Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. SEM-II Examination June 2011

Subj. code: 721203 **Sub.Name:** Design of Canal Network and Regulation work

Date: 27/06/2011 **Total Marks: 60** **Time: 10:30am-1:00pm**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Write your answers briefly and to the point.**

Q.1	(a)	Explain lacey`s regime theory. State the differences for the design of an alluvial canal by Lacey`s and Kennedy`s theories.	**06**
	(b)	Design an irrigation canal for a discharge of 30 cumecs by lacey`s theory. Consider silt factor f=1.2. also tally the results which obtained from Lacey`s diagrams.	**06**
Q.2	(a)	Distinguish between Bligh`s creep theory and Khosla`s theory.	**06**
	(b)	State the procedure of designing a lined canal and derive the geometrical properties of a trapezoidal section of a lined canal.	**06**
		OR	
	(b)	Design a lined canal to carry a discharge of 120 cumecs. Take B/D ratio as 6.5; N = 0.018; side slope = 1.5:1 and bed slope = 1in 4500.	**06**
Q.3	(a)	State the advantages and disadvantages of lining a canal. Also state the few qualities of a good lining material.	**06**
	(b)	State the different types of lining and describe briefly cement mortar lining.	**06**
		OR	
Q.3	(a)	Write a note on maintenance of open drains. Clearly state the disadvantages of the same.	**06**
	(b)	An open drain is to be designed for an area of 500 ha. If the drainage coefficient is 5.5 cm/day, determine the capacity of the drain required and a suitable section. Take side slope as 1: 1. Use Lacey`s formula with f = 1.0.	**06**
Q.4	(a)	State the different types of CD work. Differentiate between aqueduct and siphon aqueduct.	**06**
	(b)	What is canal transition? Why it is adopted? Describe briefly Mitra`s method of canal transition.	**06**
		OR	
Q. 4	(a)	What is a canal fall? State its purposes and discuss the different factors to be considered for the selection of location of a fall in the canal network.	**06**
	(b)	(i) Explain the term `economic viability` of lining a canal. (ii) determine the economic viability of lining a canal from the following data:	**06**

Sr.No.	Item	Lined canal	Unlined canal
(i)	Wetted perimeter	20m	30m
(ii)	Seepage loss	0.6cumec/Mm^2 of wetted peri.	2.5cumec/Mm^2 of wetted peri.
(iii)	Annual maintenance cost	Rs.0.15/m^2 of wetted peri.	Rs.0.20/m^2 of wetted peri.
(iv)	Extra cost of lining works	Rs. 25 per m^2	
(v)	Average annual revenue of 1 cumec of water	Rs. 5.5 Lacs	
(vi)	Life of lining = 50 years.		
(vii)	Interest rate=6.5 %		

Q.5 (a) Discuss in brief Khosla`s method of independent variables. **04**

(b) Find the uplift pressure at key points E2; C2 and D2 for a structure shown in Fig.1 having a floor of negligible thickness and resting on permeable soil. Use Khosla`s curves. **08**

OR

Q.5 Write Short Notes: (Any Four) **12**

(i) Exit gradient and critical exit gradient.
(ii) Limitations of Khosla`s theory.
(iii) Silt excluder.
(iv) Scour due to surface flow.
(v) Rigid modules.

