

(3 Hours)

[ Total Marks : 100

- N.B.** (1) Question No. 1 is **compulsory**.  
 (2) Answer any **four** questions from remaining **six** questions.  
 (3) Assume **suitable** data where **necessary**. State them **clearly**.

1. (a) Enlist the methods of irrigation and explain any three in detail. 10  
 (b) The base period, intensity of irrigation and duty of various crops under a canal system are given in the following table. Find the reservoir capacity, if the canal losses are 20% and reservoir losses are 12%. 10

| CROP      | BASE PERIOD (DAYS) | DUTY AT FIELD (hect/cumec) | AREA UNDER CROP (hect) |
|-----------|--------------------|----------------------------|------------------------|
| Wheat     | 120                | 1800                       | 4800                   |
| Sugarcane | 360                | 800                        | 5600                   |
| Cotton    | 200                | 1400                       | 2400                   |
| Rice      | 120                | 900                        | 3200                   |
| Vegetable | 120                | 700                        | 1400                   |

2. (a) What are the different types of precipitations ? Explain any two. 6  
 (b) Write a short note on Symon's Rain Gauge. 4  
 (c) The hourly ordinates of two hour unit hydro graph are as given below. Derive a 6 hour unit hydrograph for the same catchment. 10

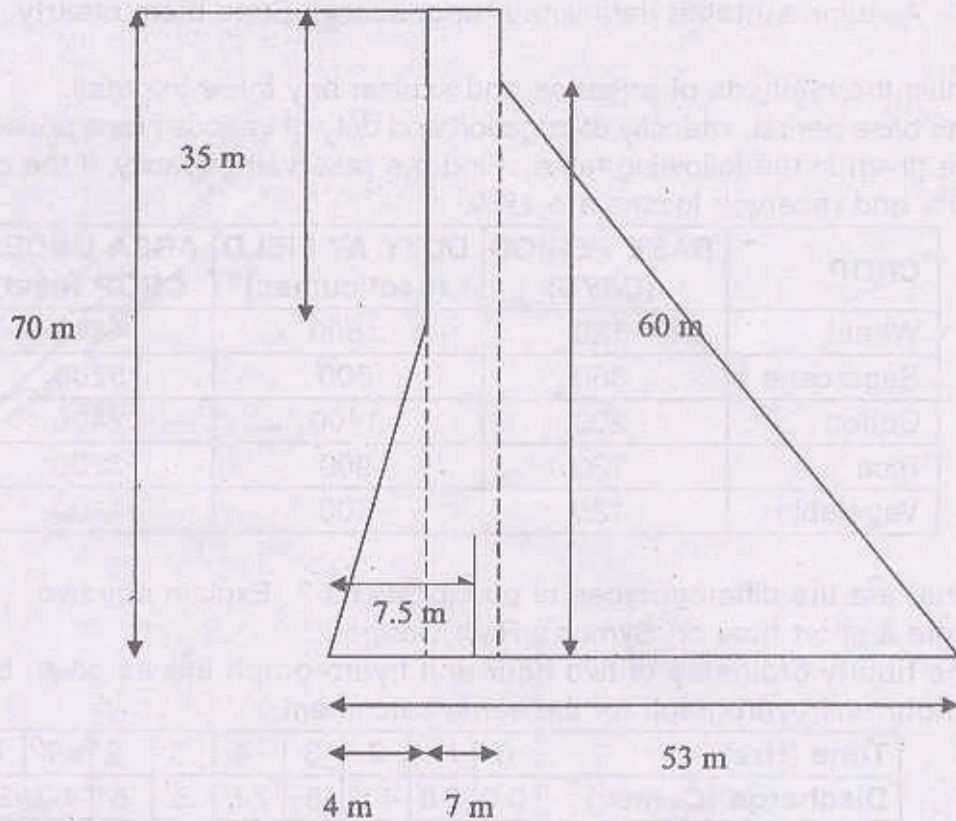
| Time (Hrs)        | 0   | 1   | 2   | 3 | 4   | 5 | 6 | 7   | 8   | 9   | 10  |
|-------------------|-----|-----|-----|---|-----|---|---|-----|-----|-----|-----|
| Discharge (Cumec) | 0.0 | 1.8 | 4.5 | 5 | 7.5 | 8 | 6 | 4.2 | 2.5 | 1.3 | 0.0 |

3. (a) Define : 6  
 (i) Storage Coefficient  
 (ii) Coefficient of permeability  
 (iii) Coefficient of Transmissibility.  
 (b) Write a Short note on Recuperation Test. 4  
 (c) A well penetrates fully, a 10 m thick water bearing stratum of medium sand having coefficient of permeability of 0.005 m/sec. The well radius is 10 cm and is to be worked under a drawdown of 4 m at the wall face. Calculate the discharge from the well. What will be the % increase in discharge if the radius of the well is doubled ? Take radius of drawdown as 300 m in each case. 10
4. (a) Enlist different types of Spillways and explain any two in detail. 10  
 (b) Explain the methods to compute average rainfall. 10
5. (a) Compare Kennedy's and Lacey's theories. 10  
 (b) Design an irrigation channel in alluvial soil according to Lacey's silt theory from the following : 10  
 Full supply discharge = 15 cu.m/sec.  
 Lacey's Silt factor = 1.0  
 Channel side slope = 0.5 : 1.

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6. (a) Write a short note on causes of failures of earthen dams. 10  
 (b) Check the stability of the dam section shown for reservoir full condition with uplift. 10  
 Also find principle stresses at the toe and heel.  
 Take  $\gamma_{con} = 24 \text{ kN/m}^3$  and  $\gamma_w = 10 \text{ kN/m}^3$ .



7. (a) What are the effects of water logging ? 5  
 (b) What are the different types of canal linings ? 5  
 (c) Write a short note on Sarda type fall. 5  
 (d) Write a short note on Bligh's Theory.