(3 HRS) **(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 stating clearly

Q.1 (a) Define Irrigation and explain the necessity, benefits and Ill effects of irrigation in India **[5]**

(b) Explain the term Aquifer, Aquiclude, Aquitard,and Perched Aquifer. **[5]**

(c) Explain ill effects of water logging **[5]**

(d) Explain the term Base period, Duty & Delta. Derive the relation between them. **[5]**

(e) What is meant by cross drainage works? Explain any one. **[5]**

Q.2 (a) Explain the mass curve of demand and supply for reservoir. **[10]**

(b) Table below gives the necessary data about the crop, their duty and area under each crop, **[10]** commended by a canal taking off from a storage tank. Taking a time factor for the canal to be 0.65 and capacity factor 0.8. Calculate the design discharge required at the head of the canal.

Crop	Base period (days)	Duty at the field (ha/cumec)	Area under each crop (Ha)
wheat	120	1800	4800
suagarcane	360	800	5600
Cotton	200	1400	2400
rice	120	900	3200
vegetables	120	700	1400

Q.3 (a) What is hydrograph? Draw a single peaked hydrograph and explain its components. **[10]**

(b) Find out the ordinates of a storm hydrograph resulting from a 3 hour storm with rainfall of 3, **[10]** 4.5, 1.5 cm during subsequent 3 hours intervals. The ordinates of unit hydrograph are given below in the table below:

Hours	0	03	06	09	12	15	18	21	24	03	6	09	12
Ordinates UH (cumecs)	0	90	200	350	450	350	260	190	130	80	10	20	0

Assume an initial loss of 5 mm, infiltration index of 5 mm / hour and base flow of 2 cumec.

Q.4 (a) Derive an expression for the steady state discharge of well fully penetrating into an unconfined aquifer. **[10]**

(b) Fig shows the section of gravity dam (non-overflow section) built of concrete. Calculate **[10]** (neglecting earthquake effects). 1) The max vertical stress at heel & toe of the dam. 2) The major principal stress at toe of the dam. 3) Intensity of shear stress on horizontal plane.

55963 **Page 1 of 2**
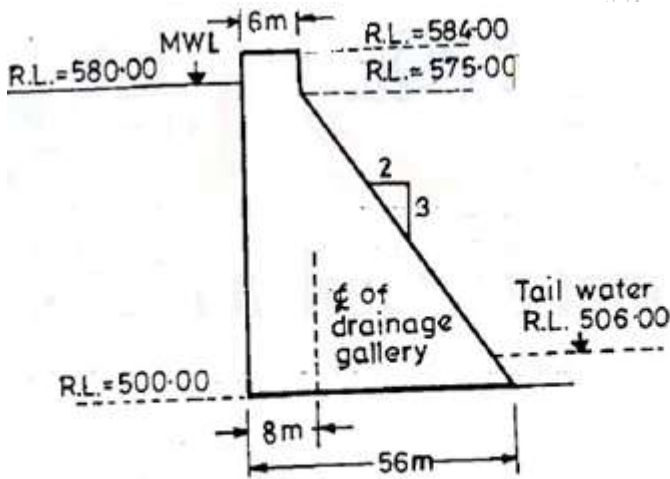
Q.5 (a) Design an irrigation channel in alluvial soil according to Laceys silt theory given following **[10]**
data: - slope of the channel = 1: 5000, lacey's silt factors = 0.9, Channel side slope – ½ : 1.

(b) Explain in details modes of failures of Gravity dam **[10]**

Q.6 (a) What is Bhandara Irrigation? What are the advantages and disadvantages **[5]**

(b) Compare the Kennedy's theory and Lacey'stheory. **[5]**

(c) What is runoff? What are the factors that affect the runoff from a catchment area? **[5]**

(d) What is meant by Canal lining? What are its advantages and disadvantages? **[5]**

.

_____

X237Y251088X237Y251088X237Y251088X237Y251088