

18/12/2025

Total marks: 80

QP-10098343

Duration: 3 hours

Q.1 is COMPULSORY

Attempt any THREE out of remaining questions

Assume suitable data wherever required.

Q.1 Attempt any FOUR of the following (20)

- Explain the necessity of irrigation in India.
- Enlist the irrigation methods in hierarchy pattern.
- Discuss the forms of precipitation.
- What are well losses?
- Explain components of Hydrograph with a neat sketch.
- What are the control measures of reservoir sedimentation?

Q.2. A.i. Define irrigation and discuss in brief ill effects of irrigation. (05)

A.ii. Explain in short the Drip irrigation (05)

B. Discuss in detail sprinkle irrigation along with the different systems & classification based on type of nozzle. (10)

Q.3. A.i Explain the classes of availability of soil water (05)

A.ii. Derive the relationship between duty delta and base period. (05)

B. The base period, intensity of irrigation and duty of water for various crops under the canal system are given. Determine the reservoir capacity, if the culturable command area is 45000 hectares, canal losses are 20% and reservoir losses are 12%. (10)

Crop	Base period(days)	Duty at field (Ha/cumec)	Intensity of irrigation
Wheat	120	1700	25%
Sugarcane	360	1800	20%
Cotton	180	1350	10%
Rice	120	800	15%
Vegetables	120	650	15%

Q.4. A. The ordinates of 3-h unit hydrograph for a drainage basin are given below. Obtain 9-hr UH by S-curve method (10)

Hours	0	3	6	9	12	15	18	21	24	27	30
Ordinates of UH (cumecs)	0	7	13	25.5	45	86	78	43	9.5	3	0

B. State and explain the factors affecting runoff. (10)

- Q5. A.i. Define aquifer, aquiclude, specific yield, specific retention and perched aquifer. (05)
A.ii. Derive an expression for discharge from a well fully penetrating unconfined aquifer. (05)

B. An artesian tube well has a diameter of 20cm. The thickness of aquifer is 30m and its permeability is 38m/day. Find its yield under a drawdown of 4m at the well face. Use radius of influence as recommended by Sichardt. (10)

- Q.6. A.i. Discuss different zones of reservoir storage with neat sketch. (05)
A.ii. What are factors affecting selection of site for reservoir. (05)

B. A channel has to be designed for the following data:

Discharge = 30cumecs

Silt factor = 1.00

Side slope 0.5 : 1

Find also the longitudinal slope by Lacey's theory. (10)