PENENTUAN
TRANSMISIVITAS & KOEFISIEN TAMPUNGAN

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TRANSMISIVITAS (T)

- Transmisivitas adalah suatu angka dimana air pada viskositas kinematik yang umum ditransimisikan melalui sebuah unit lebar dari aquifer untuk satu satuan gradien hidraulik.

- Transmissivity is the rate at which water of the prevailing kinematic viscosity is transmitted through a unit width of the aquifer under a unit hydraulic gradient. It replaces the term t "coefficient of transmissibility“ because by convention it is considered a property of the aquifer, which is transmissive, whereas the contained liquid is trans-missible.However,though spoken of asaproperty oftheaquifer,it embodies also the saturated thickness of the aquifer (b) and the properties of the contained liquid . It is equal to an integration of the hydraulic conductivities across the saturated part of the aquifer perpendicular to the flow paths.

KOEFISIEN TAMPUNGAN (S)

- Koefisien tampungan adalah volume air yang dilepaskan ke atau diambil dari dalam tampungan oleh sebuah aquifer per satuan permukaan aquifer per satuan perubahan tinggi tekanan.

- The storage coefficient is the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head. In a confined water body the water derived from storage with decline in head comes from expansion of the water and compression oftheaquifer;similarly, wateraddedtostoragewithariseinhead is accommodated partly by compression of the water and partly by expansion of the aquifer. In an unconfined water body, the amount of water derived from or added to the aquifer by these processes generally is negligible compared to that involved in gravity drainage or filling of pores; hence, in an unconfined water body the storage coefficient is virtually equal to the specific yield.

