



CBCS SCHEME

17CV832

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Eighth Semester B.E. Degree Examination, July/August 2021 Hydraulic Structures

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions.
2. Draw the neat sketch wherever necessary.*

- 1 a. What is a gravity dam? List the forces acting on gravity dam. What are the I.S. recommendations for determining uplift pressure under the base of dam provided with drainage gallery? (05 Marks)
b. With neat sketches, explain the modes of failure of a gravity dam. (10 Marks)
c. Design the practical profile of a gravity dam given the following data:
R.L of base of dam = 1450 m
R.L of F.R.L = 1480.5 m
Specific gravity of masonry = 2.4
Safe compressive stress for masonry = 1200 kN/m²
Height of waves = 1 m (05 Marks)
- 2 a. List the various components of gravity dam. Derive expression for normal, principal and shear stress at the base of dam. (10 Marks)
b. Calculate the maximum vertical stress at heel and toe of a vertical face gravity dam using the below data. Neglect earthquake effects.
Top width of dam = 6 m
Base width = 56 m
M.W.L (R.L) = 285 m
R.L of Top/crest = 289 m
R.L. of base = 205 m
R.L of Tail water = 211 m
Drainage Galley at 8m from tow
Slope of D/S inclined face = 2H:3V (10 Marks)
- 3 a. With the help of neat sketches, explain the different types of earth dams. (10 Marks)
b. Derive equations for phreatic line using Casagrande's graphical method in a dam with horizontal drainage filter. (10 Marks)
- 4 a. Explain the structural failure in earthen dam. (10 Marks)
b. For the earth dam of homogeneous section with a horizontal filter of length equal to 25 m inwards from the d/s toe.
Coefficient of permeability = 5×10^{-4} cm/s
Level of top of dam = 200 m
Level of deepest river bed = 178.0 m
H.F.L of reservoir = 197.5 m
Width of top of dam = 4.5 m
U/S slope = 3:1
D/S slope = 2:1 (10 Marks)

- 5 a. What is a spillway? What are its functions? What are the different energy dissipation methods used below the spillways. (10 Marks)
b. Explain with the help of a neat sketch, the various components of diversion head works. What are their functions? (10 Marks)
- 6 a. With a neat sketch, list the steps for design of an Ogee Spillway. (10 Marks)
b. Explain Bligh's creep theory for design of impervious Weir floor. What are the design criterias and what are the limitations of Bligh's theory? (10 Marks)
- 7 a. With neat sketches, explain the suitability of various types of cross drainage works. (12 Marks)
b. What are the features of design of cross drainage works? (08 Marks)
- 8 What are the design steps adopted when the water depth in the transition varies using Hind's method? (20 Marks)
- 9 a. Explain the necessity of canal fall. What are the conditions or suitability criterias for its location? (08 Marks)
b. What are the functions of canal head regulator and canal cross regulators? (12 Marks)
- 10 a. Explain with neat sketches:
(i) Vertical drop fall (10 Marks)
(ii) Glacis type fall (10 Marks)
b. What is a canal outlet? What are its essential requirements? What are its types? (10 Marks)

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