



American University of Beirut
Department of Geology
330 M Analysis of Pumping Test Data
Final Exam



NAME: _____

Spring 1999

(20 points) 1. Define the following terms.
theoretical drawdown

theoretical specific capacity

total drawdown

well efficiency



- (20 points) 2.
- (10 points) A. Aquifer parameters can be determined by numerical methods. This approach, however, has certain limitations. What are these limitations?
- (10 points) B. Explain how well efficiency can be determined from distance-drawdown analyses.
- (20 points) 3. List the assumptions used in the development of Bouwer-Rice's slug test method.
- (20 points) 4. Explain how pumping tests are designed.

(20 points) 5.

A well in a confined aquifer is pumped at a constant rate of $6.4 \text{ m}^3/\text{min}$. Listed below are the drawdowns, which were measured in an observation well located 152 m from the pumped well. Is it possible to calculate the transmissivity and storativity of this aquifer using the provided equations (listed on the next page)? If your answer is yes, calculate the transmissivity and the storativity. If your answer is no, explain why.

<u>time (min)</u>	<u>drawdown (m)</u>
5	0.10
7	0.16
10	0.24
15	0.76
20	1.13
30	1.65
45	2.17
60	2.54
80	2.90
100	3.19
140	4.01
190	4.78
250	5.49
300	5.97

Equations

$$s = \frac{Q}{4\pi T} W(u) \quad ; \quad u = \frac{r^2 S}{4Tt}$$

$$T = \frac{2.3 Q}{2\pi \Delta s} \quad ; \quad T = \frac{2.3 Q}{4\pi \Delta s}$$

$$S = \frac{2.25 T t_0}{r^2} \quad ; \quad S = \frac{2.25 T t}{r_0^2}$$

$$Q = \frac{2\pi T (h_2 - h_1)}{\ln\left(\frac{r_2}{r_1}\right)}$$

$$Q = \frac{\pi K (h_2^2 - h_1^2)}{\ln\left(\frac{r_2}{r_1}\right)}$$