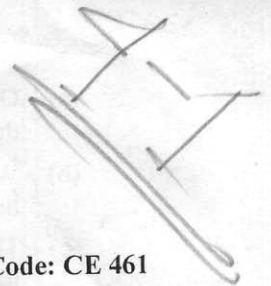


**University of Asia Pacific**  
**Department of Civil Engineering**  
**Final Examination, Fall 2012**  
**Program: B. Sc. Engineering (Civil)**



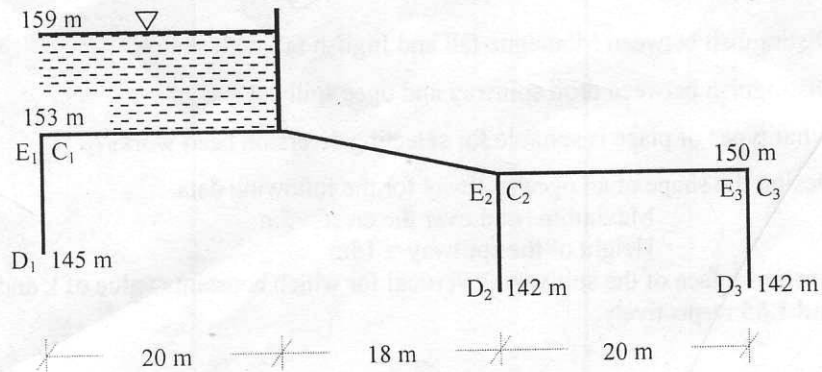
Course Title: Irrigation and Flood Control  
 Time: 3 hours

Course Code: CE 461  
 Full Marks: 150

**SECTION A**

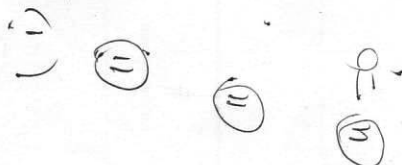
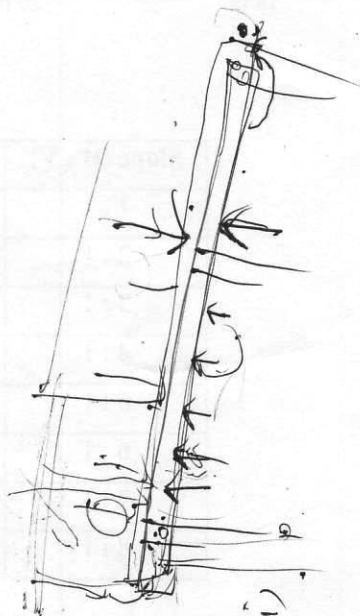
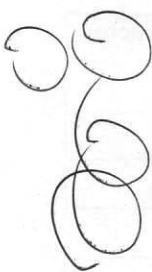
Answer question No. 1 and any THREE from the rest  
 (Assume any reasonable data if not given)

1. (a) Distinguish between the following (any four) (16)
- (i) Alluvial and Non-alluvial canals ✓
  - (ii) Attracting and repelling groyne ✓
  - (iii) Efficiency of water storage and water use ✓
  - (iv) Aqueduct and siphon aqueduct ✓
  - (v) Bligh's and Lane's theory
  - (vi) Free flooding and Border flooding
  - (vii) Contour canal and watershed canal
- (b) Use Khosla's curves to calculate the percentage uplift pressure at points  $C_1, E_2, C_2, D_3$  and  $E_3$  for a barrage foundation profile shown in figure below applying necessary corrections. Also determine the exit gradient. [Assume: floor thickness = 1 m] (18)



Slope (H : V)	Correction Factor
1 : 1	11.2
2 : 1	6.5
3 : 1	4.5
4 : 1	3.3
5 : 1	2.8
6 : 1	2.5
7 : 1	2.3
8 : 1	2.0

