

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-II Examination Jun-July 2010

Subject code: 721203

Subject: Design of Canal Networks & Regulation Works

Date: 21 /12 /2010

Time: 02.30 pm – 05.00 pm

Total Marks: 60

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Design a lined canal to carry a discharge of 110 cumecs and B/D= 6.5, N=0.018 and side slope 1.5:1 and bed slope 1 in 4500. **06**

(b) A hydraulic structure is founded on pervious fine sand with safe exit gradient 1/7. Determine key point pressures at d/s end pile -3 Only without applying any correction. Also find the exit gradient of this structure shown in fig.-1. Use Khosla's theory and plate 1 & 2. Whether this structure is safe or not? Assume no tail water at the d/s. **06**

Q.2 (a) Explain Khosla's safe exit gradient. State the critical exit gradient. What will happen if critical gradient exceeds? **06**

(b) Explain the use of Garret's diagrams in the design of alluvial canal by Kennedy's theory. **06**

OR

(b) State the basic equations given by Lacey and using them derive the equation of perimeter. **06**

Q.3 (a) Discuss the main causes of water logging. Explain different ill effects of its. **06**

(b) What is canal fall? What is its necessity? Discuss various factors for selecting the location of a fall. **06**

OR

Q.3 (a) State and explain design criteria for open drains **06**

(b) Explain how the floor thickness correction and correction due to mutual interference of piles are calculated. **06**

Q.4 (a) What is meant by scour? How would you determine the maximum scour depth? **06**

(b) For the hydraulic structure shown in fig.-2, determine the location of the point-P where the hydraulic jump will be formed. Assume $q = 8 \text{ m}^3/\text{sec}/\text{m}$. Use Blench curve plate -3 **06**

OR

Q.4 (a) State the qualities of the good lining material. Explain the economics of the lining a canal. **06**

(b) Determine the economic viability of the lining of a canal from the following data **06**

Item	Lined canal	Unlined canal
Wetted perimeter	25 m	30 m
Annual maintenance cost	Rs 0.15 /m ²	Rs 0.20/ m ²
Seepage loss	0.6 m ³ /s/M m ² of wetted peri.	2.60 m ³ /s/M m ² of wetted peri

Cost of lining work = Rs.22/m².

Average annual revenue of 1 cumec of water = Rs6 lacs

Life of lining =50 years

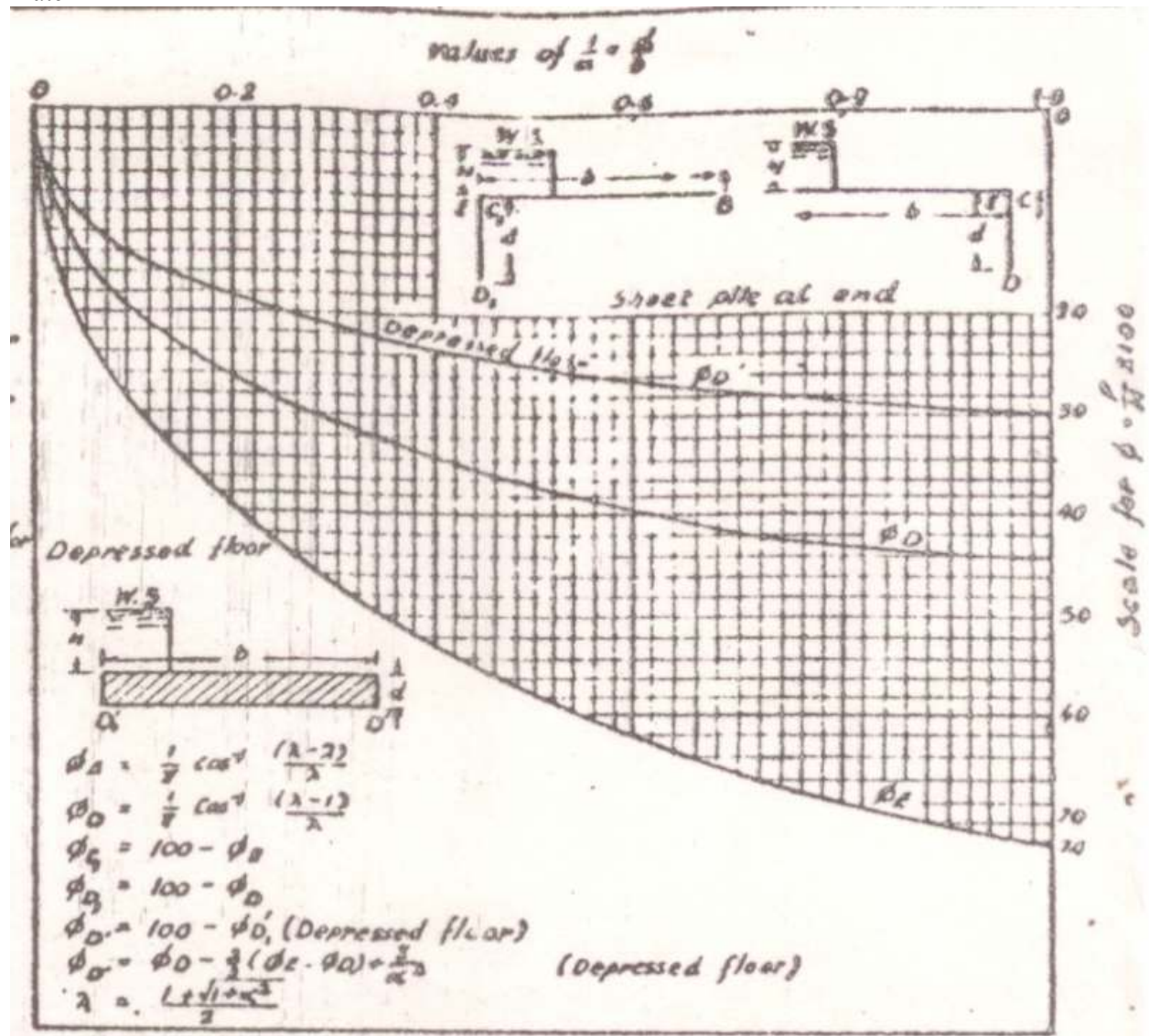
Interest rate = 6.5%.

