Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013

Subject code: 1721203 **Date: 03-06-2013**

Subject Name: Design of Canal Network and Regulation Work

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 Khoslaôs solution for a horizontal floor of negligible thickness and length b. **07**

(b) Determine the uplift pressure at the salient points E, D and C of the d/s pile shown in fig.1. Also determine the exit gradient of this structure. If the permissible value of exit gradient for foundation soil is 1/6, say whether this structure is safe or not? **07**

Q.2 **(a)** State Laceyôs silt theory with its limitations. **07**

(b) State the different causes of failure of weirs founded on permeable soils with remedies. **07**

OR

(b) Design an alluvial canal by using Laceyôs theory from the following data: **07**

(i) Full supply discharge = 35 cumec.
(ii) Rougosity coefficient = 0.025
(iii) Side slope 1:1
(iv) Average CVR = 0.9 to 1.1
(v) Standard rougosity coefficient of soil N_a = 0.0225

Q.3 **(a)** Explain the procedure for the design of an alluvial canal by Khoslaôs theory when bed slope is known. **07**

(b) Design an irrigation canal to carry a discharge of 20 cumec. Take N = 0.0225, S = 1/2500 and m = 1.0. Use Garrateôs diagram. **07**

OR

Q.3 **(a)** State the requirements of suitable site for cross drainage works. Describe Aqueduct in detail. **07**

(b) A siphon aqueduct has single barrel of 3 m diameter, length 90 m, discharge capacity of 25 cumec, f in Darcy-Wiesbach formula 0.013, coefficient of (i) bend loss (2 bends) 0.1,(ii) in expansion at outlet 0.2 and (iii) in contraction of inlet 0.1. Determine afflux. Neglect the velocity of approach. **07**

Q.4 **(a)** State the points for the selection of suitable type of canal lining. Explain briefly cement mortar lining. **07**

(b) What is financial justification of lining a canal? Design a lined canal for 250 cumec discharge, side slope 1.25:1, bed slope 1 in 6666 and N = 0.013. Assume permissible velocity = 1.75 m/s. **07**

OR

Q.4 **(a)** State different type of fall and explain any two of them in detail. **07**

(b) Design a meter flume for a distributory of 3 cumec capacity, bed width 6 m, depth = 1.0 m, fall = 0.25 m. Given other data☹i) FSL = 101.00, (ii) Bed level = 99.75, (iii) Cistern level = 99.60 **07**

Q.5 **(a)** State the design criteria for Head Regulator and explain the same by giving neat figure. **07**

(b) Explain the term Outlet. What are the essential requirements of a good outlet? **07**

OR

Q.5 Write Short Notes (Any Four): **14**

(i) Blighôs creep theory.

(ii) Drawbacks in Kennedyôs and Laceyôs theory.

(iii) Difference between barrage and weir.

(iv) Khoslaôs method of independent variables.

(v) Vertical drop weirs.

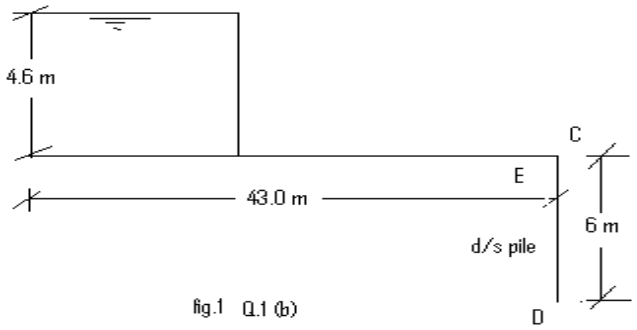

fig.1 Q.1 (b)

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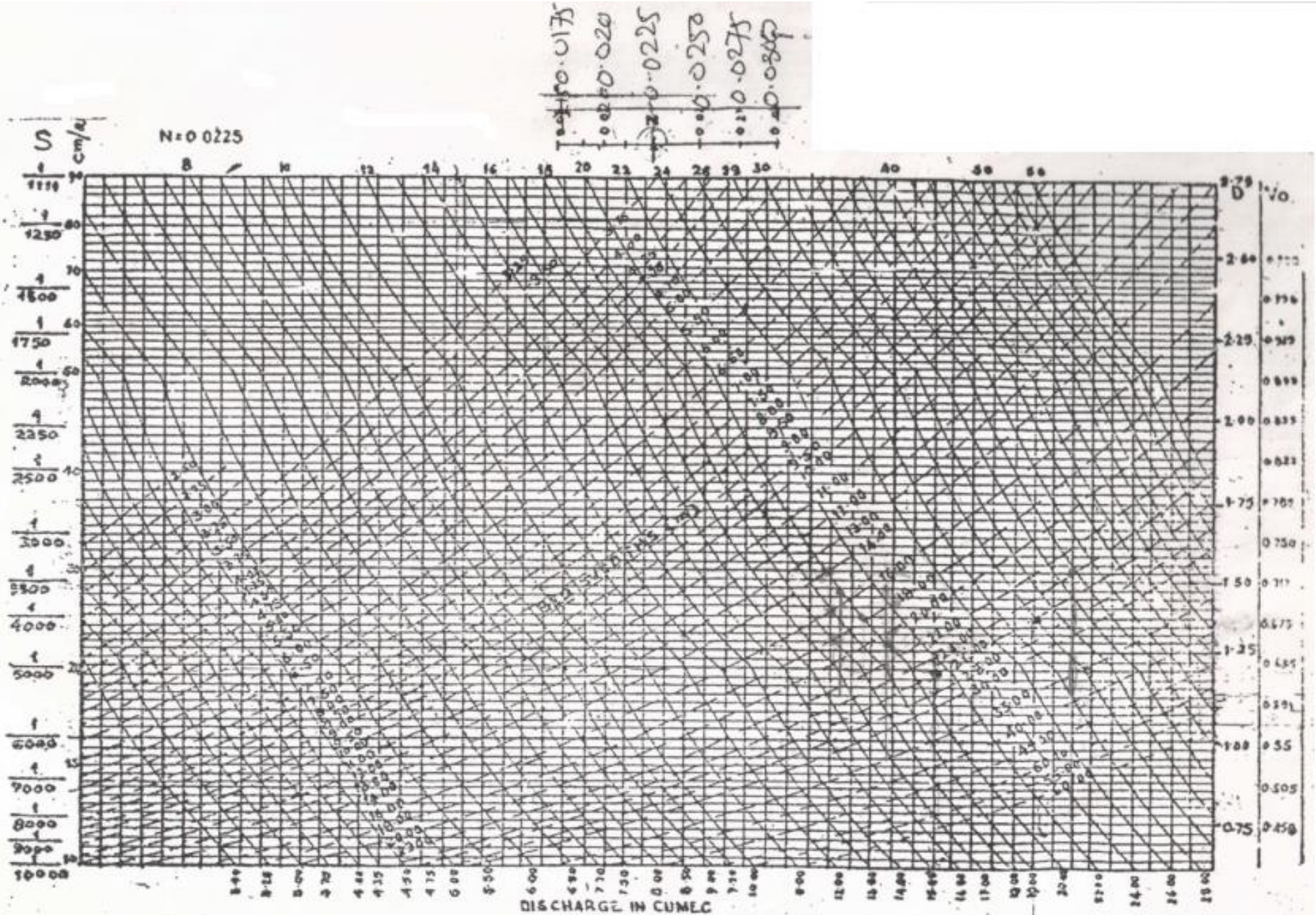

Garret's Diagrams