SEAT No. :

P3293

[Total No. of Pages : 4

[4959]-2

B.E. (Civil) (Semester - I)

DAMS AND HYDRAULIC STRUCTURES

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:
  1) *Answer any three questions from each section.*
  2) *Answer to the two sections should be written in separate books.*
  3) *Neat diagrams must be drawn wherever necessary.*
  4) *Figures to the right indicate full marks.*
  5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Describe briefly guidelines for dam safety. **[6]**

b) What is economic height of dam. How it is determined? **[6]**

c) Write short note on : **[6]**

Application of remote sensing & GIS to watershed management.

OR

Q2) a) Discuss the data required to be collected before the construction of dam. **[6]**

b) Describe in detail instrumentation of dam. **[6]**

c) Explain the influence of following factor on the choice of the type of dam. **[6]**

i) Geological foundation conditions.

ii) Spillway size and location.

Q3) Write short note : **[4 × 4 = 16]**

a) Gallories in gravity dam.

b) Earthquake forces in gravity dam

c) Discuss the methods of construction of gravity dam.

d) Construction joints in gravity dam.

P.T.O.

Q4) A gravity dam 80 m high, top width 7m. The face exposed to water has slope of 1H : 10V after a distance of 30 m from top. The free board is 3 m. The downstream face has slope of 0.7H to 1V after a vertical distance of 13 m from top.

Take specific weight of concrete = 24 kN/m³

Coefficient of friction μ = 0.7

Shear strength of concrete = 1400 kN/m²

Check the stability of gravity dam for reservoir full condition considering weight of the dam, water pressure and full triangular uplift pressure. **[16]**

Q5) a) Explain various causes of failure of earthen dam. **[8]**

b) What is pheretic line? Enlist steps to draw pheretic line. **[8]**

OR

Q6) a) For an earthen dam of homogeneous section cross section is drawn to scale of 1 cm = 25 m. Following results were obtained on trial slip circle.

Area of N diagram = 4863 kN

Area of T diagram = 1831 kN

U = 1200 kN

If the angle of arc φ = 580° and radius of slip circle 53.5 m.

Soil properties are cohesion = 24 kN/m³

Angle of internal friction = 25°

Specific weight = 24 kN/m³

Determine factor of safety of slope. **[8]**

b) Explain with sketch chimney drain. **[4]**

c) What do you understand by construction pore pressure in earth dams & how are they determined. **[4]**

SECTION - II

Q7) a) A Ogee type spillway has 12 crest gates each having 12m 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 orest level is 101.00m. Take Coeff. C = 2.16

Coeff of end contraction of piers = 0.05

Coeff of contraction for abutment = 0.1

Neglect velocity of approach.

Also design downstream profile of this spillway of gravity dam having downstream face slope 0.7H to 1V. **[8]**

b) Write types of gates and explain any one. **[5]**

c) Explain lanes weighted creep theory. **[5]**

OR

Q8) a) How does a siphon spillway function? What are the ways in which a siphon spillway can be primed? What are the limitations of siphon spillway. **[8]**

b) Maintenance of outlet structure. **[5]**

c) Compare Khoslas and Blighs creep length theory for seepage. **[5]**

Q9) a) Check wheather following canal parameters conterm to Kennedys theory of canal design.

Full supply discharge = 45 m³/s

Full slope depth = 1.8 m

Bed slope of channel = 1 in 4000

Side slopes = 1H : 2V

Bed width = 30 m

Critical velocity ratio = 1.17

Mannigags constant n = 0.023 **[8]**

b) What is meant by cross drainage works? State the types of cross drainage works and explain any one with neat sketch. **[8]**

OR

Q10) a) Design an irrigation channel in alluvial soil according to Laceys theory for the following data. **[8]**

Full supply discharge = 50 m³/s

Laceys silt factor = 1.00.

Side slope of channel = $\frac{1}{2}$H : 1V

b) Write notes on : **[8]**

    i)   Rapid falls

    ii)   Notch falls

    iii) Stepped falls

    iv) Glacis type falls

Q11) a) What is cut off? Describe briefly how a cutoff may be used as a river training measure. Also describe pitched islands. **[8]**

b) What is meant by hydropower? What are different types of hydropower plants and explain any one with a neat sketch. **[8]**

OR

Q12) a) Write necessity of river bank protection and types of work for such protection. **[4]**

b) Spur groynes as types of river training were. **[4]**

c) Define the term : **[8]**

    i)   Load factor

    ii)   Power factor

    iii) Utilization factor

    iv) Plant factor

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