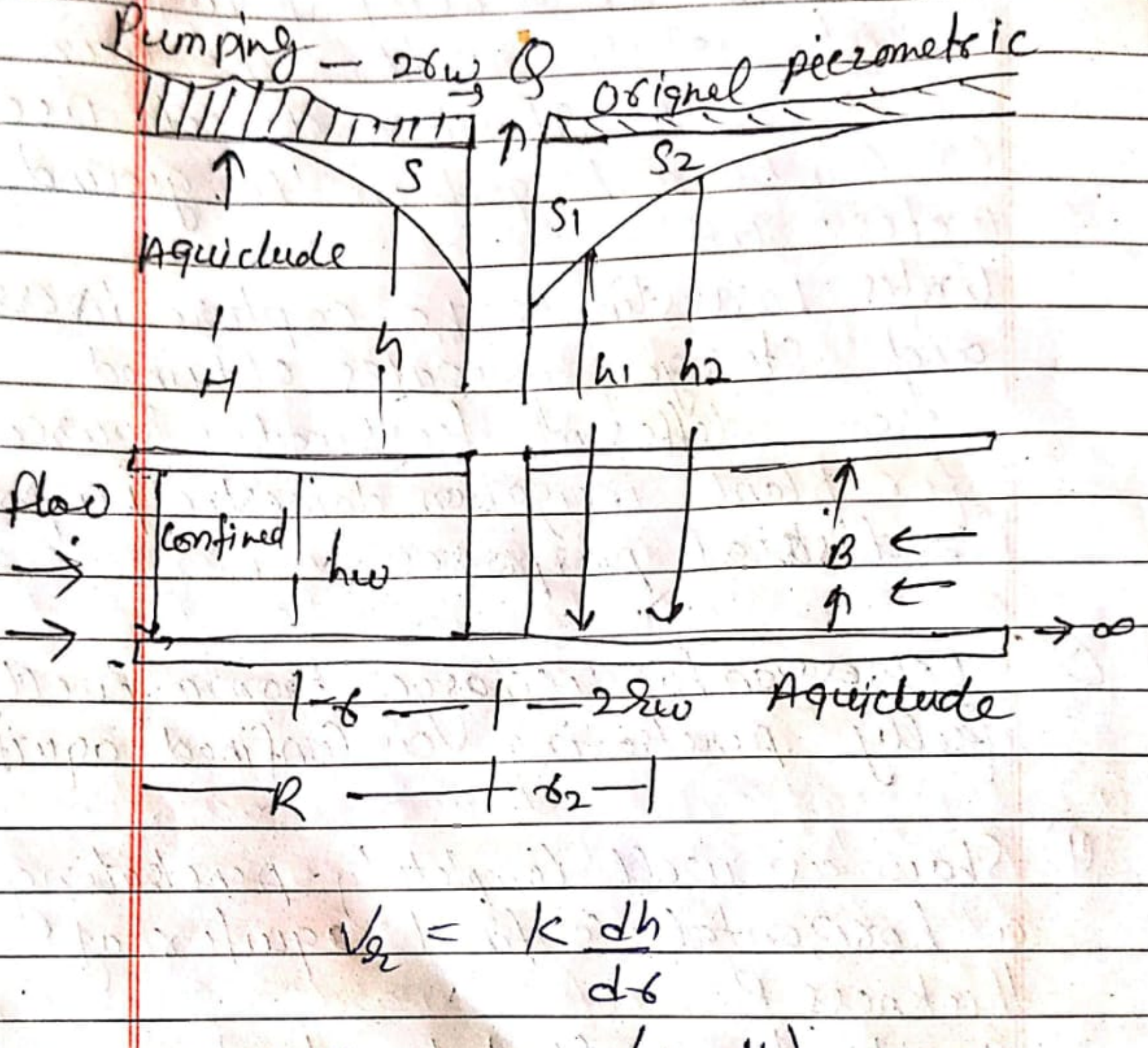
8 Expression for discharge from a well fully penetrating a confined aquifer

① Show as well completely penetrating a horizontal confined aquifer of thickness B.

② Consider the well to be discharge a steady flow Q.

③ Original piezometric head was H and the drawdown due to pumping is indicated

(4) The piezometric head at pumping well is h_w and the drawdown s_w



$$V_r = K \frac{dh}{dr}$$

$$Q = 2\pi B \left(K \frac{dh}{dr} \right)$$

$$dh = \frac{Q}{2\pi K B} \frac{dr}{r}$$

$$\frac{Q}{2\pi k_B} \ln \frac{r_2}{r_1} = h_2 - h_1$$

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

$S_1 = H - h_1$, $S_2 = H - h_2$ $k_B = T$

$$Q = \frac{2\pi T (S_1 - S_2)}{\ln \frac{r_2}{r_1}}$$

$S_2 = 0$, $r_2 = R$, $H_2 = H$, $r_1 = r_w$, $h_1 = h_w$

$S_1 = S_w$

$$Q = \frac{2\pi T S_w}{\ln R / r_w}$$