Total No. of Questions : 12]

SEAT No. :

P1907

[Total No. of Pages : 4

[5254]-2

B.E. (Civil)

DAMS AND HYDRAULIC STRUCTURES

(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Define the term dam and state its purpose. **[4]**

b) Explain clearly various factor that affect the choice of particular type of dam for given site condition. **[4]**

c) Differentiate between Rigid dam and Non rigid dam. **[4]**

d) Explain clearly criteria for the selection of type of dam. **[4]**

OR

Q2) a) State clearly various methods of classification of dams. **[4]**

b) Distinguish between Arch dams & Buttress dam. **[4]**

c) Define meaning of Height of dam. **[4]**

d) State the procedure of fixing the appropriate Height of the dam to store water in the reservoir to its designed capacity. **[4]**

Q3) a) Discuss in brief various investigation required for reservoir planning. **[6]**

b) Derive an expression for limiting height of gravity dam. **[6]**

c) What is meant by elementory profile of gravity dam? Obtain an expression for base width of elementary profile for no tension condition. **[6]**

OR

Q4) a) Gallaries in gravity dam. **[5]**

b) Various zones of storage in a reservoir. **[5]**

P.T.O.

c) Determine the stability analysis of gravity dam with the following data. **[8]**

i) Overturning moment at toe = 1×10^6 kN-m.

ii) Total resisting moment at toe = 2×10^6 kN-m.

iii) Total vertical force above base = 50×10^3kN.

iv) Base width of dam = 50m

v) Slope of D/s surface = 0.8 H : IV.

vi) Calculate the maximum and minimum vertical stresses on foundation and also determine the maximum principle stress at toe of dam. Assume that there is no tail water and U/S face is vertical.

Q5) a) Briefly discuss causes of failure of earthen dam. **[4]**

b) Explain with sketch syphon spillway. **[4]**

c) Briefly discuss the checks that are required to be made to investigate the stability of an earthen dam. **[8]**

OR

Q6) a) Write short note on earth dam construction. **[4]**

b) Write short note on radial gate. **[4]**

c) Describe the method of plotting pheretic line for an earthen dam with horizontal filter at downstream side with sketch. **[8]**

SECTION - II

Q7) a) State various types of spillway gates and their specific applications. **[5]**

b) Discuss various types of energy dissipation devices used below spillways in relation to the position at tail water depth & Jump Height curve. **[5]**

c) A Ogee type spillway has 12 crest gate each having 10m clear span. Find the max flood that can be safely passed by lifting all the gates when the maximum resenon level is 105.00m and crest level is 101.00 m. **[8]**

Take coeff. C = 2.16.

Coeff of end contraction of piers = 0.05.

Coeff. of contraction for abutment = 0.1.

Neglecting the velocity of approach design the downstream profile of this spillway of gravity dam having downstream face slope 0.7 H : IV.

OR

Q8) a) Explain vertical lift gates or Rectangular gates. **[5]**

b) Write short note on maintenance of outlet structures. **[5]**

c) Explain creep theories by Blign and lane for the hydrauliz design of weir on permeable foundation. State the advantages of Khosla's theory over creep theories. **[8]**

Q9) a) What is cross drainage works explain with sketch. **[4]**

b) Laceys theory for design of alluvial canal. **[4]**

c) Design a channel using Kennedys theory carrying a discharge $30m^3/s$ with critical velocity ratio and mannings constant equal to 1.0 and 0.0225 respectively.

Assume that the bed slope is equal to 1 in 5000. Assume side slope ½ H : IV. **[8]**

OR

Q10)a) Explain the significance of bedforms in alluvial hydraulics. **[4]**

b) Define the following terms as applied to Laceys theory. **[4]**

i) Regime channel

ii) Initial Regime

iii) Final regime

iv) SMT factor.

c) What are the various canal regulation works. **[4]**

d) What are canal escapes? What is its necessity. **[4]**

Q11)a) Write short notes on : **[8]**

i) Attracting spurs

ii) Submerged dikes

iii) Marginal Bunds

iv) Pitched island

b) Discuss the necessity of river training and enumerate the various works associated with it. **[8]**

OR

Q12)a) What is levee? Where it is used. **[4]**

b) State the purpose and location of a surge tank and draft tube in hydro power scheme. **[4]**

c) Explain the function of a pumped storage power plant. **[4]**

d) What are the principle components of a hydro electric scheme? Discuss the utility if each components. **[4]**