Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY PDDC - SEMESTER-VII • EXAMINATION - SUMMER • 2014

Subject Code: X 70601

Subject Name: Design of Hydraulic Structures

Time: 02:30 pm - 05:00 pm

Total Marks: 70

Date: 28-05-2014

- **Instructions:**
 - 1. Attempt all questions.
 - 2. Make suitable assumptions wherever necessary.
 - 3. Figures to the right indicate full marks.
- 0.1 (a) What is meant by gravity dams? What are the advantages and disadvantages of 07 a gravity dam over the other types?
 - (b) Explain briefly with neat sketches the different forces that may act on a gravity 07 dam. Indicate their magnitudes, directions and locations.
- (a) What are the main points to be considered while selecting a site for a gravity 0.2 07 dam construction?
 - (b) Calculate (neglecting earthquake effect) the maximum and minimum vertical 07 stresses at the heel and toe of the non-overflow section of the dam.
 - 1) Base width of dam = 56 meters
 - 2) Top width = 6 meters
 - 3) u/s slope = vertical
 - 4) d/s slope = 2 horizontal and 3 vertical
 - 5) starting of d/s slope from top of the dam = 9 meters
 - 6) location of drainage gallery from u/s heel = 8 meters
 - 7) height of dam = 84 meters
 - 8) height of water in dam = 80 meters
 - 9) Free board = 4 m.
 - 10) weight of concrete = 24 kN/cubic meter
 - 11) Weight density of water = 10 kN/cubic meter.

OR

- (b) Calculate (neglecting earthquake effect) the major principal stresses at the toe 07 and intensity of shear stress at the toe of the non-overflow section of the dam.
 - 1) Base width of dam = 56 meters
 - 2) Top width = 6 meters
 - 3) u/s slope = vertical
 - 4) d/s slope = 2 horizontal and 3 vertical
 - 5) starting of d/s slope from top of the dam = 9 meters
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(a) What do you mean by the elementary profile of gravity dam? Q.3 07 07

(b) Briefly explain the function of drainage gallery.

OR

0.3 (a) An earthen dam made of a homogeneous material has the following data:

1) Co-efficient of permeability of dam material = 5×10^{-4} cm/sec

- 2) Level of top of dam = 200.0 meter
- 3) Level of deepest river bed = 178.0 meter
- 4) Highest flood level of reservoir = 197.5 meter
- 5) Width of the top of dam = 4.5 meter
- 6) Upstream slope = 3:1
- 7) Downstream slope = 2:1

Determine the phreatic line for this dam section and the discharge passing through the dam.

- (b) A flow net is plotted for a homogeneous earthen dam of height 22 m and 07 freeboard 2.0 m. The results obtained are.
 - 1) Number of potential drops = 10
 - 2) Number of flow channels = 4

The dam has a horizontal filter of 30 m length at the downstream end and the co-efficient of permeability of the dam material is 5×10^{-4} cm/sec. Calculate the discharge per m run of the dam.

- What are the 'earthen dams' and under what circumstances are they preferred? **Q.4** 07 **(a)**
 - **(b)** Enumerate the different types of earthen dams, and draw neat sketches showing 07 each type.

OR

Q.4	(a)	Enumerate the different methods which are adopted for constructing earthen	07
		dams.	
	(b)	What are the causes of failures of earth dam?	07
Q.5	(a)	Briefly describe an 'ogee spillway'.	07
	(b)	Write a short note energy dissipation below spillways	07
		OR	
Q.5	(a)	What is meant by 'canal drops'? Why is the canal drops constructed in a canal	07
		system?	
	(b)	What are functions of canal head regulator?	07

(b) What are functions of canal head regulator?

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