Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –I Examination Feb. - 2012

Subject code: 711203N **Date: 17/02/2012**

Subject Name: Design of Hydraulic structures

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)** Explain various classifications of dam. **07**

(b) Draw a typical section of an earth dam and explain the functions performed by each component briefly. **07**

Q.2 **(a)** Explain Ogee spillway. **07**

(b) A gravity dam has the following dimensions: **07**

- height of dam = 80 m
- Free board = 1 m
- Slope of u/s face = 0.15 : 1

Taking $\alpha = 0.1$, determine (i) hydrodynamic earthquake pressure and (ii) its moment a joint situated 50 m below maximum water surface.

OR

(b) Differentiate between followings: **07**

(i) High and Low gravity dam

(ii) Elementary and practical profile of a dam

Q.3 **(a)** Draw seepage line and calculate discharge through homogeneous section of an earth dam having following data. **07**

-Top width of dam = 6 m

-u/s slope = 2.5H : 1V

-d/s slope = 2.0H : 1V

-Total height of dam above base = 22 m

-Maximum water level above base = 20 m

-Horizontal filter length from toe = 20 m

-Co-efficient of permeability = 4×10^{-3} cm/sec

(b) Write short note on Temperature control in mass concrete of a gravity dam. **07**

OR

Q.3 **(a)** Explain the method of determining principal and shear stresses in a gravity dam. **07**

(b) Explain with the figures, various seepage control measures adopted in earth dam. **07**

Q.4 **(a)** Discuss briefly various methods used for energy dissipation below spillway. **07**

(b) Explain energy dissipation arrangement for T.W.C. always above H.J.C. **07**

OR

Q.4 **(a)** Write short note on Cavitation on the d/s surface of the Ogee spillway. **07**

(b) Discuss various factors affecting the co-efficient of discharge in the discharge equation of an Ogee spillway. **07**

Q.5 **(a)** Explain briefly various types of spillway crest gates. **07**

(b) Explain combination of loading for analysis of gravity dam according to IS. **07**

OR

Q.5 **(a)** Describe the procedure of plotting the phreatic line in earth dam. **07**

(b) Write short note on Pore pressure in earth dam. **07**

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