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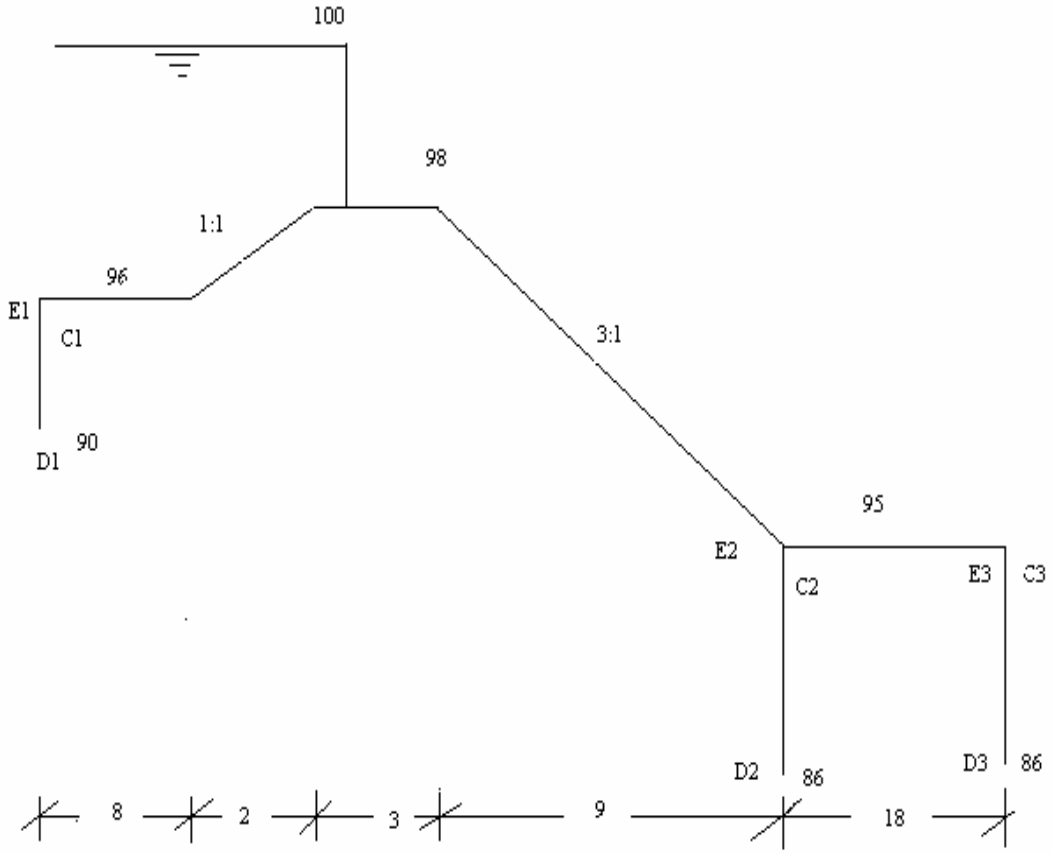
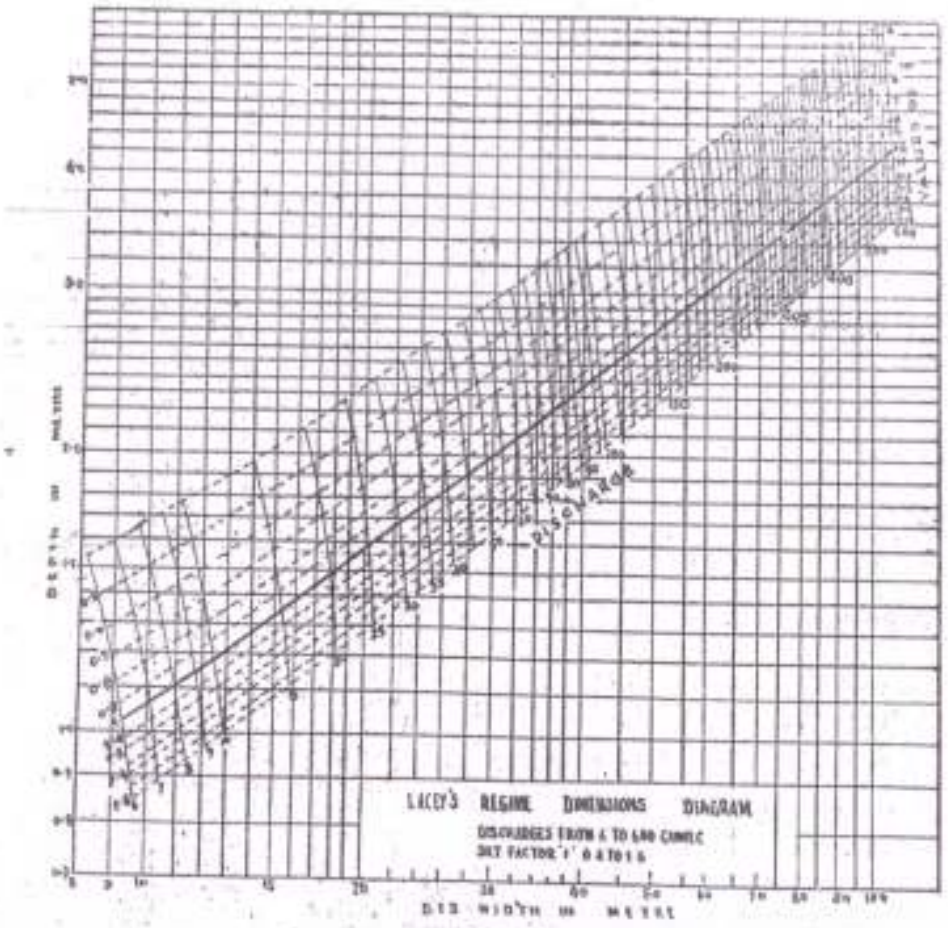