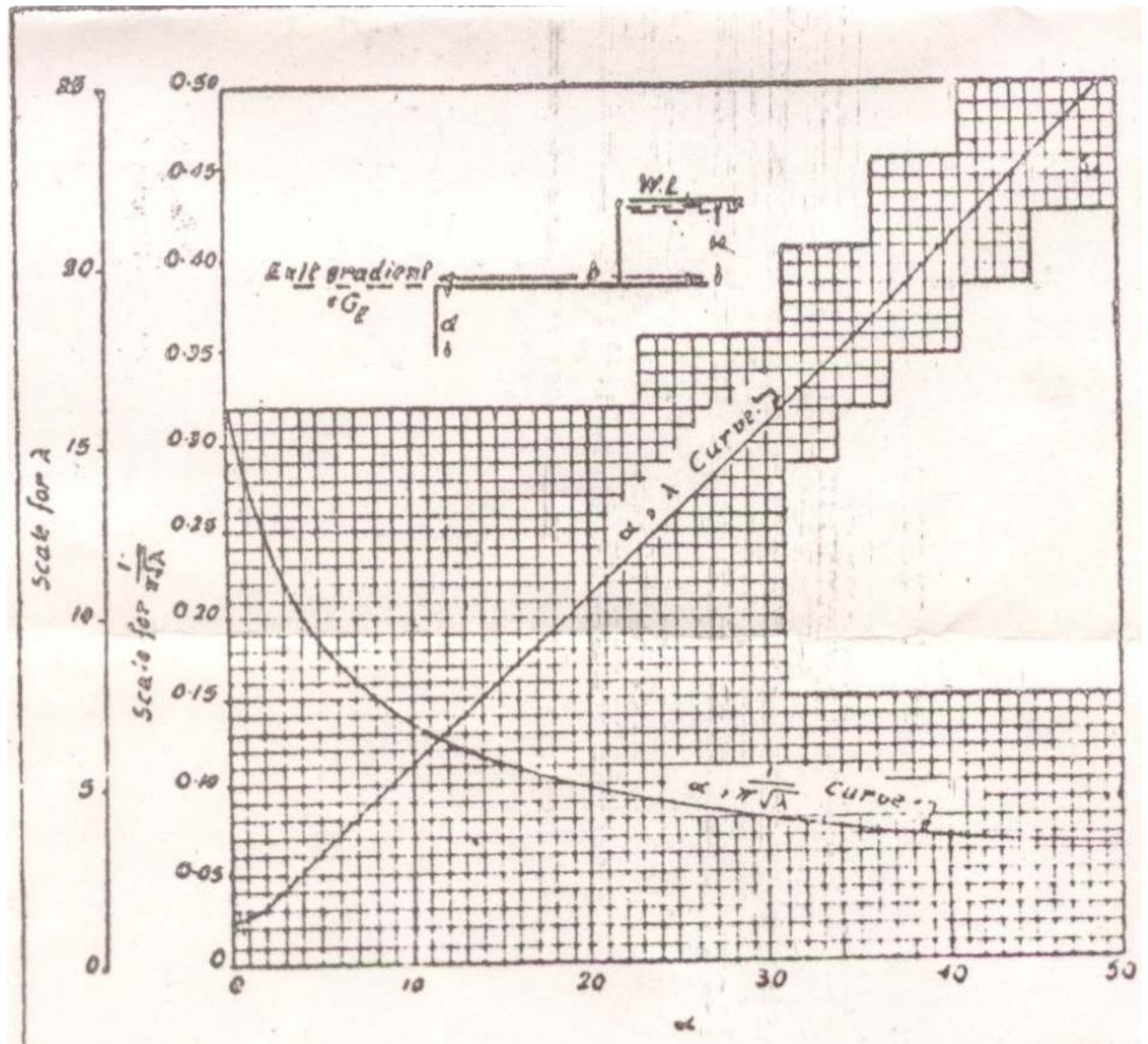
- Q.5 (a)** State the functions of canal outlets. Discuss the requirements of a good outlet. **06**
- (b)** Design a pipe out let for the following data: **06**
- Full supply discharge at the head of water course = $0.09 \text{ m}^3/\text{sec}$.
 - FSL of distributory = 205.00
 - FSL in water course = 204.00
 - Coefficient of discharge $C_d = 0.62$
 - Assume the dia. of pipe = 25 cm.

