Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 1721203 Date: 04-12-2014

Subject Name: Design of Canal Network and Regulation Work

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.**

Q.1 **(a)** Laceyôs theory is an improvement over Kennedyôs theory explain. **07**

(b) Write short note on linings of canal. **07**

Q.2 **(a)** What are outlets? Enumerate the different types of outlets and explain any one briefly. **07**

(b) An irrigation canal has been constructed with following parameters: **07**

Full supply discharge = 45 cumec
Bed width = 30 meter
Full supply depth = 1.8 meter
Side slopes = ½:1
Bed slope = 1 in 6600
Manningôs N =0.0225
Critical velocity ratio = 1
Check whether the section designed satisfies Kennedyôs theory.

OR

(b) Design an irrigation canal by Laceyôs theory for the following data: **07**
F.S.D = 14 m^3/sec, f = 1, Side slopes ½ : 1 (Horizontal : Vertical), Coefficient of rugosity N = 0.0225

Q.3 **(a)** Discuss laceyôs regime equations. **07**

(b) Design a concrete lined channel to carry a discharge of 200 cumec at a slop of 0.1 per 1000. The side slopes of the channel are 1.25 : 1 and N may be taken as 0.016 Velocity = 1.4 m/sec **07**

OR

Q.3 **(a)** Explain Laneôs weighted creep theory. **07**

(b) Determine the most efficient cross-section of a trapezoidal canal to carry the water at the rate of 15 cubic meter per second. To prevent scouring the maximum velocity is not to exceed 1 meter/second. The side slope of the canal 2:1(Horizontal : vertical). Take C = 60 , determine bed slope for the canal. **07**

Q.4 **(a)** What corrections are required in determining seepage pressure by method of independent variables **07**

(b) A horizontal apron of 16 m length a sheet pile is provided at 12 m distance from the upstream end. The sheet pile is of 4 m depth. The weir on the floor stores water upon 3 m height. Calculate uplift pressures at both faces of the sheet pile just below the floor and also at lower end of the sheet pile. **07**

OR

Q.4 **(a)** Discuss causes of failure on weirs on permeable foundation. **07**

(b) Two sheet piles of unequal length are provided at two ends below an impervious floor of 12 m length. Total head created on the floor is 2 m. Using Khoslaôs method of independent variables calculate uplift pressures at the junction of inner faces of both piles with the floor. Take upstream pile 3 m deep and downstream pile 4 m deep. **07**

Q.5 **(a)** Draw a neat sketch of siphon aqueduct and name various components. **07**

(b) Design a straight glacis fall on the branch canal with following particulars: **07**

Full supply discharge $\frac{u/s}{d/s}$ =14.5 cumec

Full supply level $\frac{u/s}{d/s} = \frac{40.00}{39.10}$

Full supply depth $\frac{u/s}{d/s}$ =1.40 m

Bed width of canal $\frac{u/s}{d/s}$ =9.2 m

Permissible exit gradient = 1/7

Calculate (1) crest dimensions (2) cistern dimension (3) Cut-off .

OR

Q.5 **(a)** Discuss the merits and demerits of notch type fall and sarda type fall. **04**

(b) Design a siphon aqueduct with the following data: **10**

(1) Canal :

Discharge	20 cumec
Bed width	18 m
Depth of water	1.30 m
Bed level	250 m

(2) Drainage:

High flood discharge	200 cumec
High flood level	250.70 m
Bed level	248.50
General ground level	250.00 m

Calculate: (1) drainage water way .(2) canal water way (3) head loss and bed level at different sections (4) transitions

