PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester V - 2020

Course Code : PET2006

Course Name : Sem V - PET2006 - Fundamentals of Oil and Gas Production Technology
Program : B.Tech. Petroleum Engineering

Date : 6-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. How would you define wellhead in oil and gas?

(CO1) [Knowledge]

2. How would you outline the functions of packer?

(CO1) [Knowledge]

3. What is Inflow Performance Relationship?

(CO1) [Knowledge]

4. What are the names of different components of sucker rod pump surface assembly?

(CO2) [Knowledge]

5. Describe the mechanisms involved in the working of Gas Lift technique.

(CO3) [Knowledge]

6. How would you define Dynamometer Cards?

(CO2) [Knowledge]

7. List out the advantages of Gas Lift over other Artificial Lift Techniques.

(CO3) [Knowledge]

8. List out the downhole components of an ESP system.

(CO4) [Knowledge]

9. List out the downhole components of a PCP.

(CO4) [Knowledge]

10. Define Bernoulli's Principle. How it is related to Production Engineering?

(CO4) [Knowledge]

ANSWER ALL THE FOUR QUESTIONS   4 X 10 = 40M

11. The pressure fluctuation downstream the choke should not travel upstream the choke. Pressure ratio across the choke is the major factor in controlling the transfer of pressure fluctuation to upstream part of choke. Consider a well producing at choke inlet pressure 2500 psi and outlet pressure 1500 psi. If the value for K is 1.28, discuss about the type of flow condition that will occur across the choke.

(CO1) [Comprehension]

12. Sucker Rod Pump (SRP) has certain advantages over other artificial lift methods as it is a simple and rugged equipment. It has high energy efficiency and has an easy automation if prime mover is electric. The salvage value of the SRP is also high. But it is prone to disadvantages which limits its use in several situations. Describe the conditions and situations where SRP application is restricted.

(CO2) [Comprehension]

13. A continuous gas lift system at 8000 ft depth is producing from a reservoir with average reservoir pressure of 2650 psi. The surface gas pressure is 900 psi and valve pressure loss is 100 psi. The Productivity index for the well having this gas lift system is 0.2 stb/d-psi. The expected flow rate from the operator company is 500 stb/d. Explain whether the well is damaged or undamaged with the help of proper justifications.

(CO3) [Comprehension]

14. ESP works on principles of centrifugal pump to provide supplementary pressure to the well bore fluid so that it can reach to the surface at desired flow rate. Explain and justify the following statements for ESP:
    a) ESP can not be effectively used for gassy wells.
    b) ESP can be used for deviated wells.
    c) Check valve is required to prevent damage to ESP motor.

(CO4) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS   2 X 20 = 40M

15. An oil well is producing from a reservoir that is characterized by a bubble-point pressure of 2800 psig. The current average reservoir pressure pf the reservoir is 3500 psig. Available flow test data shows that the well produced 300 STB/day at a flowing bottom hole pressure (pwf) of 3000 psig. Determine the flow rate for the oil reservoir at 2500 psig and 3100 psig with the help of Vogel's method.

(CO1) [Application]

16. A gas lift valve with dome pressure 750 psi and spring pressure 50 psi is being used as operating valve at 6900 ft depth. The fluid in the tubing, with density 7.49 ppg, is causing at pressure 200 psi at the valve depth. If the valve area and bellow area is .18 sq inch and 1.71 sq inch, then determine the opening and closing pressure for this valve. If spring pressure is assumed to be 0 by mistake from the production engineer, then compute the spread for this particular situation.

(CO3) [Application]

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