Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-VIII Examination May 2012

Subject code: 180601

Subject Name: Design of Hydraulic Structures

Date:10/05/2012 **Time: 10.30 am – 01.00 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Discuss in brief merits and demerits of various types of dams. **07**

(b) Explain how you would account for earthquake effects in design of a gravity dam. **07**

Q.2 **(a)** Why spillways are considered 'safety valve' for dams. Classify and write suitability of various spillways. **07**

(b) Discuss in brief the causes of failure of earthen dams. **07**

OR

(b) What is a fall in canal? Write necessity of a fall and governing factors in locating a fall. **07**

Q.3 **(a)** Distinguish clearly between a low gravity dam and high gravity dam. Derive an expression used for such a distinction. **07**

(b) The figure 1 gives the profile of a gravity dam with reservoir level as shown. If the coefficient of friction is 0.75, is the dam safe against sliding? Take weight density of concrete = 2.4 tonnes/cum **07**

OR

Q.3 **(a)** Enlist the various forces acting on gravity dam as per IS -6512 and discuss in detail uplift and wave pressure. **07**

(b) Explain the step by step method of designing a high gravity dam. **07**

Q.4 **(a)** Classify earthen dams with suitability of each. **07**

(b) Discuss the Swedish slip circle method for checking the stability of down-stream slop under steady seepage condition. **07**

OR

Q.4 **(a)** What is meant by pore pressure and what is its significance in design of earthen dams? **07**

(b) A flow-net is plotted for homogeneous earthen dam of height 22 m and free board 2.0 m. Number of potential drops and flow channels are 10 and 4 respectively. The dam has a horizontal filter of 30 m length at a downstream end and the coefficient of permeability of the dam material is 5×10^{-4} cm/sec. Calculate the discharge per m run of the dam. **07**

Q.5 **(a)** Write design principles of four major parts of an ogee spillway with governing equations. **07**

(b) Compute the discharge over an ogee weir with coefficient of discharge equal to 2.4 at a head of 2 m. The length of spillway is 100 m. The weir crest is 8 m above the bottom of the approach channel having the same width as that of the spillway. (consider velocity of approach) **07**

OR

Q.5 **(a)** Write short notes on a) Sarda type fall b) Cross regulator **07**

(b) Write short notes on a) World Commission on Dams b) Uses of flow-net for earthen dams **07**

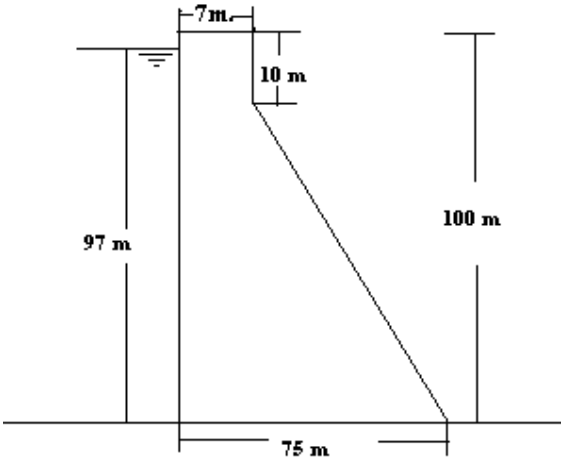

Fig.-1

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