(3 HOURS) **TOTAL MARKS: 80**

1. Question No. One is compulsory.
2. Attempt any Three questions out of remaining five questions,
3. All questions carry equal marks.
4. Assume Suitable data if necessary

Q.No.1 Attempt any four:-

[a] Define Irrigation & discuss its benefits. **[5]**

[b] What do you understand by canal lining & water logging? **[5]**

[c] Explain different forms of precipitation. **[5]**

[d] Write short note on Bandhara irrigation. **[5]**

[e] Discuss the physical factors governing selection of type of dam **[5]**

Q.No.2 [a] what do you mean by duty, delta & base period? Explain briefly various factors affecting duty. **[10]**

[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 commands area is 4000 hectors, canal losses are 25% and reservoir losses are 15%. **[10]**

Crop	Base period (days)	Duty at field (ha/cumec)	Intensity of irrigation
Wheat(Rabi)	120	1800	20%
Sugarcane	360	1700	20%
Cotton	180	1400	10%
Rice	120	800	15%
Vegetable	120	700	15%

Q.No.3 [a] Explain various methods use for estimation of missing rainfall data & computation of average rainfall over a basin. **[10]**

[b]The ordinates of a 4-hour unit hydrograph of catchment are given below:

Time(hours)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinates of 4h UH(m^3/sec)	0	20	60	150	120	90	70	50	30	20	10	0

Derive the flood hydrograph in the catchment due to the storm given below:

Time from start of storm(h)	0	4	8	12
Accumulated rainfall (cm)	0	5.0	5.8	8.8

The ϕ-index for the catchment can be assumed to be 0.25 cm/ hour and constant base flow of 20 cm^3/ sec. is appropriate. [10]

TURN OVER

Q.No.4 [a] Derive an expression for discharge from a well fully penetrating a unconfined aquifer. **[10]**

[b] A 30 cm diameter well penetrates 25m below the static water table. After 24 hours of pumping @5400liters/minute, the water level in a test well at 90 m is lowered by 0.53 m, and a well 30 m away the drawdown is 1.11 m. (a) what is the transmissibility of the aquifer? (b) Also determine the draw down in the main well. **[10]**

Q.No.5. [a] A rectangular masonry dam is 3 m at the base. Compute the maximum permissible height H (a) when no tension is permissible, and (b) when the factor of safety against sliding is 1.5. Given the following: (i) μ=0.5, (ii) density of masonry=24 times the water, and (iii) c=1.What will be corresponding values of H if uplift is neglected? **[10]**

[b] What do you mean by Gravity dam, arch dam and butters dam? **[06]**

[c] Explain in brief about multipurpose reservoir **[04]**

Q.No.6. Write short notes on following:

(a)Ogee spillway **[05]**

(b) Reservoir sedimentation **[05]**

(c) Silt extractor and silt ejector **[05]**

(d) Aqueduct & syphon aqueduct **[05]**
