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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION – JAN 2023

Course Code: PET 301

Course Name: Well Design and Construction

Program & Sem: B.Tech (PET) & VI

Date: 24 Jan 2022

Time: 1.00 PM to 04.30 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. Fill up the blanks,

- (a) Squared-section drill collars are used for special drilling purposes such _____.
- (b) _____ drill collars are manufactured from nonmagnetic steel alloys, and are used to shield directional survey instruments

(C.O.No.2) [Knowledge]

4. Make "**SET**" from the following [e.g. {a, A}]

Formation: (a) Soft formation (b) Hard Formation

Bit Characteristic: (A) High ROP (B) Short tooth (C) More bit balling (D) Wide Spacing

(C.O.No.3) [Knowledge]

5. Define Pore Pressure and Overburden Pressure. (C.O.No.4) [Knowledge]
6. What is the unit CHDP and ROP? (C.O.No.4) [Knowledge]
7. Write TRUE/FALSE, with respect to TRENDLINE, (C.O.No.4) [Knowledge]
- (a) In normal compaction trendline, the montmorillonite content should decrease with depth
- (b) The D exponent is inversely proportional to rock strength and for normally pressured formations
8. Write any two limitation of RFT. (C.O.No.2) [Knowledge]
9. The Eaton Method is used in most sedimentary basins for calculating pore pressure from _____ dc values. The Ratio Method has been used successfully in _____. (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.

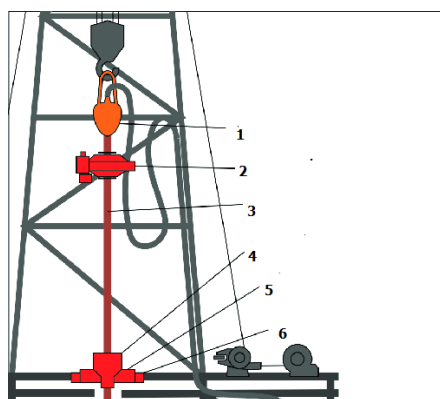


Fig: 1

(C.O.No.2) [Comprehension]

17. Give five supporting statements for each statements.

- (a) Shale resistivity increases with depth but the montmorillonite content should decrease with depth

- (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 weight 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. Read the attached tabulated data and based on your understanding identify the top and bottom of the abnormal pressure zone/zones. While selecting the data do refer to multiple parameters. Upon identify the abnormal pressure zone/zones determine the expected Pore pressure on the top of the zones. Consider Normal Pore Pressure gradient 0.478 Psi/ft. and Overburden Gradient 0.385 Psi/ft.

[Use semi log paper]

Depth (ft.)	ROP (ft/hr)	d(exponent)	CEC (meq./100 g)	Resistivity (ohm)	Transit time (ms)	Density (g/cc)
500	200	13	212	6	5.565	2.3
800	195	20	205.342	9	5.545	2.56
1100	192	23	192.684	12	5.525	2.81
1400	187	23	180.026	15	5.505	3.07
1700	186	29	167.368	18	5.485	3.33
2000	180	30	154.71	21	5.465	3.58
2300	176	33	142.052	24	5.445	3.84
2600	172	39	129.394	27	5.425	4.10
2900	165	44	116.736	30	5.405	4.35
3200	160	48	104.078	33	5.385	4.61
3500	156	50	91.42	36	5.365	4.87
3800	165	44	97.42	39	5.595	5.12
4100	178	40	103.42	42	5.825	5.38
4400	189	34	109.42	45	6.055	5.64
4700	173	29	115.42	48	6.285	5.90
5000	160	22	121.42	51	6.515	6.15
5300	158	29	119.42	54	6.495	5.49
5600	155	33	117.42	57	6.475	4.84
5900	151	39	115.42	60	6.455	4.18
6200	148	42	113.42	63	6.435	3.52
6500	147	49	111.42	66	6.415	2.86
6800	155	44	109.42	63	6.395	3.12
7100	159	35	107.42	60	6.375	3.38
7400	163	30	105.42	57	6.355	3.63
7700	163	26	103.42	54	6.335	3.89
8000	160	29	101.42	57	6.315	4.15
8300	156	35	99.42	60	6.295	4.40
8600	151	41	97.42	63	6.275	4.66

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