P4/RT-Ex-07-24

Con. 2844-07.

Irrigation Engg.

[OLD COURSE]

(3 Hours)

ND–806

[Total Marks] 100

N.B. (1) Question No.1 is **compulsory**.
    (2) Attempt any **four** questions out of remaining **six** questions.
    (3) Assume any **suitable** data wherever necessary.

B.E. (C) VII old Irrigation Engg. 24/5/07

1. (a) Explain with neat sketches modern methods of irrigation and their advantages over traditional methods. **10**

   (b) A canal has Gross Command Area of 25,000 Hectares, of which 80% is culturable. Intensity of irrigation for Rabi is 40% and 20% for Rice. If kor period for Rabi is 4 weeks and 2.5 weeks for rice, find outlet discharge. Outlet duty for Rabi is 1600 Ha / cumec and for rice 800 Ha/cumec. Calculate delta for each case. **10**

2. (a) Explain the methods of calculating average annual rainfall. **10**

   (b) A catchment of 2300 sq. km. gave following hydrograph for a 6 hour storm. Derive and plot 6 hour UH. **10**

Time (Hrs)	00	06	12	18	24	30	36	42	48
Flow (cumecs)	15	190	305	227	148	94	61	35	15
Base flow (cumecs)	15	10	5	7	8	9	11	13	15

3. (a) Describe forces acting on a gravity dam. **10**

   (b) A concrete dam can be assumed to be trapezodial in section having a top width of 2 m and bottom width of 10 m. Its height is 12 m and upstream face has a batter of 1 : 10. 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 pressures. Assume uplift intensity factor as 100%. Also determine the compressive stresses at the toe and heel. Assume height of concrete to be 24 kN/m^3, unit shear strenth of concrete to be 1400 kN/m^3 and the coefficient of friction between concrete and foundation soil to be 0.7. **10**

4. (a) Draw cross section of a zoned earthen dam and show there on all different component parts and explain their functions. **10**

   (b) Explain how you will get base parabola and pheratic line for a homogeneous earth dam section without any filter at toe. **10**

5. (a) Define :– **10**
   Permeability, Transmissibility, confined aquifer, well losses, well development.

   (b) A 30 cm diameter well penetrates 25m below the static watertable. After 24 hours of pumping at 5400 liters/minute, the water level in a test well at 90 m is lowered by 0.53 m, and in a well at 30 m away the drawdown is 1.11m **10**
       (i) What is the transmissibility of the aquifer
       (ii) Also determine the drawdown in the main well.

6. (a) Explain the various types of spillways. **10**

   (b) Design an irrigation channel to carry 50 cumecs of discharge. The channel is to be laid at a slope of 1 in 4000. The critical velocity ratio for the soil is 1.1. Use Kutter's rugosity coefficient as 0.023. **10**

7. Write notes on :– **20**
   (a) Water Logging
   (b) Lining of Canal
   (c) Syphon aqueduct