METODE COOPER-JACOB

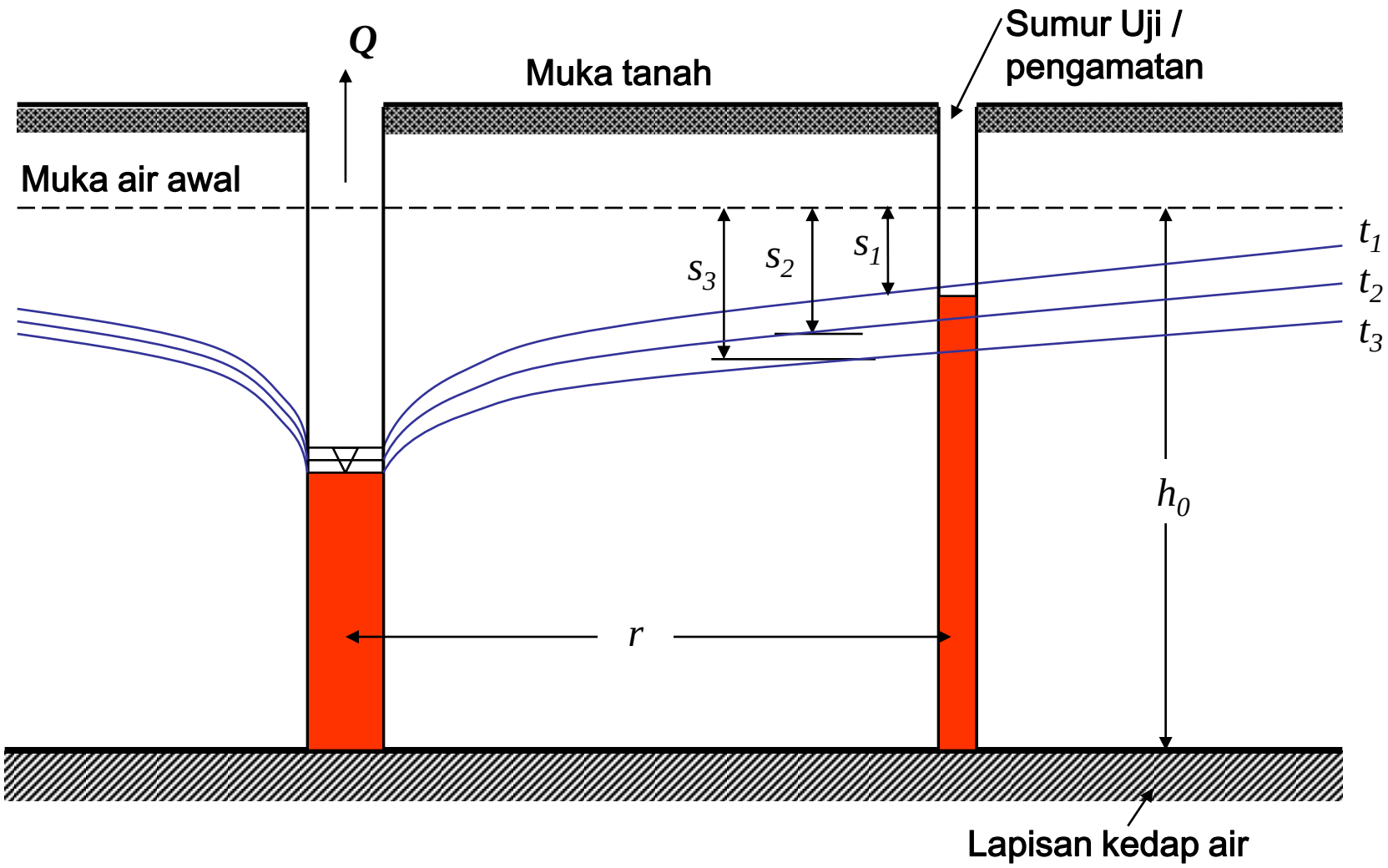
Transmisivitas

$$T = \frac{2{,}30 \cdot Q}{4\pi\Delta s}$$

Koefisien Tampungan

$$S = \frac{2{,}25 \cdot T \cdot t_0}{r^2}$$

SUMUR UJI


Q
Muka tanah
Sumur Uji /
pengamatan
Muka air awal
s_3
s_2
s_1
t_1
t_2
t_3
h_0
r
Lapisan kedap air

