4.2 Steady Radial Flow to a well

Draw down curve
Cone of depression

a) confined aquifer (Fig 4.2.1/4.2.2)

$$Q = VA = 2\pi r\ bK\frac{dh}{dr}$$

Fig 4.2.1

$$h = h_w, r = r_w, h = h_0, r = r_0$$

$$h_0 - h_w = \frac{Q}{2\pi Kb}\ln\frac{r_0}{r_w}$$

$$Q = 2\pi Kb\frac{h_0 - h_w}{\ln(r_0 / r_w)}$$

Extensive confined

$$Q = 2\pi Kb\frac{h - h_w}{\ln(r / r_w)}\ (Thcein\ Eq.)$$

Transmissivity $T = Kb = \frac{Q}{2\pi(h_2, h_1)}\ln\frac{r_2}{r_1}$

b) unconfined aquifer (Fig 4.2.7)

$$Q = -2\pi r\ Kh\frac{dh}{dr}$$

$$h = h_w, r = r_w\ and\ h = h_0, r = r_0$$

$$Q = \pi K\frac{h^2{}_0 - h_w{}^2}{\ln(r_0 / r_w)}$$

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

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