Roll No												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION- JAN 2023

Course Code: PET 2003

Course Name: Fundamental of Oil and Gas Drilling Technology

Program : B.Tech

Date: 20-Jan-2023

Time: 9.30 PM to 12.30 PM

Max Marks: 100

Weightage: 50%

Instructions:

(i) Read the all questions carefully and answer accordingly.
(ii) Question paper consist of three parts, PART A, B & C
(iii) All questions are mandatory

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks. (15Qx 2M= 30M)

1. Arrange the following equipments in the correct sequence:
   (a) Kelly, Drill Bit, Travelling block, Drill String, Crown Block, Swivel [From Top to Bottom]
   (b) Kelly, Rotary table, Drill Bit, Master Busing, Drill String, Kelly busing [From the origin of Rotary motion] (C.O.No.1) [Knowledge]

2. Following two are **wrong** statements, correct it. (C.O.No.1) [Knowledge]
   (a) The swivel also carries the total weight of the drill string and is, therefore, the most heavily loaded item.
   (b) Class Three: Pipe having a minimum wall thickness of 80% with all wear on one side.

3. Define “Kick” and “Kick of Point”. (C.O.No.2) [Knowledge]

4. What is Class I and II Drill Pipe? (C.O.No.3) [Knowledge]

5. Define Pore Pressure and Overburden Pressure. (C.O.No.4) [Knowledge]

6. What is the full form of RIH and ROH? (C.O.No.4) [Knowledge]

7. What is BOP? Write its function. (C.O.No.2) [Knowledge]

8. Write any two limitation of RFT. (C.O.No.2) [Knowledge]

9. What is Kill line and Choke line? (C.O.No.4) [Knowledge]

10. As per IADC classification, what does the first four digit represent in the first code of roller cone bit? (C.O.No.2) [Knowledge]

11. Write one function for both Kelly Sever sub and Kelly cock. (C.O.No.2) [Knowledge]

12. Why Bit sub and X/O subs are used? (C.O.No.2) [Knowledge]

13. Write the meaning of following codes for Roller Cone Bit: (a) 2-3-1 (b) 3-3-3
(C.O.No.2) [Knowledge]

14. Define Journal Angle and Cone Offset. (C.O.No.2) [Knowledge]

15. Write any two reason for Kelly failure. (C.O.No.2) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TWENTY marks. (2Qx20M=40M)

16. Identify the components present in the Fig 1 and mention to which system these components are belongs to? Then elaborate the importance of each and every component with their function.
(C.O.No.2) [Comprehension]

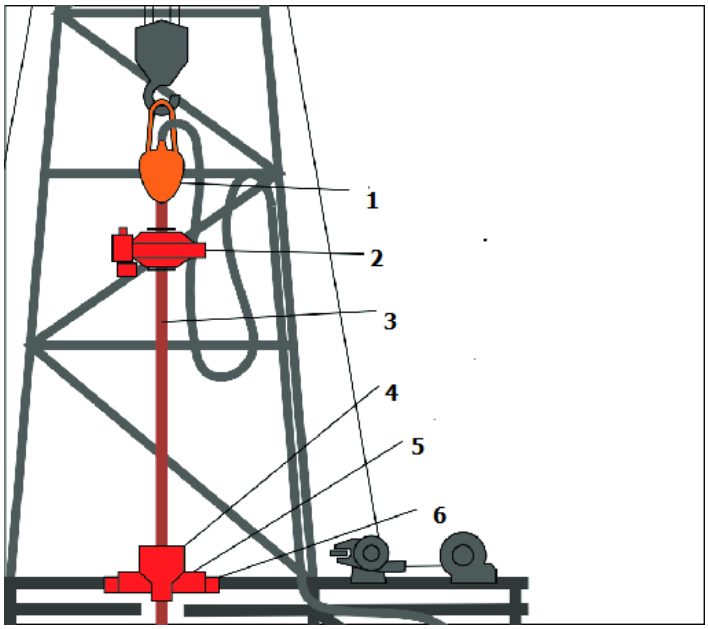

Fig 1

17. Give five supporting statements for each statement.
(a) Drill collar and HWDP are two integral part of Drill string.
(b) Drill string design is never based on the tabulated yield strength value but, instead, on 90% of the yield strength is taken for consideration. Also drill string weigh inside and outside the well bore is also different
(c) The cone size decreases as the journal angle increases from 0° to 45
(d) The criteria employed in tooth design include, spacing and inter fitting of teeth, shape and length of teeth, Types of teeth (C.O.No.1, 2, 3 & 4) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries THIRTY marks. (1Qx30M=30M)

18. A drill string consists of 600 ft. of $8^{1}/_{4}$ in x $2^{12}/_{16}$ in drill collars (Weight of drill collar= 161lbm/ft.) and the rest is a 5 in, 19.5lbm/ft. Grade X95 drillpipe. If the required MOP is 100000 lb and mud weight is 75 pcf(10 ppg), calculate the maximum depth of hole that can be drilled when (a) using new drillpipe and (b) using Class 2 drillpipe having a yield strength (P_t) of 394 600 lb. Given density of steel =489.5 lbm/ft; P_t = 501090 lb (for Grade X95 new pipe).

    If 10000 ft of the drillpipe is used, determine the maximum collapse pressure that can be encountered and the resulting safety factor. The mud density is 75 pcf (10 ppg). If the fluid level inside the drillpipe drops to 6000 ft below the rotary table, determine the new safety factor in collapse (collapse resistance of new pipe of Grade X95 is 12010 Psi)

    (C.O.No. 4) [Application]