PERMEABILITY TEST IN THE FIELD BY PUMPING FROM WELLS

$$q = k\left(\frac{dh}{dr}\right) 2\pi r h$$

$$\int_{r_2}^{r_1} \frac{dr}{r} = \frac{2\pi k}{q} \int_{h_2}^{h_1} h\,dh$$

$$\boxed{k = \frac{2.303 q \log_{10}\left(\frac{r_1}{r_2}\right)}{14.7 \pi (h_1^2 - h_2^2)}}$$

q = rate of discharge (gpm)
h_1 & h_2 = are in ft.

Average hydraulic conductivity for a confined AQUIFER:

$$q = k\left(\frac{dh}{dr}\right) 2\pi r H$$

$$\int_{r_2}^{r_1} \frac{dr}{r} = \int_{h_2}^{h_1} \frac{2\pi k H}{q}\, dh$$

$$k = \frac{q \log_{10}\left(\frac{r_1}{r_2}\right)}{2.727 H (h_1 - h_2)}$$

In situ Hydraulic conductivity of Compacted Clay soils

* nine methods

1) Boutwell Permeameter
> hole is drilled first
> casing is placed in it
> casing is filled w/ water
> falling head permeability test is conducted

$$\boxed{K_1 = \frac{\pi d^2}{\pi D (t_2 - t_1)} \ln\left(\frac{h_1}{h_2}\right)}$$

d = ϕ standpipe
D = ϕ casing
h_1 = head at time (t_1)
h_2 = (t_2)

> after hydraulic conductivity is determined, hole is deepened by augering
> permeameter is reassembled
> falling-head hydraulic conductivity test is conducted again

$$\boxed{k_2 = \frac{A'}{B'} \ln\left(\frac{h_1}{h_2}\right)}$$

$$\boxed{A' = d^2 \left\{ \ln\left[\frac{L'}{D} + \sqrt{1 + \left(\frac{L'}{D}\right)^2}\,\right]\right\}}$$

$$\boxed{B' = 8D \frac{L'}{D}(t_2 - t_1)\left\{1 - .562^{-1.57\left(\frac{L'}{D}\right)}\right\}}$$