

Total No. of Questions : 8]

SEAT No. :

P1446

[Total No. of Pages : 3

[6004]-466

**B.E. (Civil Engineering) (Semester - VIII)**  
**DAMS AND HYDRAULICS STRUCTURES**  
**(401011) (2019 Pattern)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat sketches/diagrams must be drawn wherever necessary
- 3) Figures to the right indicate full marks for the sub-questions.
- 4) Assume suitable data if necessary and state them in your answer clearly.
- 5) Use non-programmable pocket size electronic calculator is allowed.

- Q1) a) What is an emergency spillway? state its purpose. [5]
- b) What is a spillway gate? Briefly explain anyone types of gates. [5]
- c) Discuss the various types of energy dissipator used below spillway in relation to the position of tail water depth and jump height curve at least two with sketch. [7]

OR

- Q2) a) Enlist main components of spillway & explain any one. [5]
- b) Enlist type of energy dissipator & explain in details bucket type energy dissipater. [5]
- c) Design an ogee spillway for concrete gravity dam, for the following data.[7]
- i) Average river bed level = 160 m
  - ii) Slope of D/S = 0.75 H : IV, u/s face is vertical
  - iii) Spillway crest RL = 265 m
  - iv) Design discharge = 5750 m<sup>3</sup>/s
  - v) Spillway length is 6 spans with a clear length of 7 m each.  
Pier thickness = 2m.

P.T.O.

**Q3) a)** Write a note on measures adopted for safe drainage of seepage water in earthen dam. [5]

b) Explain the function of hearting and rock toe in earthen dam. [5]

c) Determine the factor of safety of downstream slope of (homogeneous section) an earth dam drawn to a scale of 1:650, for the following data:[8]

Area of N-rectangle = 20 cm<sup>2</sup>

Area of T-rectangle = 10 cm<sup>2</sup>

Area of U-rectangle = 5 cm<sup>2</sup>

Length of slip circle arc = 20 cm

Angle of internal friction = 26°

Cohesion  $c = 24 \text{ kg/m}^2$

Specific weight of soil = 18 kN/m<sup>3</sup>

OR

**Q4) a)** Briefly explain various causes of modes of failure of earthen dams. Draw relevant sketches. [5]

b) Describe the method of plotting phreatic line for an earth dam with horizontal filter at the downstream. [5]

c) With the help of appropriate sketches explain Swedish slip circle method of stability analysis of an earth dam. [8]

**Q5) a)** Write short note on. [5]

i) Canal falls

ii) Canal outlets

b) Describe the types of canals on the basis of their purpose. [5]

c) Briefly explain Kennedy's theory. What are the drawbacks of Kennedy's theory. [7]

OR

- Q6)** a) Write short note on [5]
- i) Canal escapes
  - ii) Canal regulators
- b) Explain types of canal according to function. [5]
- c) Design a regime channel of trapezoidal section for carrying water at the rate 12 cumecs having side slopes 1 H : 2 V, if Lacey's slit factor is 0.90. [7]
- Q7)** a) Explain bulgh's theory of seepage with neat sketch. [5]
- b) What do you understand by cross drainage work? Write the factors for selection of CD works. [5]
- c) Explain in brief [8]
- i) Aqueduct
  - ii) Super passage
  - iii) Level crossing
  - iv) Inlet and outlet

OR

- Q8)** a) Explain Khosla's theory of independent of seepage variable. [5]
- b) Explain the importance of exit gradient. [5]
- c) Draw a labelled sketch of diversion headworks Also enumerate the function of each component. [8]

x

x

x