Lecture Quiz 3

(1) When R_n is positive, it indicates an energy surplus at a given location. A portion of that energy surplus will be transferred to the soil as soil heat flux (H_g). The magnitude of soil heat flux at a given site for a given R_n will be influenced by:

a. Soil Organic Matter Content
b. Soil Moisture Content
c. Soil Porosity
d. B & C
e. A, B, & C

Answer:

e. A, B, & C

(2) Soil's thermal conductivity k varies _____ as a function of the k of it's components and the relative proportion of each component in the soil.

a. Linearly
b. Non-linearly
c. Relatively little
d. B and C
e. A and C

Answer:

b. Non-linearly

(3) All else equal, a soil with a high thermal admittance, compared to a soil with low thermal admittance will:

a. Have relatively high soil surface temperatures on sunny day
b. Have relatively low soil surface temperatures on sunny day
c. Be more prone to frost on a clear night
d. Impossible to say given the information provided
e. A & C

Answer:

b. Have relatively low soil surface temperatures on sunny day

(4) All else equal, a soil with a high thermal diffusivity, compared to a soil with low thermal diffusivity will:

a. Have relatively high soil temperatures at depth on sunny day
b. Have relatively low soil temperatures at depth on sunny day
c. Be more prone to frost on a clear night
d. Impossible to say given the information provided
e. A & C

Answer:

a. Have relatively high soil temperatures at depth on sunny day

(5) All else equal, which properties of an air parcel that **is not** saturated, will vary as a function of air temperature?

a. Vapor density ρ_v
b. Vapor pressure P_v
c. Mixing ratio $r_H 2O$
d. Relative humidity RH
e. All of the above

Answer:

d. Relative humidity RH

(6) When a parcel is saturated:

a. $\rho_v = \rho_v^*$
b. $VDD = 0$
c. $T = T_d$
d. A & B
e. A, B, & C

Answer:

e. A, B, & C

(7) This equation allows us to approximate P_v^* as a function of T to a reasonable degree of accuracy for temperature and pressure conditions commonly experienced on Earth:

a. The Buck Equation
b. Fourier's Law
c. Clausius–Clapeyron Equation
d. Ideal Gas Law
e. The Adiabatic Process Equation

Answer:

a. The Buck Equation

(8) An adiabatic process is one where:

a. Temperature changes without the exchange of heat with the surrounding environment
b. Temperature changes because of the exchange of heat with the surrounding environment
c. Temperature changes because of a change in atmospheric pressure
d. A & C
e. B & C

Answer:

d. A & C

(9) The saturated adiabatic lapse rate has a lower magnitude (i.e., absolute value) than the dry adiabatic lapse rate because:

a. Evaporation releases latent heat to the surrounding environment
b. Evaporation takes latent from the surrounding environment
c. Saturation is an energy negative process
d. Condensation takes latent from the surrounding environment
e. Condensation releases latent heat to the surrounding environment

Answer:

e. Condensation releases latent heat to the surrounding environment

(10) A parcel of air descends 1000 m; what will happen to it?

a. Its T will change by 10 K
b. Its T will change by -10 K
c. Its P will increase
d. B & C
e. A & C

Answer:

e. A & C