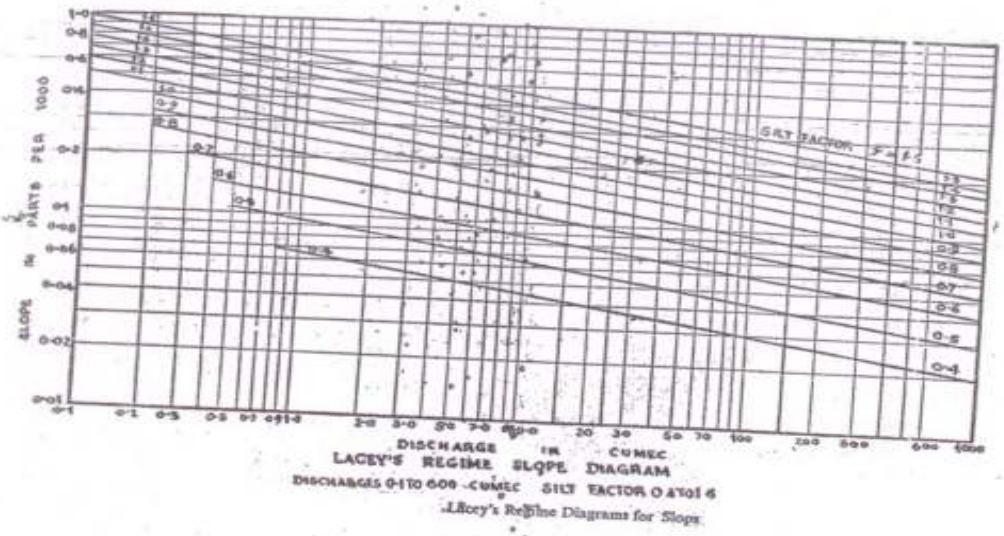
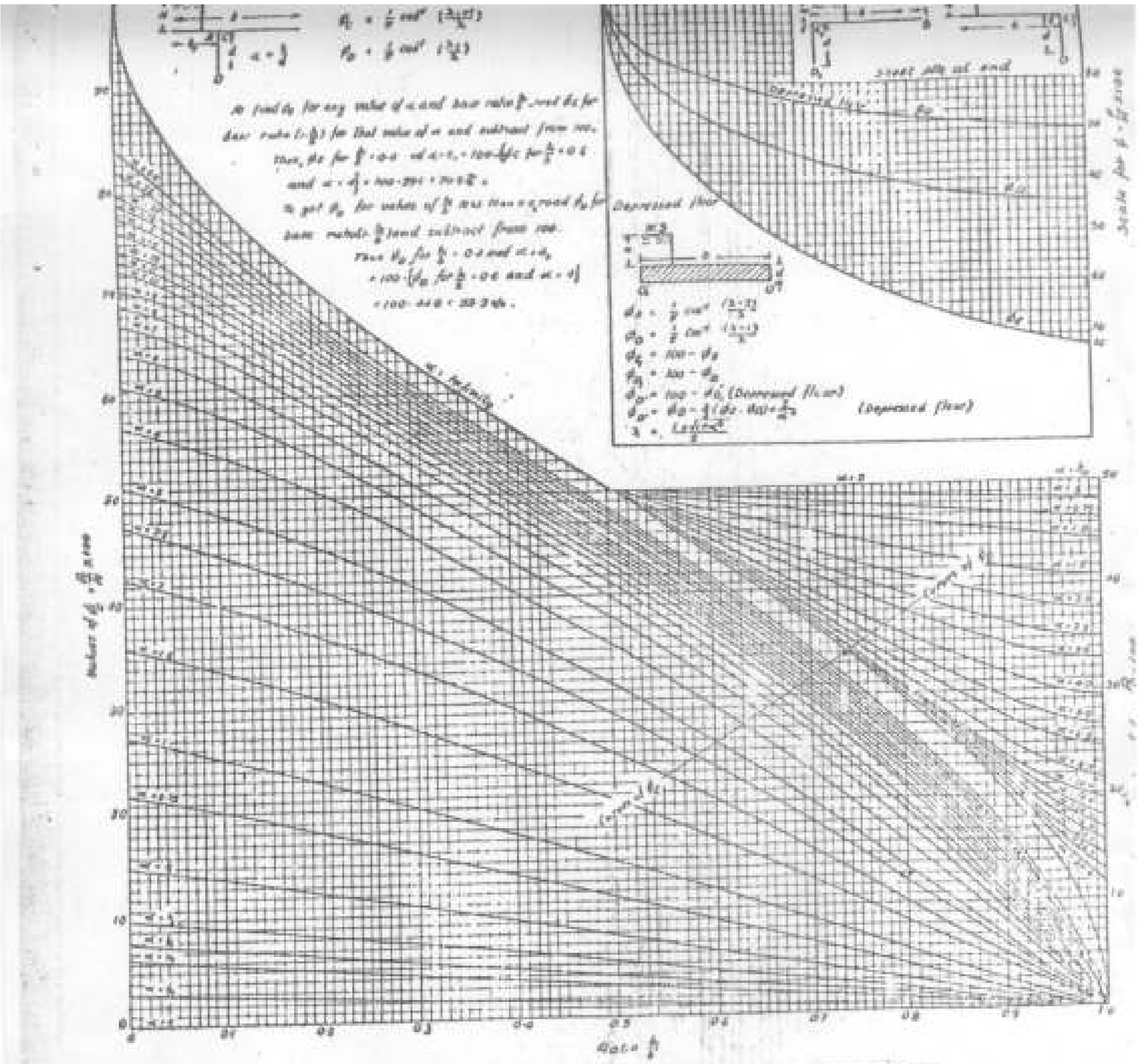
FIG.1 Q5(b) Figure not to scale

