جـــامعة مصـــراتة
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الامتحان النهائي لمقرر/هندسة انتاج 1 هـ.ن 440
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كليـــــــــــة الهندســـــــــة
قـــــــــسم هندســـــــة النفط
الزمن : ثلاث ساعـــــات3
أستاذ المقرر: أ. وليـد بن صـالح

اسم الطالب:

رقم الطالب:

ملاحظات: الرجاء تسليم ورقة الامتحان مع كراسة الاجابة

Question 1: *(15 Points).*

The following data are for a flowing oil well:

Well depth (d) = 7500 ft
Tubing diameter = 2 inch tubing ID.
Well head Pressure (P_{wh}) = 100 psi
Flow rate (q_o) = 600 bpd (*All oil*)
Reservoir Pressure (P_r)=1680 psi
Productivity index (P.I.) =1 *(Assume linear IPR)*

Flowline diameter = 4 inch I.D
Flowline length = 4000 ft

A. Find the required Gas-Liquid Ratio (G/L) for this well to flow.
B. Estimate Separator pressure (P_{sep}) (for this part B, assume all water is flowing in the flow line at same rate (600 bpd) and same Gas-Liquid ratio calculated in part A)
C. Comment on the result of part B.

Question 2: *(15 points).*

Given are two flow tests of the following well:

Well Data:
Well depth (d) =6700 ft
Gas-liquid ratio (G/L)= 500 scf/stb
Tubing I.D = 2 inch (all oil)

Test 1	Test 2
q_o= 1000 bpd	q_o = 600 bpd
P_{wh} = 200 psi	P_{wh} = 400 psi

A. Find Pr and PI for a linear relationship
B. For Vogel's reference, curve construct IPR

Question 3: *(10 Points)*

A. Graphically show the pressure profile for an undamaged well, damaged well and a stimulated well.
B. Write the *balanced chemical reaction equation* for the following reactions:
   - Limestone formation with HCI Acid.
   - Dolomite formation with HCL Acid.

Question 4: *(20 Points)*:

The following data are for a flowing oil well

Reservoir Pressure (P_r)= 3000 psi
Gas-Liquid Ratio (G/L) 400 scf/bbl
Productivity Index (P.I.) =1.3 (*linear IPR*)
Well head Pressure (P_{wh}) = 120 psi
Well Depth (d) = 8000 ft
Tubing Diameter = 2 inch I.D

Determine the following:

A. Operating flow rate q_o to flow the well.
B. Using ***Gilbert Correlations***, estimate the choke size that will produce the well at this flow rate (From part A)
C. Flow rate resulting from a choke size of 10/64
D. Flow rate resulting from a choke size of 36/64

Appendix:

Gilbert two-phase choke correlation and constants.

$$P_1 - D = \frac{A \times q_L \times {F_{gl}}^B}{{d_{64}}^C}$$

P_1 = Upstream pressure psia.

q_L= Liquid flow rate stb/day.

F_{gl}= Gas-Liquid Ratio scf/stb.

d_{64}= Choke diameter in 64th of an inch.

Correlation	A	B	C	D
Gilbert (1954)	10.00	0.546	1.89	14.7

End of Questions

Good Luck