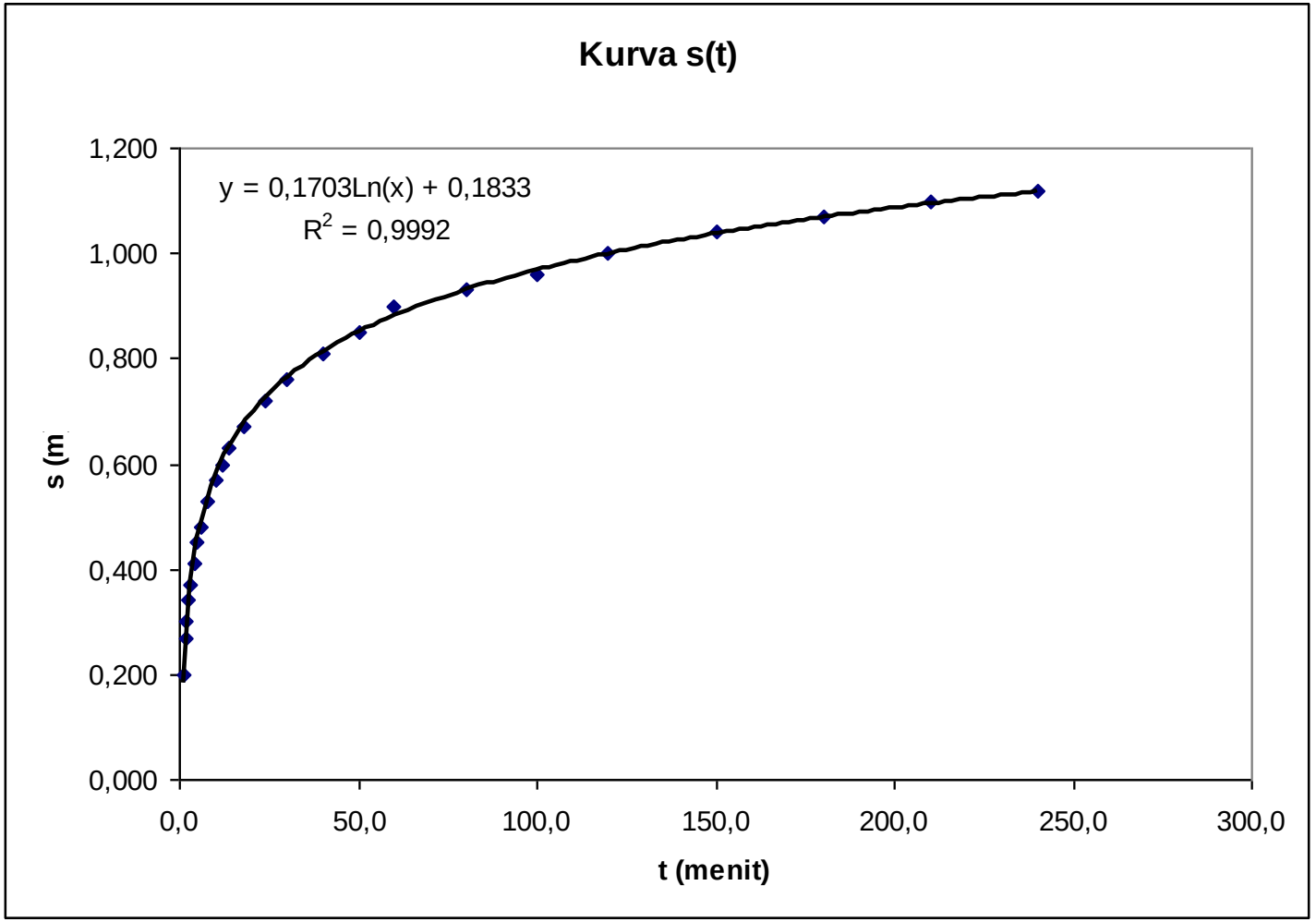
t (menit)	s (m)
0,0	0,000
1,0	0,200
1,5	0,270
2,0	0,300
2,5	0,340
3,0	0,370
4,0	0,410
5,0	0,450
6,0	0,480
8,0	0,530
10,0	0,570
12,0	0,600
14,0	0,630
18,0	0,670
24,0	0,720
30,0	0,760
40,0	0,810
50,0	0,850
60,0	0,900
80,0	0,930
100,0	0,960
120,0	1,000
150,0	1,040
180,0	1,070
210,0	1,100
240,0	1,120

