Total No. of Questions : 8]

SEAT No. :

P6537

[Total No. of Pages : 2

[6181]-86

B.E. (Civil Engineering)

DAMS AND HYDRAULICS STRUCTURES

(2019 Pattern) (Semester - VIII) (401011)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
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) Define spillway & state its purpose. **[5]**

b) Enlist main components of spillway & explain Control structure. **[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 : 1V, u/s face is vertical

iii) Spillway crest RL = 265 m

iv) Design discharge = 5530 m^3/s

v) Spillway length is 6 spans with a clear length of 7 m each.

vi) Pier thickness = 2m.

OR

Q2) a) Enlist type of energy dissipator & explain Ski jump type energy dissipater. **[5]**

b) State four types of spillway gate and explain any one with sketch. **[5]**

c) Explain the design criteria of U.S. type II stilling basin. Draw a neat sketch of the stilling basin. **[7]**

Q3) 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]**

OR

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Q4) a) Explain the function of hearting and rock toe in earthen dam. **[5]**

b) Draw a neat sketch of a cross-section of earthen dam indicating the various components & explain any one component. **[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^2
Area of T-rectangle = 10 cm^2
Area of U-rectangle = 5 cm^2
Length of slip circle arc = 20 cm
angle of internal friction = 26°
cohesion c = 24 kg/m^2
specific weight of soil = 18 kN/m^3

Q5) a) What is a canal? Explain types of canals based on function. **[5]**

b) Explain the advantage and disadvantages of lining of canals. **[5]**

c) Design a regime channel of trapezoidal section for carrying water at the rate 10 cumecs having side slopes 1 H: 2 V, if Lacey's slit factor is 0.90. **[7]**

OR

Q6) a) Write short note on. **[5]**

i) Canal falls
ii) Canal outlets

b) Write note on khosla's theory of independent variable. **[5]**

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

Q7) a) Explain Khosla's theory of independent od 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]**

OR

Q8) a) Explain in brief : **[5]**

i) Level crossing
ii) Super passage

b) Compare bligh's and lane's creep theores of seepage. **[5]**

c) Write note on khosla's theory application for design of structure on permeable foundations. Also explain the importance of exit gradient. **[8]**