

**Course Name :** Sem V - PET3004 - Advanced Well Engineering

**Program :** B.Tech. Petroleum Engineering

**Date :** 16-JAN-2023

**Time :** 9.30AM - 12.30PM

**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. Define Kick and state the function of BOP. (CO1) [Knowledge]
2. Define Kelly and Kelly bushing. (CO1) [Knowledge]
3. What is HWDP? (CO1) [Knowledge]
4. Write the equations for the following:
  - a. To convert densities from gm/cc to psi/ft (CO2) [Knowledge]
  - b. To convert psi/ft to ppg
5. State the difference between Hydrostatic pressure and Hydrostatic pressure gradient (CO2) [Knowledge]
6. List out the causes of abnormal pressure. (CO2) [Knowledge]
7. Name the 3 distinct pieces of pressure data obtained from Repeat Formation Test. (CO3) [Knowledge]
8. List out the factors on which resistivity of shale depends on. (CO3) [Knowledge]
9. List out the reasons for producing a well cost. (CO4) [Knowledge]
10. Identify the various factors which affects well costs for a single well. (CO4) [Knowledge]

**PART B**

**ANSWER ALL THE FOUR QUESTIONS**

**4 X 10 = 40M**

11. In normal drilling operations the mud columns inside and outside the drill pipe are both equal in height and are of the same density. This results in zero differential pressure across the pipe body and, in turn, zero collapse pressure on the drill-pipe. But if the Drill pipe is run empty drill pipe is more prone to collapse pressure.
  - a. Prove the same fact with a **numerical** example.
  - b. Once the collapsing pressure is calculated, express how safety factor can be determined (CO1) [Comprehension]

12. A drill string consists of 600 ft of 8 1/4 in x 2 13/16 in drill collars and the rest is a 5 in, 19.5lbm/ft Grade X95 drill pipe.  
If the required MOP is 100000 lb and mud weight is 75 pcf (10 ppg), Decide the maximum depth of hole that can be drilled when  
(a) using new drill pipe and  
(b) using Class 2 drill pipe having a yield strength (PI) of 394 600 lb.  
(CO1) [Comprehension]
13. Abnormal pore pressure is developed as a result of a combination of geological, geochemical, geophysical and mechanical process. Substantiate the statement given by explaining the causes.  
(CO2) [Comprehension]
14. "Fractures will be vertical in areas where the minimum principal stress is horizontal and horizontal where the minimum principal stress is vertical". Justif the statement given above with the help of various factors which influence fracture gradient.  
(CO3) [Comprehension]

### PART C

ANSWER ALL THE TWO QUESTIONS

2 X 20 = 40M

15.

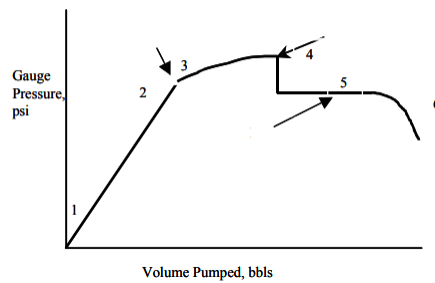


Figure. 1

- a) Identify the points 1, 2, 3, 4, 5, and 6.  
b) Interpret the same with proper explanation.

(CO3) [Application]

16. a) Using the Table (1) provided below, construct a response Of Corrected dc In Transition And Overpressured Zones

SL no	Depth	ROP	RPM	WOB	B
1	500	30	200	10000	12
2	1000	35	200	10001	12
3	1500	40	200	10002	12
4	2000	45	200	10003	12
5	2500	55	200	10004	12
6	3000	58	200	10005	12
7	3500	65	200	10006	12
8	4000	66	200	10007	12
9	4500	67	200	10008	12
10	5000	68	200	10009	12
11	5500	68	200	10010	12
12	6000	68	350	10011	12
13	6500	70	400	10012	12
14	7000	75	480	10013	12
15	7500	78	500	10014	12
16	8000	85	650	10015	12
17	8500	89	200	10016	12
18	9000	47	200	10017	12
19	9500	48	200	10018	12
20	10000	49	200	10019	12
21	10500	50	200	10020	12

Table. 1

- b) Also, Apply the knowledge of Eaton's method and predict the pore pressure value at 9000 ft depth.

(CO4) [Application]

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