2. (a) Optimum utilization of irrigation water? Write short notes on Berms and Balancing depth. (4+6)
- (b) Why diversion of head works is needed? What are the components of diversion of head of works? Draw the layout of diversion of head works? (6)
- (c) The culturable command area for a distributary is 15,000 hectares. The intensity of irrigation is 40% for Rabi and 10% for rice. Duty for Rabi and rice may be assumed as  $1800 \text{ ha/m}^3/\text{sec}$  and  $175 \text{ ha/m}^3/\text{sec}$ . What is the design discharge at distributary head at 10% conveyance loss? (6)
3. (a) What is cross-drainage works? Explain its necessity. (2+4)
- (b) Explain four causes of failure of hydraulic structures. (7)
- (c) How will you justify economically the necessity of lining an existing canal? What added benefits you will expect if the canal to be lined? (6+3)
4. (a) Explain soil-water relationship. Explain its importance to make an economical irrigation canal. (5)
- (b) Write the purposes of marginal bunds. (3)
- (c) What are the important aspects need to be included in an irrigation project report? Define canal system along with his components. (4+3)
- (d) The discharge available from a tubewell is 136 cubic meters per hour. Assuming 3000 hours of working for this tubewell in a year, estimate the culturable area that this tubewell can command. The intensity of irrigation is 50% and the average water depth required for the rabi and kharif crops is 51 cm. (7)
5. (a) Distinguish between Montague fall and English fall with sketch. (5)
- (b) Distinguish between drop spillway and ogee spillway. (5)
- (c) What types of place is suitable for selecting diversion head works? (4)
- (d) Design the shape of an ogee spillway for the following data (8)
- Maximum head over the crest = 5m  
Height of the spillway = 15m
- Upstream face of the spillway is vertical for which constants value of k and n are 2.0 and 1.85 respectively.



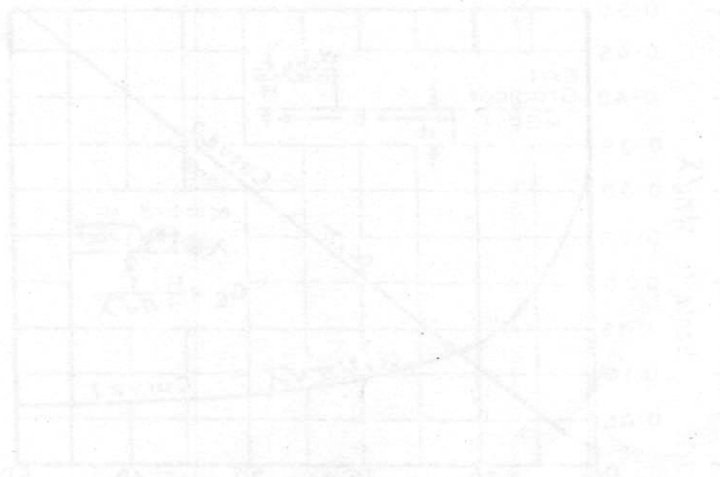
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**Section B**

**Answer Question no. 6 and any THREE from the rest**

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6. What are the types of measures of flood management? Distinguish between them. (3+4+5)  
Name the methods of flood management under each type.
7. Explain the following (any three) (3×4)
- (a) Polder
  - (b) Distinguish between Flood proofing and Flood protection
  - (c) Flood Forecasting
  - (d) Retired Embankment
8. Write down the FAP guiding principles of flood management. (12)
9. (a) Write down the major issues that have been identified in the NWMP (8)  
(b) What are the objectives of flood management? (4)
10. What is water logging? What are the causes of water logging? How can you control water logging? (3+4+5)
11. (a) What is Leaching Requirement? Deduce equation for Leaching Requirement. (2+5)  
(b) Write down the process of salinization (5)





