Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 1724305 **Date: 23-06-2014**

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.
4. Use of Programmable calculator is strictly prohibited

Q.1 Attempt **<u>any seven</u>** out of the following. Answer only in two-three lines with proper reasons: **14**

i. Rolled earth fill type of embankment is favorable under which conditions and why?
ii. Which is most suitable foundation for rockfill dams and why?
iii. Why slanting core is more advantageous compare to central core?
iv. Which criteria should be followed for selection of rock toe? Is there any relation between height of dam and rock toe?
v. 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?
vi. How thickness and vertical interval between filter layers are decided?
vii. Define Sloughing and which type of failure is observed under such phenomena?
viii. Which type of material is preferable on u/s of dam so as to control pore water pressure when reservoir is lowered after being full for some time?
ix. Under which conditions ógroutingô is preferable technique for treatment of foundations?
x. What is the advantage of asphaltic concrete membranes?

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

Q.2(b) 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**

OR

Q.2(b) Draw a neat sketch of earthen and rockfill dam as per IS: 8826-1978 showing all their components. Explain the function of each component in one line only. **07**

Q.3(a) 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**

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) Write a detail note on concrete diaphragm and grout curtain with reference to IS: 8414-1977.

Q.3(b) Describe the various types of failure for earthen dams. Support your answer with any one case study.

Q.4(a) Explain Terzaghi criteria for design of transition filters. Explain briefly órock toeô and óchimney drainô. **07**

Q.4(b) Discuss various quality control measures of construction as per IS: 14690-1999. Justify their various criteriaôs. **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 = 25m, head of water = 89m, permeability of filter = 1.67 x 10^{-4} m/s, permeability of impervious material = 4.46 x 10^{-8} m/s, permeability of over burden = 5.89 x 10^{-4} m/s, angle of discharging face with horizontal = 64.1°, base width of impervious core = 105m, 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**

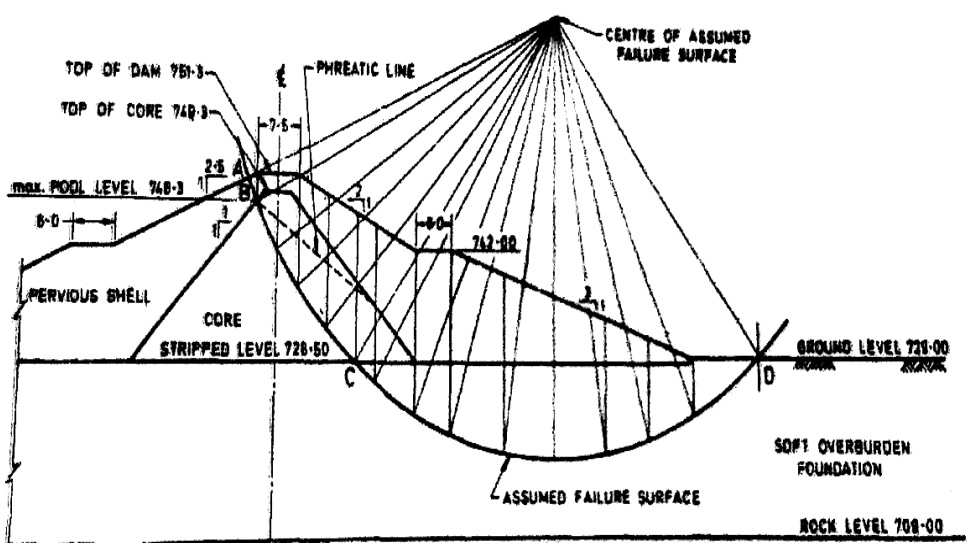
Q.5(a) Define rockfill dams. Classify rockfill dams and discuss their suitability along with limitations. Also write a small note on Asphaltic concrete membrane. **07**

Q.5(b) What are the desirable features of good instrumentation? Enlist the various types of piezometers. Write a detail note on open stand pipe piezometers. **07**

OR

Q.5 Determine the stability of u/s slope for a given dam section as shown in fig.1 for ócnd 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	20.7	----	---	0	0.56
Core	17.8	9.05	19.05	2.0	0.37
Foundation	---	7.44	---	1.9	0.42



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