Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1724305 **Date: 12/07/2012**

Subject Name: Earth and Rockfill Dams

Time: 10:30 am – 13:00 pm **Total Marks: 70**

Instructions:

1. **Attempt <u>any five</u> questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 Attempt **<u>any seven</u>** out of the following. Support your answer in just two-three lines with reasons: **14**

i. Which is the most suitable site for homogeneous earthen dams?

ii. Which is most suitable foundation for Rockfill dams?

iii. Define flow net. How seepage is determined using flownets.

iv. Why soils of high compressibility are avoided as a selection of core material in earthen dams?

v. Write the two approaches to control seepage through the embankment as well as foundations.

vi. What is the importance of location of core in the dam section?

vii. Define chimney drains and give three names of dams in India were they are provided.

viii. What is the advantage of asphaltic concrete membranes?

ix. What is Wilkins observation for settlement of concrete faced dams in Australia?

x. What is the general practice for Rockfill placement? Give Cooke criteria.

Q.2 State any six factors affecting selection for earthen dam. State and Discuss in detail the types of earth dams according to material and construction techniques. Support your answer with sectional details of any two dams. **14**

Q.3 **(a)** Explain Casagrande method for determine seepage pressure for earthen dam. State the various criteria given by Sherard for classification of core materials on the basis of resistance to concentrated leak. **07**

(b) Differentiate between central core, moderately slanting core and slanting core with respect to its location in dam section. Give advantages of each. What conclusions were drawn by 'Reinius' for slanting core compare to vertical core. **07**

Q.4 **(a)** Explain in detail the purpose of relief wells. What are the design requirements of relief wells? Give U.S.B.R criteria. **07**

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

Q.5 **(a)** Define construction pore pressures. Explain total and effective stress methods of analysis. Explain with neat sketches the types of slip surface failures possible in earthen dams. Discuss in detail the 'drawdown' condition for stability analysis of earthen dams with equations. **07**

(b) Explain in detail with steps the 'Swedish slip circle' method for stability analysis of earth dams. **07**

Q.6 Determine the stability of u/s slope of Ramganga dam section as shown in figure 1. for 'end of construction' condition by Swedish circle method considering following geometrical features and soil properties. **14**

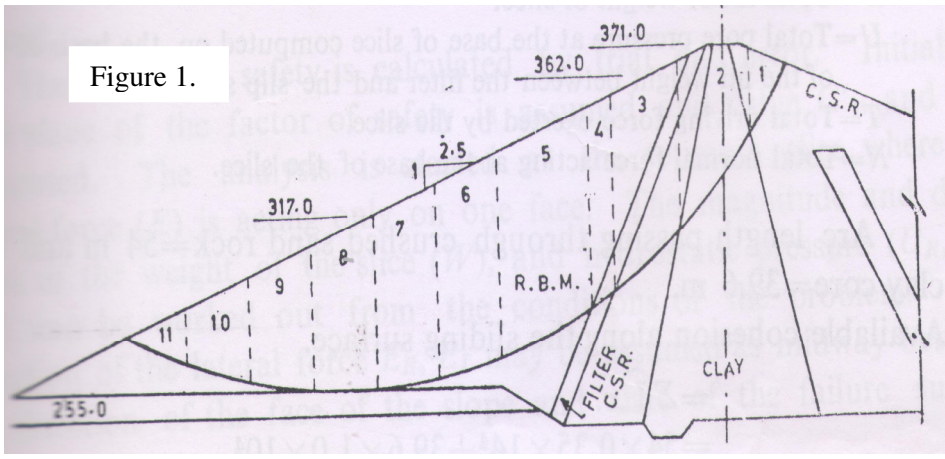

Figure 1.

Soil Properties

Material	Moist density (kg/m^3)	Cohesion (kg/cm^2)	Ø
Clay core	2.0×10^3	1.02	20°
Crushed sand rock	1.9×10^3	0.36	30°
River bed material	1.72×10^3	----	35°
Filter	2.2×10^3	----	38°

Q.7 **(a)** Explain in detail with steps the 'Simplified Bishops' method for stability analysis of earth dams. Support your answer with necessary equations and calculations. **07**

(b) Explain in detail (**any one**) with neat sketch (i)electric piezometers (ii) open standpipe piezometers (iii) vibrating wire cell **07**

Q.8 **(a)** Attempt the following: (**any four**) **09**

i. Which type of axis alignment is preferable for Rockfill dams and why?

ii. What is the importance of base to height ratio in membrane type Rockfill dam? Justify your answer with criteria's if any.

iii. What are the major causes of settlement in Rockfill dams? How settlement problems can be minimized.

iv. Give advantages of rock rip-rap over concrete for upstream slope wave protection.

v. Explain rock grouting and its necessity. How it is evaluated?

(b) Describe the desirable features of good instrumentation **05**

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