

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2018

Course: Production Engineering & Well Testing & Analysis

Semester: 2nd

Program: M. Tech Petroleum Engineering

Time: 03 hrs.

No. of Pages: 3

Max. Marks: 100

Instructions:

1. Neat diagrams must be drawn wherever necessary.
2. Use a non-programmable calculator
3. Assume suitable data, if necessary and clearly state it.

SECTION A

S. No.		Marks	CO
Q 1	A sucker rod pump unit is designated by C-228D-200-74. What does 'C'; '228'; 'D'; '200' & '74' represents here?	4	CO3
Q 2	Discuss possible pressure losses in a petroleum production system: -	4	CO1
Q 3	Explain the changes in phase behavior in the production tubing while producing oil: -	4	CO2
Q 4	What is the Tubing Head Pressure of a well, completed with 8000 ft of 2.375 in. tubing, that is flowing at 600 bbl/day and GLR of 0.4 Mcf/bbl if the bottom of the tubing is 2200 psi? Gilbert chart is attached in the question paper.	4	CO2
Q 5	Discuss the importance of knowing the IPR of a well with necessary illustrations.	4	CO1

SECTION B

Q 6	Explain in detail various vessel internals for a horizontal 2 phase separator. Also explain potential operating problems occurring while separating oil and gas: -	10	CO4
Q 7	Explain in detail multiphase flow in oil wells for both vertical and horizontal tubing with typical temperature and pressure profile: -	10	CO2
Q 8	Which test is performed to confirm commercial quantity of hydrocarbon in exploratory wells? Explain it in detail with illustration.	10	CO6
Q 9	Construct IPR of a vertical well in a saturated oil reservoir using Vogel's equation. Following data is given: Porosity, $\Phi = 19\%$ permeability, $k = 8.2$ mD Reservoir thickness = 53 ft. Reservoir pressure = 5651 psi = bubble point pressure (since saturated oil reservoir) Oil formation volume factor = 1.1 bbl/STB Oil viscosity = 1.7 cP Drainage radius = 2980 ft. Wellbore radius = 0.328 ft.	10	CO1

Assume pseudo steady state flow of fluids and skin factor as zero.

SECTION-C

Q 10

(a) Following data is given for a 2 phase vertical separator:
gas flow rate = 25 mmscfd
oil flow rate = 3000 bbl/day
separator operating pressure = 800 psig; separator operating temperature = 80 °F
Flowing gas density = 3.4 lb/ft³ (for 20.3 lb./lbmol molecular weight of gas)
Flowing oil density = 51.5 lb/ft³ (for 40 ° API oil)
Assuming 10ft shell height and 30% liquid full calculate:
i. Diameter of separator in inches using gas capacity into consideration
ii. Allowable liquid flow rate (in bbl/day) through the separator

(b) Suppose two flow rates conducted on an oil well showing results as follows

	Test 1	Test 2
Oil flow rate (bbl/day)	200	400
Flowing bottomhole pressure (psi)	2400	1800

find

- i. the reservoir pressure of the formation
- ii. Production Index of the well
- iii. Maximum flow rate possible

**10+10
=20**

CO5

Q 11

Construct IPR of a well in a saturated oil reservoir using **both Vogel's Method & Fetkovich method.**
Following data is given:
Average reservoir pressure is 3000 psi

	Test 1 data	Test 2 data
Oil flow rate (bbl/day)	500	800
Flowing bottomhole pressure (psi)	2000	1000

Also state what inference do you deduce from the calculations done w.r.t to accuracy of the method.

20

CO1