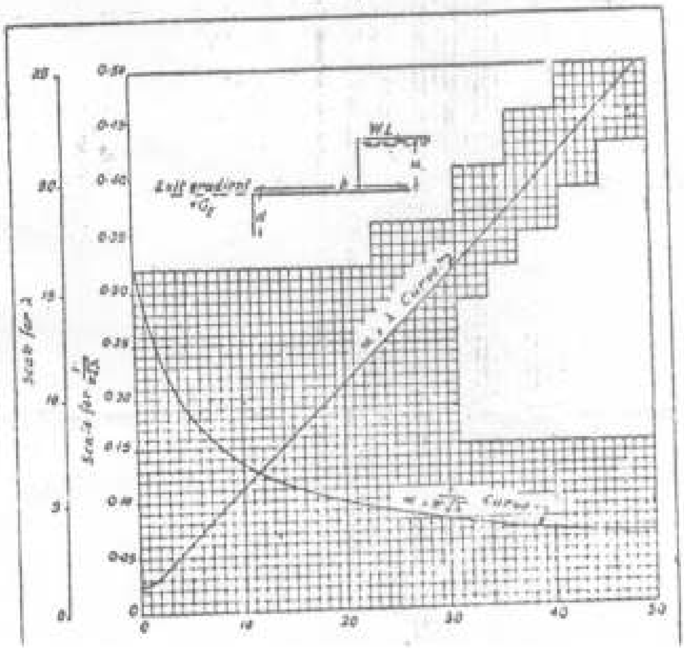






Lacey's Regime Diagrams for Slope


Depressed floor
(Depressed floor)
Ratio $\frac{1}{\alpha}$


Exit gradient
Scale for λ