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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM END TERM EXAMINATION AUGUST 2024

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| **Semester: Summer End Semester Exam** | **Date: 05-08-2024** |
| **Course Code: PET2006** | **Time: 1:00pm-4:00pm** |
| **Course Name: Fundamentals of Oil and Gas Production Technology** | **Max Marks: 100** |
| **Program: B. Tech.** | **Weightage: 50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *The question paper consists of 3 parts.*
3. *Scientific and non-programmable calculators are permitted.*
4. *Do not write any information on the question paper besides Roll Number.*
5. *Use Graph Paper wherever needed. Write the Question No. on the graph paper with a pen.*

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| **PART A** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 2M=10M** | | | |
| 1 | State the purpose of the Artificial Lift. | (CO 1) | [Knowledge] |
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| 2 | Define the role of Perforation in oil and gas wells. | (CO 1) | [Knowledge] |
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| 3 | Outline the function of a Wellhead. | (CO 2) | [Knowledge] |
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| 4 | Describe the concept of Gas Lift. | (CO 3) | [Knowledge] |
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| 5 | Define the term 'Separator' in production facilities. | (CO 3) | [Knowledge] |
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| 6 | Narrate the use of a Choke in production operations. | (CO 4) | [Knowledge] |
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| 7 | State the difference between Primary and Secondary recovery methods. | (CO 4) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 8 | 1. Given a reservoir pressure (Pr) of 3000 psi and a flowing bottom-hole pressure (Pwf) of 1000 psi, calculate the inflow performance relationship (IPR) for a well producing 200 bpd using the “*Vogel Equation”*. 2. Calculate the maximum flow rate (Qmax) for a well if the productivity index (PI) is 2 bpd/psi and the reservoir pressure (Pr) is 3000 psi. **5+5=10** | (CO 1) | [Comprehension] |
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| 9 | 1. Determine the IPR for a well using the “*Fetkovich Equation”* if Qmax is 4000 bpd, Pr is 2500 psi, and Pwf is 1000 psi. 2. Calculate the productivity index (PI) if a well produces 1000 bpd at a reservoir pressure of 3500 psi and a flowing bottom-hole pressure of 1500 psi. **5+5=10** | (CO 1) | [Comprehension] |
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| 10 | 1. Estimate the bottom-hole flowing pressure (Pwf) if the well produces 800 bpd with a PI of 2 bpd/psi and a reservoir pressure (Pr) of 2500 psi. 2. Estimate the productivity index (PI) if a well produces 500 BPD at a pressure drawdown of 200 psi. **6+4=10** | (CO 2) | [Comprehension] |
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| 11 | 1. Calculate the inflow performance using “*Vogel's Equation”* if Qmax is 5000 bpd, Pr is 3000 psi, and Pwf is 1500 psi. 2. Estimate the reservoir pressure (Pr) if a well with a PI of 3 bpd/psi produces 600 bpd at a bottom-hole flowing pressure of 800 psi. **5+5=10** | (CO 2) | [Comprehension] |
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| 12 | Draw a neat sketch of a Wellhead. Describe the main components of a Wellhead and their functions. | (CO 2) | [Comprehension] |
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| 13 | Define Reservoir Drive Mechanisms and their significance in production. | (CO 3) | [Comprehension] |
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| 14 | Compare and contrast Natural Flow and Artificial Lift Methods in oil production. | (CO 3) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** | | | |
| 15 | Artificial lift in oil and gas production bridges the gap between reservoir pressure and surface operations, optimizing flow rates and extending well life. Discuss the various methods used for Artificial Lift in oil production and compare their efficiencies and applications. | (CO 3) | [Application] |
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| 16 | 1. Analyze the impact of Formation Damage on oil recovery. 2. State the importance of “Skin Factor” in the context of Formation Damage. 3. Design the preventive measures in case of Formation Damage in Oil and Gas Wells. **8+4+8=20** | (CO 3) | [Application] |
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| 17 | In oil and gas production, Well-Completion Design is the nexus where technology meets geology, which is crucial for achieving operational efficiency and maximizing hydrocarbon recovery. Discuss the role of Well-Completion Design in maximizing production and ensuring integrity. | (CO 4) | [Application] |
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