

NAB

INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR

Date: _____ Time: 2 hours Full Marks: 30 Dept.: Agril & Food Engg.

No. of Students: 18 Mid Autumn Semester Examination Sub. No. AG 40011

Sub. Name: Tubewells and Pumps Final Year B.Tech (H)

Answer all the questions. Make pertinent assumptions wherever required.

Q. 1. Write brief notes on any FOUR of the followings.

- (a) Dupit Forchheimer assumptions and their use
- (b) Cavity well
- (c) Design of well screen
- (d) Recovery test
- (e) Well development

(2 x 4)

Q. 2. Describe Darcy's Law, its application, validity and limitations.

(4)

Q. 3. What do you mean by well loss? Describe briefly its effect on well yield

(4)

Q. 4. A 1m diameter tubewell fully penetrates a confined aquifer of 35 m thick. For a pumping rate of $110 \text{ m}^3/\text{h}$, the drawdown in two observation wells located at distances of 12m and 50m from the pumped well are 2.1 m and 0.5 m respectively. For steady state conditions, determine the approximate head and drawdown in the pumped well. Also determine the transmissivity of the aquifer and the radius of influence of the well. The initial piezometric level is 40 m above the datum.

(5)

Q. 5. A tubewell of 45 cm diameter penetrates 35m below the static water table. After pumping at a rate of $70 \text{ m}^3/\text{h}$ for a long period, the drawdowns in observation wells at a distance of 20m and 50m from the pumped well were found to be 2.1m and 1.5m respectively. Determine: (a) the transmissivity of the aquifer, (b) drawdown in the pumped well and (c) radius of influence of the pumped well.

(5)

Q. 6. Three wells of 10cm diameter each are installed at the vertices of an equilateral triangle 10m apart, in a confined aquifer. The radius of influence of each well is 500m, and hydraulic conductivity of the aquifer material is 20m/day. The drawdown is 2m. The thickness of the confined aquifer is 15m. Determine the discharge of each well and the percentage decrease in discharge due to well interference.

(4)