Experiment No. 8

"To study the water abstraction from a well in an unconfined aquifer"

Apparatus Name: Advanced Hydrological Apparatus

HYDROGEOLOGY LAB

CENTRE OF EXCELLENCE IN WATER RESOURCES ENGINEERING

UET, LAHORE

Procedure:

1) **Cone of Depression for a Single Well in an Unconfined Aquifer**

For this experiment no cap is placed over the sand in the area of the well and the sand surface should be horizontal and flat. Graphs of water table elevation can be drawn from the manometer readings for abstraction from the centrally placed well and, from these, a contour plan of the water table surface may be prepared. So long as the coefficient of permeability k has been determined by the method above, theoretical values for s can now be determined from the equations provided and compared with the plotted experimental values. Dupuit's formula in the form given in equation can be used for small drawdowns in the area close to the well (take value of R, equal to half the width of the catchment tank), while Thiem's formula, equation, can be used for the more distant areas.

As in the other well experiments, Qo, the discharge must be measured. To do this, the outflow pipe should be diverted into a measuring cylinder to collect the outflow over a timed period. It will be necessary to balance the inflow valves so that the well abstraction does not lead to a falling water table while readings of s and Qo are being taken. It is also important to check that a water surface is visible in the standpipe to ensure that the aquifer remains fully saturated in the region close to the wall.

Observations and Calculations:

Volume Collected L	Time to Collect sec	Qo m³/s	H m	Tapping Position m	Manometer Readings m	S (=H -manometer reading)

Assignment:

a) Calculate k from one the equation provided in the theory.

b) Compare the results obtained with typical permeability values of different types of aquifer.