Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2014

Subject code: 1724305 **Date: 05-12-2014**

Subject Name: Earth and Rockfill Dams

Time: 02:30 pm - 05:00 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 Attempt **any seven** out of the following. Answer only in two-three lines with proper reasons: **14**

i. Which is most suitable foundation for rockfill dams? Which type of axis alignment is suitable for rockfill dams?

ii. What do you mean by foundation piping?

iii. What is major disadvantage of relief wells? Why?

iv. Which is most suitable foundation for rockfill dams and why?

v. Under which central core is selected and why?

vi. Which criteria should be followed for selection of rock toe? Is there any relation between height of dam and rock toe?

vii. Which type of material is preferable on u/s of dam so as to control pore water pressures when reservoir is lowered after being full for some time?

viii. How thickness and vertical interval between filter layers are decided?

ix. What is free board? How it is decided?

x. What is the advantage of asphaltic concrete membranes?

Q.2(a) State and explain in detail classification of earth dams as per IS: 8826-1978 with neat sketches. Also give various quality control measures to be satisfied in case of earth dams. **07**

Q.2(b) Describe the various types of failure for earthen dams. Support your answer with any one case study. **07**

OR

Q.2(b) Define earthen dam and show the comparison between rigid dams and embankment dams with respect to their characteristics. **07**

Q.3(a) Discuss the various types of foundations and its suitability for earthen dams. Enlist the various features required to be followed in selection of dam section as per IS: 8826-1978. **07**

Q.3(b) Categorized location of core in dam section. Explain various conditions under which they are provided and explain why slanting core is more advantageous compare to central core. **07**

OR

Q.3(a) Discuss various quality control measures of construction as per IS: 14690-1999. Justify their various criteriaôs.

Q.3(b) Explain Terzaghi criteria for design of transition filters. Explain briefly órock toeô and óchimney drainô.

Q.4(a) What are the functions of impervious membranes in case of rockfill dams? How they are categorized and how their selection is made? Give the short comparison between ócement concrete membranesô and óasphaltic concrete membranes. **07**

Q.4(b) State the various criteria given by Sherard for classification of core materials on the basis of resistance to concentrated leak. Also state the criteria given by Sherard for deciding ócore thicknessô. **07**

OR

Q.4(a) Determine the thickness of inclined filter and horizontal filter for zoned earth dam as per IS: 9429-1999 for a given data: **07**

Depth of overburden = 28m, head of water = 93m, permeability of filter = 1.65 x 10^{-4} m/s, permeability of impervious material = 4.36 x 10^{-8} m/s, permeability of over burden = 6.19 x 10^{-4} m/s, angle of discharging face with horizontal = 63.1°, base width of impervious core = 110m, length of horizontal filter = 250m. Assume any other data if necessary with proper justification.

Q.4(b) Write a detail note on relief well with neat sketch. Also discuss the advantages and disadvantages of relief wells. **07**

Q.5(a) What do you mean by good instrumentation? Which type of problems can be instrumented or prevented with suitable instrumentation? What are the codal provinces for instrumentation in earthen dams? Enlist the various types of piezometers. Write a detail note on open stand pipe piezometers. **07**

Q.5(b) Explain stability of earthen dams. Which are the various conditions for which stability analysis is performed? Explain each condition in detail with necessary equations. **07**

OR

Q.5 Determine the stability of u/s slope for a given dam section as shown in fig.1 for ćend of constructionô condition by either Swedish circle method **or** Modified Bishops method. Soil properties as per zonation are given below. Assume any other relevant data if required with proper justification. **14**

Zone	Moist density (kN/m^3)	Submerged density (kN/m^3)	Saturated density (kN/m^3)	Cohesion (kg/cm^2)	Tan Ø
Shell	20.9	----	---	0	0.58
Core	18.1	9.15	19.08	2.5	0.41
Foundation	---	7.56	---	1.8	0.47