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Total Number of Pages : 02

B.Tech  
PCI6I102

6<sup>th</sup> Semester Regular / Back Examination 2018-19  
IRRIGATION ENGINEERING

BRANCH : CIVIL

Max Marks : 100

Time : 3 Hours

Q.CODE : F211

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- What is the classification of irrigation water having the concentrations of Na, Ca and Mg are 21, 3 and 2 milli-equivalents per litre respectively?
- The base period of paddy is 120 days. If the duty for this crop is 950 hectares per cumec, find the value of delta.
- The G.C.A. for a distributary is 6000 hectares, 80% of which is CCA. Find the area to be irrigated for wheat if the intensity of irrigation for wheat is 50%.
- Write the measures adopted to control water logging.
- Draw the typical cross section of canal syphon. How do you decide to provide this structure in field?
- What are the functions of divide wall provided in diversion head works?
- State the total Lane's creep length with sketch.
- Differentiate high gravity dam and low gravity dam.
- What is Phreatic line?
- What are the probable locations of spillway?

Part- II

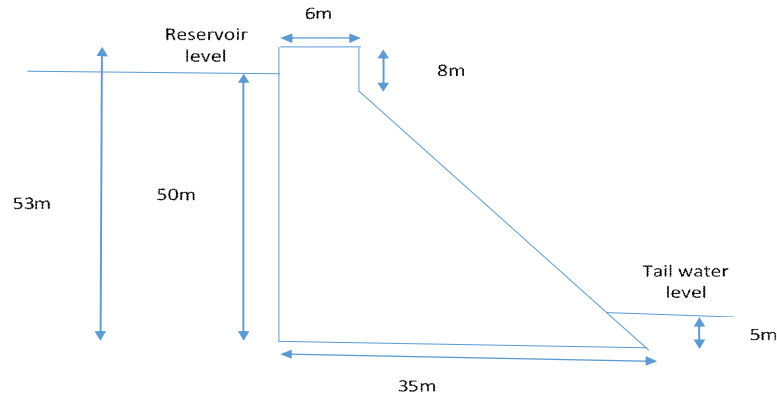
Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Determine the head discharge of a canal using the following data. The value of the time factor may be assumed as 0.80.

Crop	Base period(days)	Area (hectare)	Duty(hectares/cumec)
Rice	120	4000	1500
Wheat	120	3500	2000
Sugarcane	310	3000	1200

- In a field, the field capacity of soil is 30%, permanent wilting point is 16%, dry density of soil is 1.5gm /c.c., effective depth of root zone is 80 cm and daily consumptive use of water for a given crop is 14mm. After how many days you will supply water to soil in order to ensure sufficient irrigation of the given crop?
- Design a regime channel for a discharge of 60 cumecs and silt factor 1.0, using Lacy's Theory.
- A canal of length 7 km and of discharge capacity 4 cumec is proposed to be lined with boulder lining. The total cost of lining is estimated as 4 lakhs. The life of lining is considered as 50 years. Justify the lining in the canal from the following data:  
Rate of interest = 8%, Seepage loss = 2%, Revenue for irrigation water = Rs 80.00 per hect-m, maintenance cost per km for lined canal = Rs950.00, maintenance cost per km for unlined canal = Rs 2000.00, base period of crop = 120 days and additional benefit/km = Rs 800.00.
- Enumerate the process of reclamation of land affected by water logging.
- What is meant by cross drainage works? Explain the classification of cross drainage works with sketch.
- What are the important components of diversion head works? Illustrate their function(s).
- Name the different types of weirs and describe each type with a neat sketch.

- i) How do you calculate the forces due to weight of the dam, water pressure and uplift pressure on the gravity dam shown in figure. Unit weight of the concrete  $24 \text{ kN/m}^3$ .



- j) Design practical profile for a low gravity dam with a water depth of 84 m, wave height 3 m and specific gravity of concrete 2.4, allowable compressive strength of  $3000 \text{ kN/m}^2$ , top width of dam as 6 m.
- k) Discuss the causes of failure of earthen dam.
- l) Differentiate between Saddle Siphon spillway and Volute Siphon spillway.

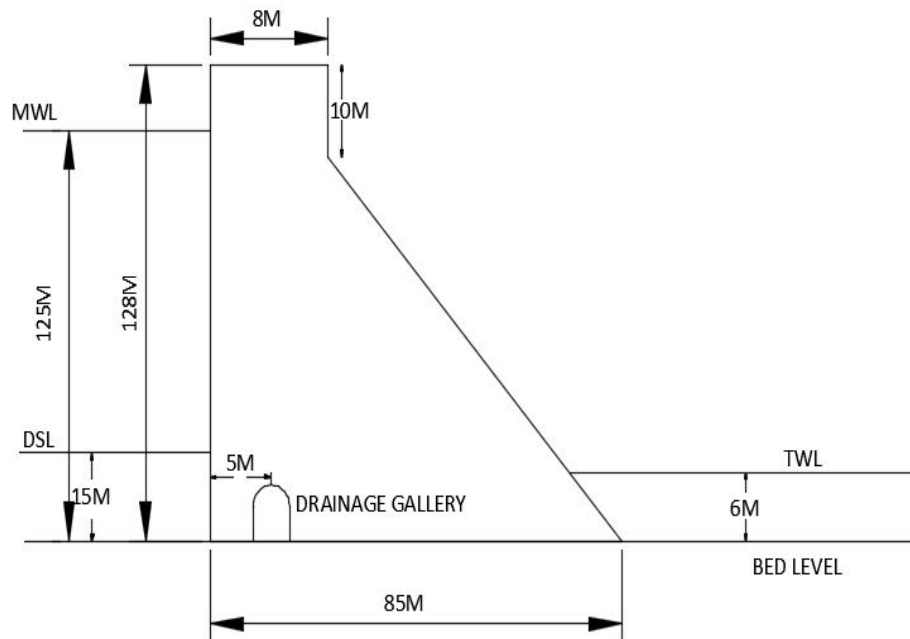
### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four)

**Q3** Describe (with sketch) the following water distribution techniques adopted in farm : (i) Free flooding, (ii) Border flooding, (iii) Basin flooding, (iv) Furrow irrigation method **(16)**

**Q4** Discuss the different types of lining provided in canal. **(16)**

**Q5** Check the stability against overturning for the gravity dam shown in figure. Consider the following criteria: Static water pressure, uplift pressure, weight of dam, silt pressure. Assume any other data required. **(16)**



**Q6** What is meant by canal fall? Why are canal falls constructed in a canal system? With sketch describe the following falls: Ogee fall, Trapezoidal Notch fall, Sarda type fall, Montague type fall. **(16)**