

CVEN 463 “Engineering Hydrology”

Potential Closed-book Questions for Exam #1

Give complete and intelligible definitions for the following:

Precipitation	Evaporation	Transpiration
Evapotranspiration	Infiltration	Exfiltration
Deposition	Condensation	Sublimation
Hydrologic Cycle	Watershed	Aquifer
Outlet	Divide	Drainage Path
Coriolis Effect	Tropopause	Hadley Cell
Ferrell Cell	Mixing Ratio	Saturated Mixing Ratio
Vapor Pressure	Saturated V.P.	Relative Humidity
Latent Heat	Hyetograph	Recording Gage
Pyranometer	Class A Pan	Potential Evaporation
Interception	Porosity	Depression Storage
Reference Crop	Remote Sensing	LCL
Dew Point Temp	Potential Temperature	
Equivalent Potential Temperature		Tensiometer

What are the three defining characteristics of a watershed?

Are the boundaries of surface watersheds and aquifers always contiguous?

Given a map of the globe, draw the major global air circulation cells and the surface winds caused by the Greenhouse and Coriolis Effects. Include important lines of latitude.

Given a map of the globe, draw the major ocean currents. Mark which are warm and which are cold currents.

Explain how ocean currents work to keep the western edge of continents cool and the eastern edge warm.

What are the three basic precipitation mechanisms? Explain how each of them works. Include appropriate diagrams.

Name instruments used to measure the following quantities and explain how each works:

Rainfall depth	Rainfall rate	Evaporation
Solar radiation		

How can rainfall be measured remotely? Explain the basic operation of the method, and give some weaknesses of the method.

Do Class A Pans tend to over- or under-estimate “true” evaporation? Why?

Explain the concept of “Return Period.”

If a storm is referred to as a “10-year, 15-minute” storm, what is meant by this description?

Sketch the hydrologic cycle and label the location and movement of water.

What is the effect of wind speed on evaporation rate?

How does evapotranspiration vary with crop height?

What are appropriate units for the following quantities:

Rainfall rate

Evaporation rate

Infiltration rate

Annual river discharge volume

What is an acre-foot?

Why is the Penman equation sometimes referred to as a “combination equation”?

Explain how the Penman-Monteith equation differs from the Penman equation. Specify what input parameters the Penman-Monteith includes that separate it from the Penman.

Lifting of air above the LCL is: Adiabatic or Pseudo-adiabatic.

From what government agency could you obtain temperature, rainfall, and evaporation measurements for long periods of record (e.g., 50 years)?

Explain why the Normal (Gaussian) PDF is not very applicable to rainfall and streamflow data. Name a PDF that would be more applicable.

What are maximum and minimum possible infiltration rates according to the Green-Ampt and Horton infiltration models?

Is Probable Maximum Precipitation likely to be greater than, less than, or equal to the 500 Year Storm Precipitation?

Can plants stop transpiration from their leaf stomata? Explain your answer.

Define the following soil moisture quantities, tell which are synonymous, and rank them by magnitude from highest to lowest: porosity, drained upper limit, wilting point, field capacity, lower limit, saturation limit.

Why do soils with high clay content “hold” water better than sandy soils?

Draw a schematic of Darcy’s experiments on flow through saturated media. State Darcy’s Law.