Contoh Ilustrasi

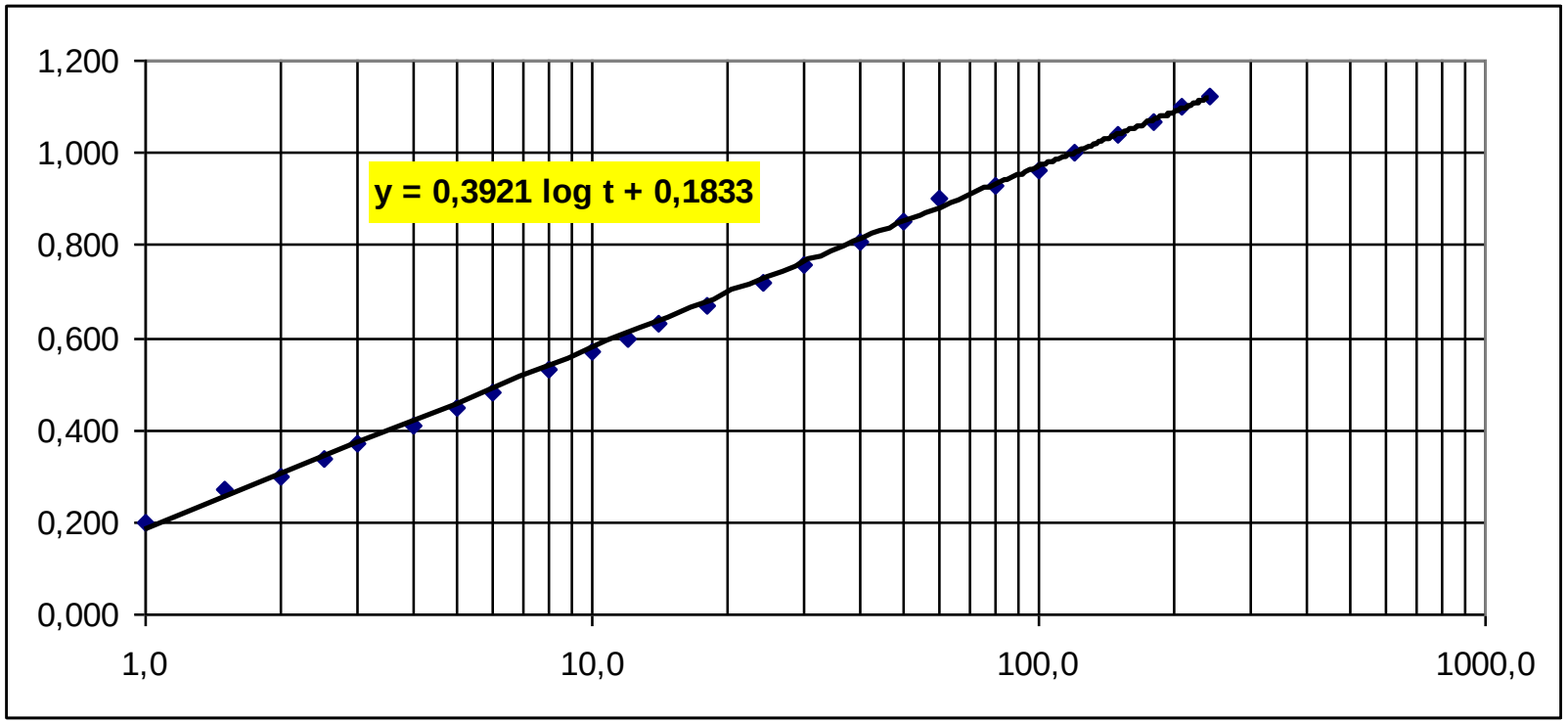
- Sebuah sumur menembus aquifer tertekan dipompa dengan debit konstan 900 m^3/hari. Selama waktu pemompaan ini, pada sebuah sumur pengamatan yang berjarak 40 m dari sumur pompa diamati penurunan muka airnya. Penurunan muka air di sumur pengamatan disajikan dalam tabel di samping ini. Hitung nilai transmisivitas (T) dan koefisien tampungan (S) dari aquifer dengan metoda Cooper-Jacob.

Penyelesaian

Dibuat kurva hubungan antara t dan s, seperti gambar berikut ini.



Selanjutnya kurva hubungan antara t dan s dilinierkan dengan cara membuat skala logaritmis pada sumbu horisontal, seperti gambar berikut ini.



Bentuk persamaan juga ditransformasi dari bentuk ln menjadi log.

Persamaan garis: **s = 0,3921 · log t + 0,1833**

Pada saat s = 0 maka t = t_0

sehingga **0 = 0,3921 · log t_0 + 0,1833**

Jadi log t_0 **= -0,1833** / 0,3921 = - 0,4675

sehingga t_0 = 10^-0,4675

t_0 = 0,3410 menit

Δs = 0,3921 m

$$T = \frac{2{,}30 \cdot Q}{4\pi\Delta s} = \frac{2{,}30 \cdot 900}{4\pi \cdot 0{,}3921} = 420\ \mathrm{m}^2/\mathrm{hari}$$

$$S = \frac{2{,}25 \cdot T \cdot t_0}{r^2} = \frac{2{,}25 \cdot \left[420/(24 \cdot 60)\right] \cdot 0{,}341}{40^2} = 0{,}00014$$