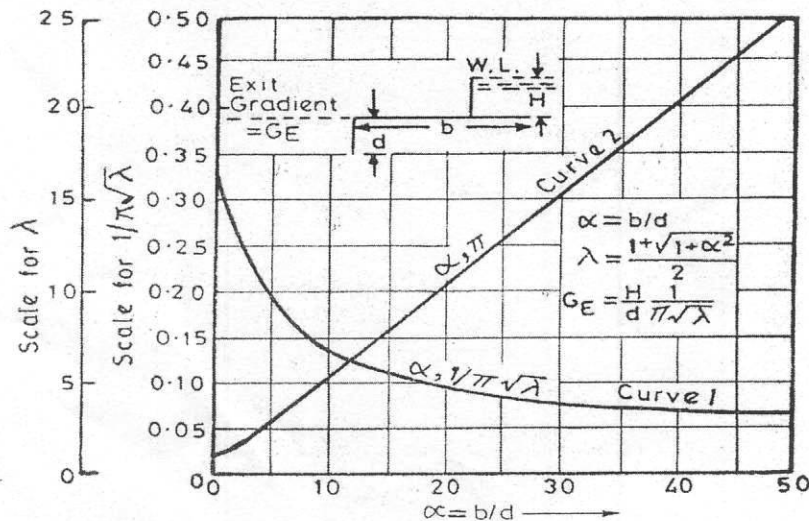
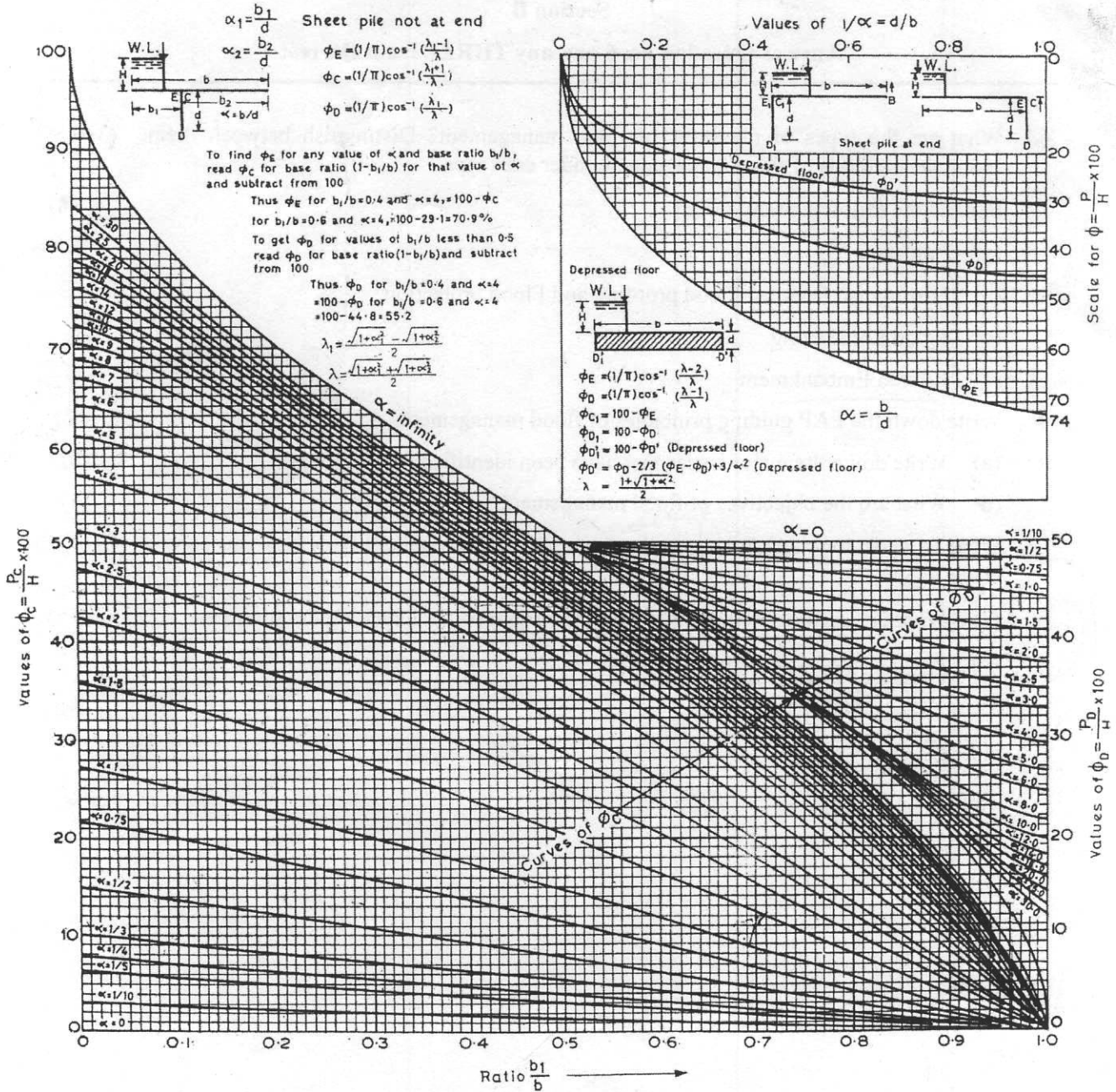


Plate 11.2