

Worksheet: Design and Calculation of Drainage Systems

Part A:

Answer the following briefly:

1. Define **Drainage Coefficient** in your own words.
2. State **Darcy's Law** and explain each term in the equation.
3. Differentiate between **surface drainage** and **subsurface drainage**.
4. Why is understanding **infiltration rate** important in drainage design?

Part B: Calculation Problems

Q1. Water Removal Calculation

- Given:
Drainage Coefficient = 5 mm/day
Field Area = 2 hectares
- Calculate:
(a) How many liters of water must be removed per day?

Q2. Drainage Flow Rate

- Given:
Hydraulic conductivity (k) = 0.2 m/day
Hydraulic gradient (dh/dl) = 0.01
Cross-sectional area of soil flow (A) = 0.5 m²
- Calculate:
(a) Flow rate (Q) in cubic meters per day.

Part C: Drainage System Sketching Task

Q3. Field Layout Design

- Given:
 - Soil type: Clay

- Crop: Vegetables
 - Drainage Coefficient: 5 mm/day
- Sketch:
 - Layout showing **lateral drains**, **main drains**, and **outlet**.
 - Indicate approximate spacing between laterals based on soil type.

Part D: Critical Thinking Questions

Q4. In which case would you prefer **surface drainage** over **subsurface drainage**? Give one example.

Q5. If infiltration rate is extremely low, what design adjustments would you make to the drainage system?

Submission Instructions:

- Complete all parts.
- Draw sketches clearly.
- Show all calculations neatly.
- Submit by [5.5.2025]