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

Note: [1] Q.No.1 is compulsory.
[2] Attempt any three questions out of remaining five questions
[3] Assume any data if required and mention clearly.

Q.No.1 Attempt any four:-

[a] Define irrigation. What is the necessity of irrigation? **[5]**

[b] Explain the terms: aquifer, aquiclude and aquifuge. **[5]**

[c] Describe various methods of computing average rainfall over a basin. **[5]**

[d] Explain the term 'storage coefficient' and 'coefficient of transmissibility'. **[5]**

[e] Explain Canal Lining. **[5]**

Q.No.2 [a] What are the factors affecting Run-off. What are various method of computing run-off? Explain any one method. **[10]**

[b] A canal takes off a reservoir to irrigate the areas given below. 40% of the water required for irrigation is assumed to be available directly from precipitation. Channel conveyance losses are 15%. Reservoir losses are 10%. What would be the capacity of reservoir needed? (The reservoir to be filled only once a year) **[10]**

Crop	Base period (days)	Duty at the field (ha/cumec)	Area under crop (ha)
Wheat	140	1700	400
Sugarcane	320	800	600
Rice	120	900	300
Cotton	220	1200	1200
Bajra	100	1200	600

Q.NO.3 [a] Explain various types of Rain-gauge with neat sketches. **[10]**

[b] Find the ordinates of a storm hydrograph from a 3hr storm with rainfall of 2, 6.75 and 3.75 cm during subsequent 3 hr intervals. The ordinates of hydrograph are given in the following table:

Hours	3	6	9	12	15	18	21	24	3	6	9	12	15	18	21	24
Ordinates of Unit hydrograph { cumec}	0	110	365	500	390	310	250	235	175	130	95	65	40	22	10	0

Assume an initial loss of 5 mm, infiltration index of 2.5 mm/hr and base flow of 10 cumecs**. [10]**

Q.No.4 [a] Derive an equation for discharge from a well in an unconfined aquifer. **[10]**

[b] Explain various types of reservoirs. What do you understand by multipurpose reservoir? **[10]**

Q.No.5 [a] A rectangular masonry dam is 3 mt 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 of water, and (iii) c=1. What will be corresponding values of H if uplift is neglected? **[10]**

[b] Discuss the causes of failure of earth dams. **[10]**

Q.No.6 Write short notes on following: **[5x4]**

(a) Hydrologic Cycle and Types of Precipitation

(b) Silt extractor and silt ejector

(c) Cross Drainage Work

(d) Reservoir Planning

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