

M. S. Khan

- N.B.** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) Assume any suitable **data** if **necessary** and mention it **clearly**.
 (4) Figures to the right indicate **full marks**.

B. ETC) in Rev Irrigation Engg - 11/12/07

1. (a) Explain how you will get base parabola and phreatic line for a homogeneous earth dam section without any filter at toe. **10**
 (b) A water course has a culturable commanded area of 1500 hectares. The intensity of irrigation for Kharif crop A is 35% and for Kharif crop B is 40%. Crop A has a kor period of 15 days and crop B has kor period of 20 days. Calculate the discharge of the water course if the kor depths for crop A and crop B are 25 cm and 30 cm respectively. **10**
2. (a) (i) Discuss recording type rain-gauges. **5**
 (ii) Explain Thiessen's Polygon method for computation of average rainfall over a basin. **5**
 (b) A storm with 10.5 cm precipitation produced a direct run-off of 6.0 cm. Given the time distribution of the storm as below, estimate the ϕ index of the storm :- **10**

Time from start (h)	1	2	3	4	5	6	7	8
Incremental rainfall in each hour (cm)	0.4	1.0	1.6	2.5	1.8	1.7	1.0	1.5

3. (a) Derive the equation for a steady state discharge from a well in Unconfined Aquifer. Clearly mention the assumption made. **10**
 (b) A 30 cm well completely penetrates a confined aquifer of 20 m thickness. After a long period of pumping at a steady rate of 1.0 m³/min, the drawdown in two observation wells 100 and 150 m from the pumping well were found to be 1.5 m and 1.0 m respectively. Determine the transmissivity of the aquifer. What is the drawdown at the pumping well ? **10**
4. (a) Explain what is pore pressure and its role during and after construction of earthen dam. **10**
 (b) Design an irrigation channel to carry 50 cumecs, by using Kennedy's method. Take $m = 1$, $B/D = 2.5$, Mannings $n = 0.0225$ and side slopes 1 V : 0.5 H. **10**
5. (a) List the salient features of cross-drainage works. Sketch and explain Syphon aqueduct and Super passage. **8**
 (b) A Concrete dam can be assumed to be trapezoidal in section having a top width of 2 m and bottom width of 10 m. Its height is 12 m and the upstream face has a batter of 0.9. Give an analysis of the stability of the dam for the base section for overturning and sliding in the full reservoir condition assuming no free board allowance but allowing for uplift pressure. Assume uplift intensity factor as 100%. Also determine the compressive stress at the toe and the heel and major principal and shear stress developed at the toe. Assume weight of concrete to be 2.4 t/m³, unit shear strength of concrete to be 140 t/m², and $\mu = 0.7$. **12**
6. (a) Write a short note on Water logging. What are the cause and control measures of water logging ? **10**
 (b) Given below are the observed flows (cumecs) from a storm of 6 hour duration on a stream with a drainage area of 316 km². Assume a constant base flow of 17 cumecs, derive and plot a 6 - h UH **10**

Time (h)	0	6	12	18	24	30	36	42	48	54	60	66	72
Flow	17	113.2	254.2	198	150	113.2	87.7	67.9	53.8	42.5	31.1	22.74	17

7. Write short notes on :- **20**
 (a) Arch and Buttress Dams
 (b) Ogee Spillway
 (c) Canal Lining