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SF-7667

B. E. - IV (Sem - VIII) (Civil) Examination

May / June – 2011

Design of Hydraulic Structures

(Elective - I)

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 4 (Sem - 8) (Civil)**

Name of the Subject :

☛ **Design of Hydraulic Structures**

☛ Subject Code No. : **7 6 6 7** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Figures to the right indicate full marks.

(3) Assume missing data suitably and state clearly.

1 (a) Define 'Gate' and 'Valve'. Draw sketches and discuss the working and suitability of butterfly valve and balanced needle valve. **6**

(b) Draw sketches and explain the working of ski-jump bucket type energy dessipating structure. Give its suitability with respect to tail water condition and river bed condition. **5**

(c) Develop an expression for horizontal throw 'X' of the trajectory for a trajectory bucket type of energy dissipating structure in terms of lip angle at the lip and resultant velocity V at the lip. **7**

2 (a) Enlist the basin appurtunences and give their function for hydraulic jump type stilling basin for dissipation of energy. **4**

(b) Give the detailed dimensioned sketch for the stilling basin type I when the froude No. of the incoming flow is less than 4.5. Show dimensioned appartunences and show the jump formation. **9**

OR

(b) Write a detailed note on location of hydraulic jump when steep slope meets a mild slope and (i) T.W.D. is less than post jump depth. (ii) TWD is more than post jump depth.

(c) Give the advantage of slotted roller bucket over solid roller bucket. **3**

3 Write short notes : (any **four**) : **16**

(a) Suitability of different type of spillways.

(b) Dynamic pressure on buckets.

(c) Causes ill effects and remedies of cavitation in high pressure gates.

(d) Construction details of chute spillways.

(e) Bell mouth entry to intake structures.

4 (a) Classify the types of intake structure and compare dry intake tower and wet intake tower. **18**

(b) Discuss the advantages and disadvantages of using vertical leaf gate at irrigation structure. **7**

5 (a) What are the factors affecting selection of spillway gate ?

(b) Discuss the causes and ill effects of lamitation in turbines. **7**

OR

(c) Design u/s and d/s transition between a canal section and a rectangular aqueduct for the following data by mitra's formula : **7**

(i) Canal bed width = 20 m.

(ii) Depth of water in canal = 1.5 m

(iii) Side slope of canal baner = 1 : 1

(iv) Aqueduct through width = 12m.

6 Attempt any **three** : **7×3=21**

Differentiate :

(a) Lake Intake and River Intake.

(b) High Pressure Gate and Low Pressure Gate

(c) Roller Gate and Radial Gate

(d) Balance needle value and Butterfly valve

(e) Discuss discharge characteristics of outlet valves use at dam.