OR

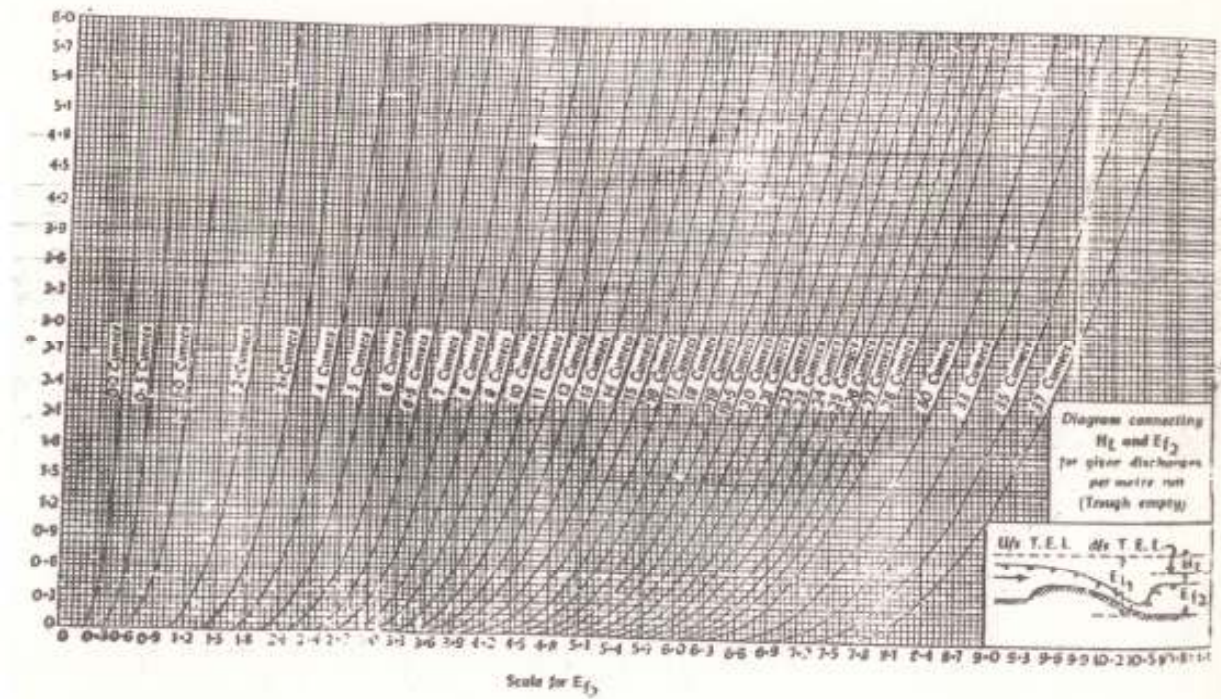
- Q.5 (a)** Discuss about the site selection for a CD work. Explain in detail Aqueduct. **06**
- (b)** What is transition? State its purposes. Design an expanding transition for a channel for the following data: **06**
- Length of flume = 18 m.
 - Width of throat = 12 m.
 - Width of channel bed = 18 m.
- Use Chaturvedi's method.

