P1675

[4859]-2

B.E. (CIVIL)

DAMS AND HYDRAULIC STRUCTURES

(2008 Course) (Semester - I)

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)   Use of calculator & steam table is allowed.

6)   Assume suitable data if necessary.

SECTION - I

Q1) a)   What are the different types of arch dams? Explain any one.   **[4]**

b)   Explain the maintenance and strength of dam.   **[6]**

c)   Classify dam based on.   **[6]**

    i)   Construction material

    ii)   Purpose

    iii) Hydraulic design

OR

Q2) Write short notes on: **[4X4=16]**

a)   Economic height of dam.

b)   Silting of reservoir.

c)   Explain uplift cell clinometer.

d)   Explain strainmeter.

Q3) Check the stability of gravity dam for reservoir full conditions. Considering wt. of dam, water pressure and full triangular uplift pressure a gravity dam 70m height, top width 7m, bottom width 60m. The face exposed to water has slope of lH:10V after a distance of 30m from top. The freeboard is 3m. The downstream face has slope of 0.7H to 1V, after a vertical distance of 13m from top.

Take specific wt of concrete = 24 KN/m^3.

Coefficient of friction = N=0.7

Shear strength of concrete = 1400 kN/m^2. **[18]**

OR

Q4) a) Explain various measures adopted to reduce reservoir losses. **[6]**

b) Explain the zone method of design of gravity dam. **[6]**

c) Explain with sketch how you will find the uplift pressure on a gravitydam with drainage gallary. **[6]**

Q5) a) A cross section of homogeneous earth dam is drawn to a scale of 1cm=25m

Following results were obtained on trial slip cirle **[8]**

Area of N diagram = 4863 kN

Area of T diagram = 1831 kN

Area of V diagram = 1200 kN

If radius of slip circle is 53.5 m and angle of arc is 58°.
Soil properties are cohesion =24 kN/m^3.
Angle of internal friction =25°.

Determine factor of safety of slopes.

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

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

OR

Q6) a) Briefly discuss causes of failure of earthen dam. **[8]**

b) Bucket type energy dissipator. **[4]**

c) Syphon spillway. **[4]**

SECTION - II

Q7) a) A ogee type spillway has 12 crest gates each having 10m clear span. Find the max flood that can be safely passed by lifting all the gates when the maximum reservoir level is 105.00m & 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

Neglecting the velocity of approach.
Also design the downstream profile of this spillway of gravity dam having downstream face spole 0.7H: lV. **[8]**

b) Briefly explain diversion head works with sketches. **[5]**

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

OR

Q8) a) Discuss the various types of energy dissipater used below spillway in relation to the position of tail water depth and jump height curve. **[8]**

b) Explain vertical lift gate or Rectangular gate. **[5]**

c) Explain necessity of inspection, maintenance and safety of spillway gates.**[5]**

Q9) a) Check whether following canal parameters conform to Kennedys theory of canal design.

Full supply discharge = 45 m²/s.

Full slope depth =1.8m

Bed slope of channel = 1 in 4000

Side slopes = 1H : 2V Bed width =30m

Critical velocity ratio = 1.17

Mannings constant n=0.0225 **[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 short 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 cut off may be used as a river training measure. Also describe pitched is land. **[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) i) Necessity of river bank protection and types of work for such protection.

   ii) Spur Gyrones as types of river training work. **[8]**

b) Define the terms. Load factor, Power factor, Utilization factor, plant factor. **[8]**

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