[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2125)

15323

B. Tech 7th Semester Examination

Design of Hydraulic Structure (NS)

CE-413

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

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, select one question from each sections A, B, C and D. Section E is compulsory.

SECTION - A

1. Discuss with neat sketch the different components of diversion headworks and explain the functions of various components. (20)

2. Discuss Khosla's method of independent variables. How would you apply the corrections for (a) thickness of floor (b) mutual interference of piles, and (c) slope of floor? (20)

SECTION - B

3. Describe the procedure for the design of a straight glacis fall when it is

   (a) Unflumed and non-metred.

   (b) Flumed and metered. (20)

4. What are different systems of classifications of falls. Design a Sarda type fall for a channel with the following data:

   (a) Full supply discharge $\frac{U/S}{D/S} = \frac{30 \text{ cumecs}}{30 \text{ cumecs}}$

[P.T.O.]

(b) Full supply level $\frac{U/S}{D/S} = \frac{200.00}{198.50}$

(c) Full supply depth $\frac{U/S}{D/S} = \frac{1.7m}{1.7m}$

(d) Bed width $\frac{U/S}{D/S} = \frac{25.0m}{25.0m}$

(e) Bed level $\frac{U/S}{D/S} = \frac{198.30}{196.80}$

(f) Drop = 1.50 m

(g) Safe exit gradient = 1/6.

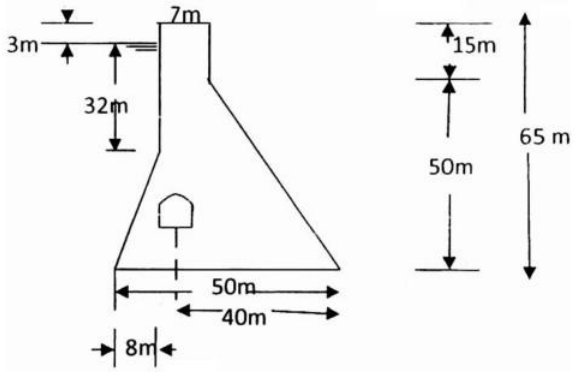
Assume any other data, if required. (20)

SECTION - C

5. Check the stability of the gravity dam section shown in fig. considering the seismic forces, in addition to self weight, water pressure and uplift. Assume: α_v = 0.10 and α_h = 0.20.

   (a) Consider only vertical acceleration.

   (b) Consider only horizontal acceleration Consider only the reservoir full condition. (20)



6. Explain the different types of embankment dams? Discuss the various causes of failure of earth dams. How would you prevent different types of failures? (20)

SECTION - D

7. What are the main component parts of the buttress dam? Explain their function. Explain the unit column theory for the design of buttresses. (20)

8. What are the essential requirements of a spillway? A flood peak of 370 cumecs is required to pass through a siphon spillway. The highest flood level in the reservoir is 168.40. If the exit level and the tail water level are respectively 162.10 and 161.00, determine the length of the spillway. The height of the throat section is 1.1 m. Take C_d = 0.90. (20)

SECTION - E

9. Attempt all questions.

   (i) What factors will you consider while selecting a suitable types of cross drainage work?

   (ii) How falls are classified?

   (iii) Differentiate between: Aqueduct and super passage.

   (iv) What is level crossing?

   (v) What is capital budgeting?

   (vi) How would you prevent piping failure in an earth dam?

   (vii) Enumerate the various forces acting on a gravity dam?

   (viii) Differentiate between: Factor of safety against sliding and sliding factor.

   (ix) Write a short note on: Joints between the deck slabs and corbel.

   (x) What are different types of spillway gates?

(2×10=20)