Plate -1





Head loss



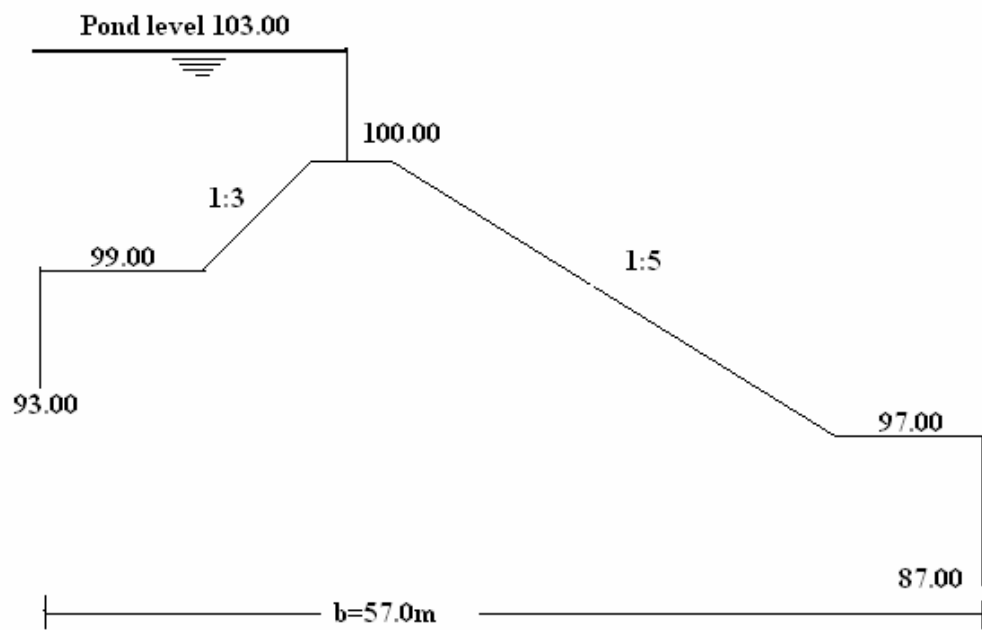


Fig.1 Q.1(b)

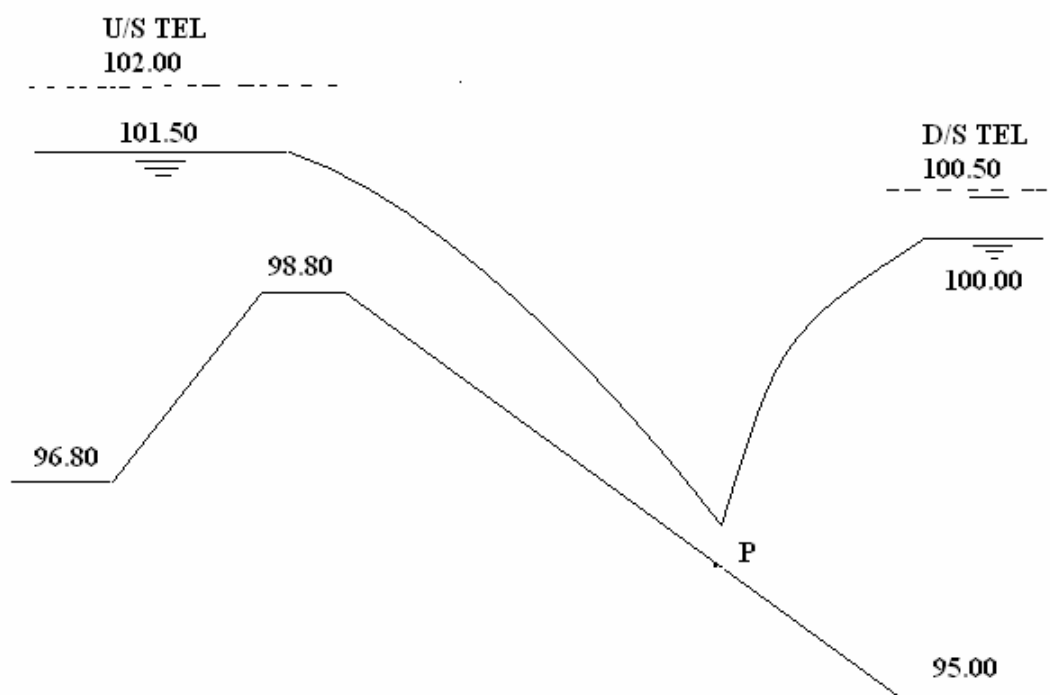


Fig.2 Q.4(b)