SEAT No. :

[Total No. of Pages : 3

[5154]-2

B.E.(CIVIL)

DAMS AND HYDRAULIC STRUCTURES

(2008 Pattern) (Semester-I) (401002)

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

Instructions to the candidates:

1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section-II.*

2) *Neat diagrams must be drawn wherever necessary.*

3) *Figures to the right side indicate full marks.*

4) *Assume Suitable data if necessary.*

SECTION-I

Q1) a) Explain the factors which govern the selection of site for dam construction. **[8]**

b) Briefly explain the meaning of storage dam, diversion dam, overflow dam and rigid dam. **[6]**

OR

Q2) a) Write the concept of arch dam. Types of arch dams and explain any one type with sketch. **[8]**

b) Write different types of instruments used to monitor dams and explain any one. **[6]**

Q3) a) Derive an expression for limiting height of a gravity dam **[6]**

b) What is meant by elementary profile of gravity dam? Obtain an expression for base width. **[6]**

c) Discuss various mode of failure of a solid gravity dam. **[6]**

OR

Q4) a) Determine the stability analysis of a gravity dam with following data:

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 box = 50×10^3 KN

iv) Base width of dam = 50 m

v) Slope of downstream surface 0.8H:1V

Calculate the maximum and min. Vertical stresses on foundation and also determine the max. principal stresses at toe of the dam. Assume that there is no tailwater and V|s face is vertical. **[10]**

P.T.O.

b) Write short note on: **[8]**
    i) Earthquake forces on gravity dam with the help of sketch.
    ii) Drainage gallary.

Q5) a) Draw a neat sketch of an earthen dam homogeneous in section of 24 m height and name the various parts. Assume necessary data. Draw to the scale. **[6]**
    b) Classify earthen dams according to the method of construction. **[6]**
    c) Discuss briefly various causes of failure of earthen dam. **[6]**

<p align="center">OR</p>

Q6) a) Derive an expression for determining the seepage i.e discharge passing through the body of an earthen dam of homogeneous section. **[8]**
    b) Explain with a neat sketch the Swedish slip circle method of analysing the stability of downstream slopes of on earthen dam under steady seepage. **[10]**

<h2 align="center">SECTION-II</h2>

Q7) a) Compare Khoslas and Blighs creep length theory for seepage. **[5]**
    b) Write types of gates on spillway and Explain any one . **[5]**
    c) A Ogee type spillway has 12 crest gates each having 10 m clear span. Find the max. flood that can be safely passed by lifting all the gates when the max. reservoir level is 105.00m. and crest level is 101.00m.
        Take coeff. C=2.16
        Coeff. of end contraction of piers=0.05
        Coeff. of contraction for abutment =0.1
        Also design downstream profile of this spillway of gravity dam having downstream face slope 0.7H:1V **[8]**

<p align="center">OR</p>

Q8) a) Explain Lanes weighted creep theory. **[5]**
    b) Discuss the merits and demerits of bucket type energy dissipator. **[5]**
    c) Write notes on: **[8]**
        i) Types of gates
        ii) Maintenance of outlet structures

Q9) Write short note on: **[4×4=16]**
    a) Discuss various design consideration in case of cross drainage work.
    b) Draw a neat sketch of syphon aqueduct and state the condition under which this type of C.D. work can be adopted.
    c) Laceys theory for design of alluvial canal.
    d) Losses in irrigation canal.

<p align="center">OR</p>

*Q10)*a) Design a channel using Kennedys theory carrying a discharge of 30 m³/s with critical velocity ratio and Mannings constant equal to 1.0 and 0.0225 respectively.Assume that bed slope is equal to 1 in 5000. **[8]**

b) Write notes on: **[4×2=8]**
   i) Rapid falls
   ii) Notch falls
   iii) Stepped falls
   iv) Glacis type falls.

*Q11)*a) Write short note on: **[4×2=8]**
   i) Objective and methods of river training
   ii) Objective and methods of Levees

b) Distinguish between high haed power development scheme and low head schemes with the help of neat sketch. **[8]**

<div align="center">OR</div>

*Q12)*a) Draw a neat sketches and explain the types of guide banks for river training works. **[8]**

b) Derive the terms: **[4×2=8]**
   i) Load factor
   ii) Capacity factor
   iii) Plant use factor
   iv) Power factor.

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