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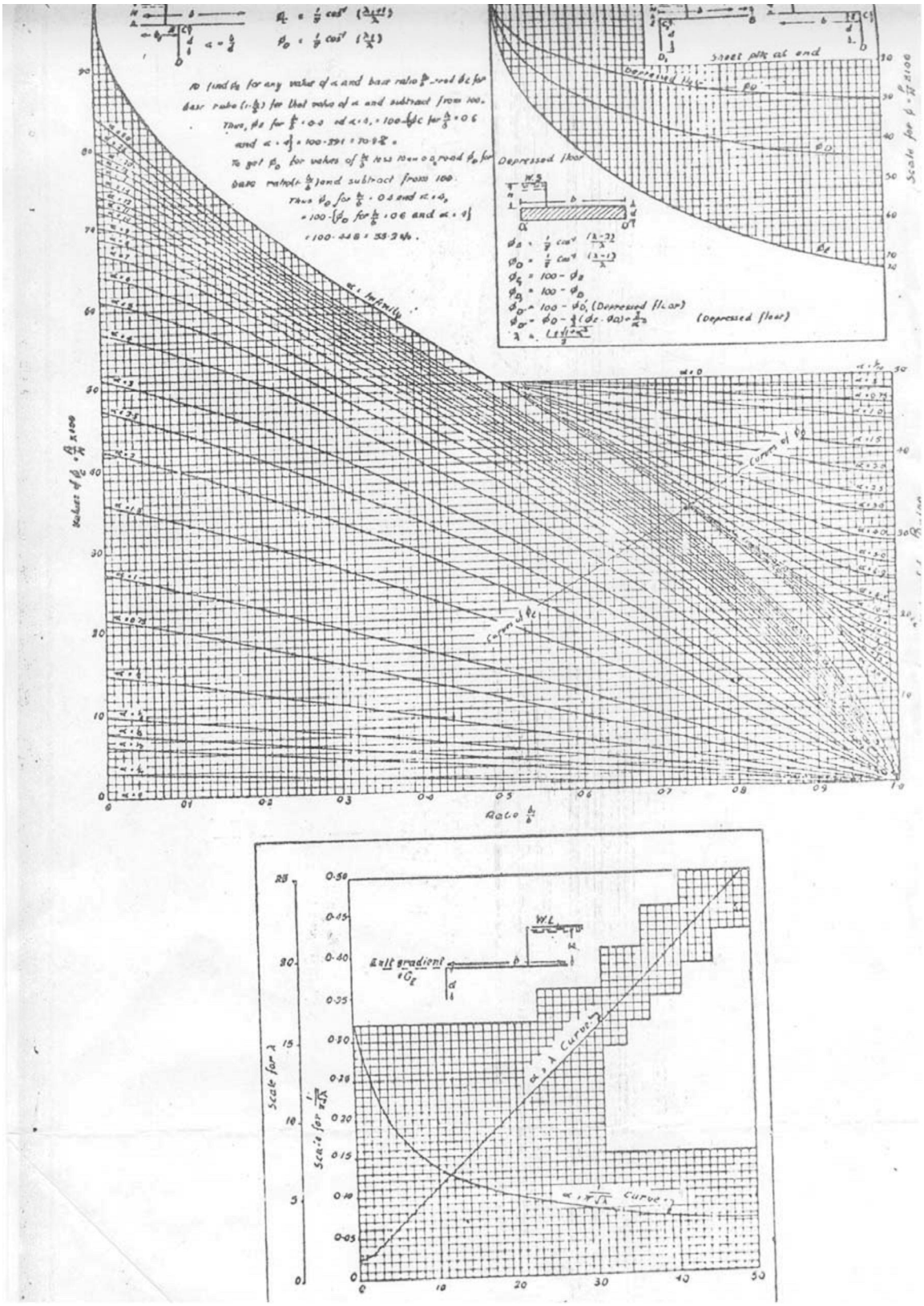
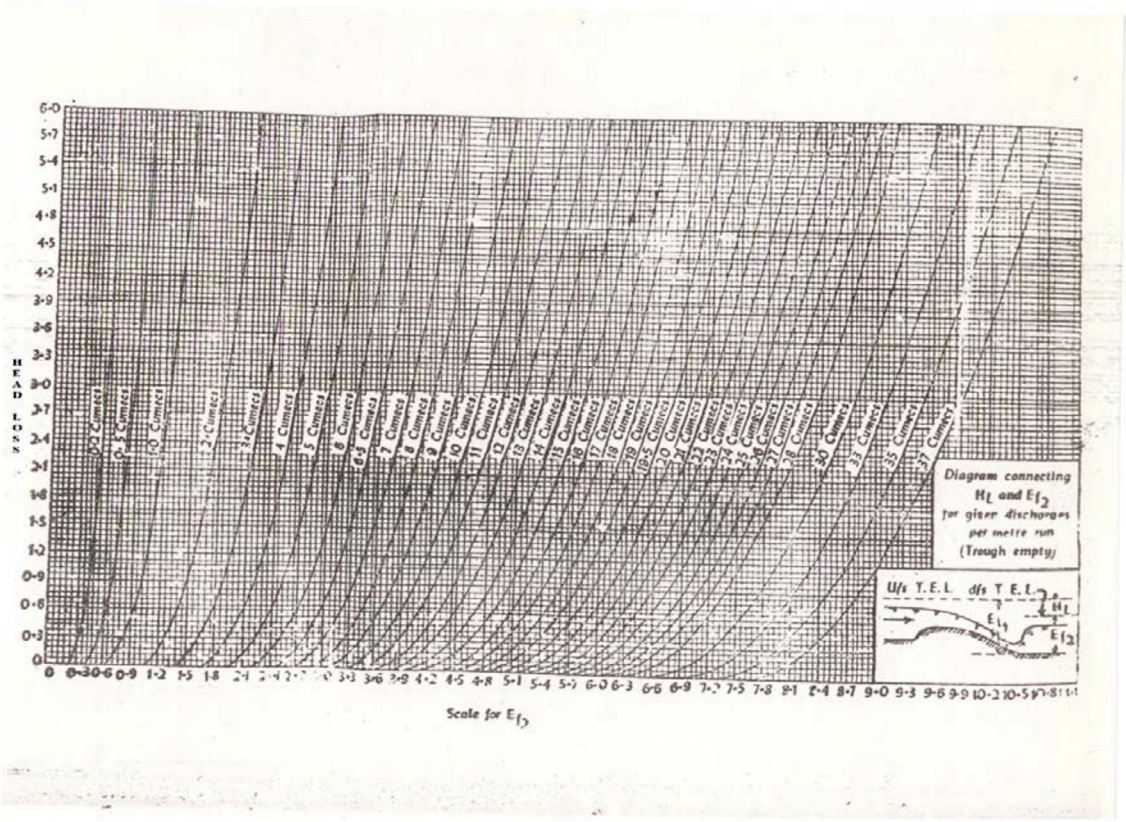
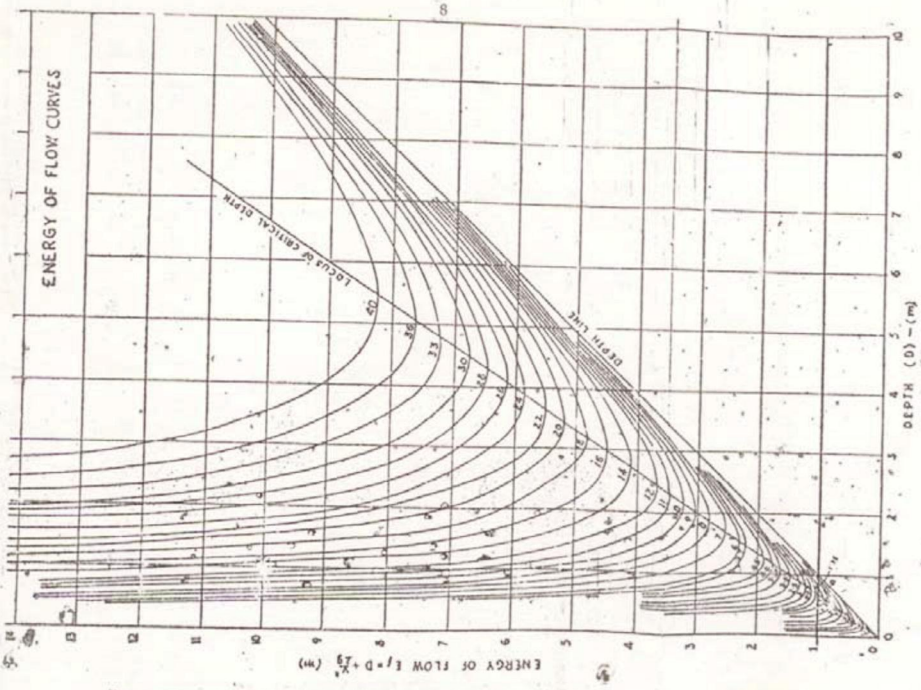
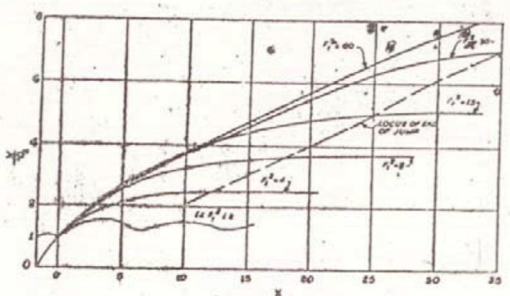

Sheet pile at end
Depressed floor
Values of $\phi_c = \frac{\phi_c}{H} \times 100$
Ratio $\frac{b_1}{b}$
Curves of ϕ_c
Curves of ϕ_D
Exit gradient G_E
W.L
$\alpha = \lambda$ Curve
$\alpha = \frac{1}{\sqrt{\lambda}}$ Curve
Scale for λ
Scale for $\frac{1}{\pi\sqrt{\lambda}}$


HEAD LOSS
Scale for E_{f_2}
Diagram connecting H_L and E_{f_2} for given discharges per metre run (Trough empty)
U/s T.E.L.
d/s T.E.L.
H_L
E_{f_2}





RELATION BETWEEN THE LENGTH AND THE HEIGHT OF JUMP

HYDRAULIC JUMP & ENERGY DISSIPATION