

320832(20)

**B. E. (Eighth Semester) Examination,
Nov.-Dec. 2018**

(New Scheme)

(Civil Engg. Branch)

WATER RESOURCES ENGINEERING-II

Time Allowed : Four hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : All questions are compulsory. Part (a) of each question is compulsory and attempt any one part from (b) and (c) of each question. Khosla's pressure and gradient curves, Blench curves & Specific energy curves are permitted.

1. (a) What are the ill effects of dam construction? 2
- (b) (i) Explain in details the various forces causing instability in a gravity dam.
- (ii) What is meant by term 'low dam'? Determine the dimensions of the elementary profile of a low gravity dam. 14

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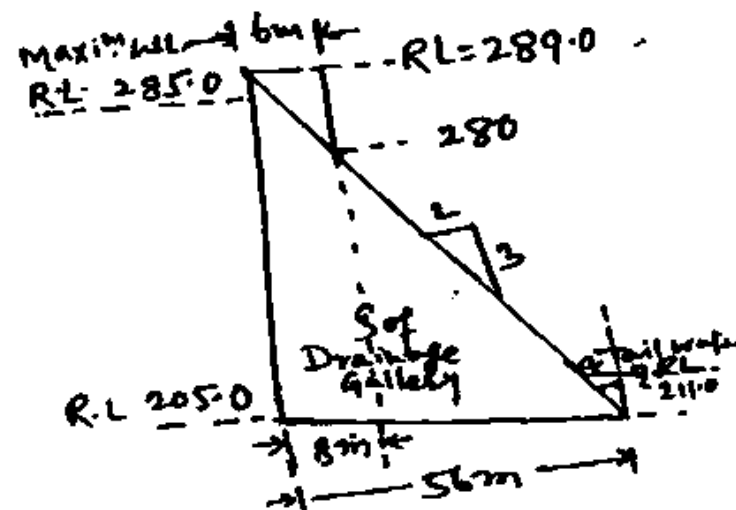
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(c) Show the section (fig 1) of a gravity dam (non-over flow portion) built of concrete, calculate (neglecting earthquake effects).

- (i) The maximum vertical stresses at the heel & toe of the dam.
- (ii) The major principle stress at the toe of the dam.
- (iii) The intensity of shear stress on a horizontal plane near the toe.

Assume weight of concrete = 23.5 kN/m³ and unit length of dam. Allowable stress in concrete may be taken 2500 kN/m².

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2. (a) What is meant by an energy dissipator? 2
- (b) Enumerate the different type of spillways which are used in dam construction. Where is it preferred to ogee and other types of spillways? 14
- (c) Design a suitable section for the overflow portion of a concrete gravity dam having the downstream face sloping at a slope of 0.7 H : 1 V. The design discharge for the spillway is 8000 cumecs. The height of the spillway crest is kept at RL 204.0 m. The average river bed level at the site is 100.0 m. The spillway length consists of spans having a clear width of 10 m each. The thickness of each pier may be taken to 2.5 m. http://www.csvtuonline.com 14
3. (a) Differentiate between a Weir and Barrage. 2
- (b) Draw a neat layout of a river regulator and indicate suitable locations for the following (i) A navigational lock (ii) A fish ladder (iii) Scouring sluices (iv) Head sluices.
Draw a typical cross-section of a head regulator and indicate the various components of the same. 14
- (c) A Weir with a vertical drop has the following particulars :

Nature of Bed : Coarse sand with the value of Bligh's C = 12

Flood discharge = 300 cumec

Length of weir = 40 m

Height of weir above low water = 2 m

Height of falling shutter = 0.6 m

Top width of weir = 2.0 m

Bottom width of weir = 3.5 m

Design the length and thickness of aprons and draw the cross-section of the weir. 14

4. (a) Define distributory head regulator and cross regulator. 2
- (b) What is meant by canal regulation? Enumerate the different engineering structures which may be required to be constructed in a canal project in order to regulate effectively the functioning of the different canals of a canal system? Discuss briefly the necessity, design and other details of any two such regulation works. 14
- (c) Design a cross regulator or a head regulator for a channel which takes off from the present channel with the following data : 14

Discharge of parent channel = 140 cumecs

Discharge of distributory = 15 cumecs

[5]

FSL of the parent channel, U/S = 210.0 m

FSL of the parent channel, D/S = 209.8 m

Bed width of parent channel, U/S = 52 m

Bed width of parent channel, D/S = 46 m

Depth of water in the parent channel

d/s & u/s = 2.5 m

FSL of distributory = 209.1 m

Silt factor = 0.8 m

Assume safe exit-gradient = 1/5

5. (a) Name the different types of cross drainage works. 2

(b) Write short notes on : 14

(i) Aqueduct

(ii) Syphon Aqueduct

(iii) Canal syphon

(iv) Level crossing

(c) Design a suitable cross-drainage work, given the following data at crossing of a canal and drainage canal

Full supply discharge = 32 cumecs

Full supply level = RL 213.5

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Canal bed level = RL 212.0 m

Canal bed level = 20

Trapezoidal canal section with 1½ H : 1 V slopes

Canal water depth = 1.5 m

Drainage

High flood discharge = 300 cumecs

High flood level = 210.0 m

High flood depth = 2.5 m

General ground level = 212.5 m 14

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