## Additional exercises Chapters 1 and 2

Supplemental homework by Dr Charles R. Fitts, University of Southern Maine

## Chapter 2

1. An air mass at 20 degrees C has a relative humidity of 60%.

    a) What is the saturation vapor pressure for air at this temperature?
    b) What is the actual vapor pressure for this air?
    c) What is the dew point for this air?

2. If the atmospheric pressure is one atmosphere, what is the weight of a column of atmosphere above a patch of ground that has an area of 10 cm x 10 cm in N? What is the mass of this column of atmosphere, assuming we are at sea level?

3. Examine the map of South American average precipitation rates. Knowing that the Andes Mountains run along the west edge of S. America, and thinking of orographic precipitation, which direction are the prevailing winds in the Andes region from 0 to 30 degrees south latitude? Explain your answer and relate it to global circulation patterns at this latitude range.

4. Consider the equation $R_n = G + H + \lambda E_a$ shown in Figure B2.12.1. For a grass field, compare the relative magnitude and signs of the terms in this equation for two cases:

    a) Mid-morning on a sunny day following a rainstorm the previous night.
    b) At night, with fog, after a warm day.

5. Pan evaporation is measured in US Class A evaporation pan (diameter 47.5 inches). The pan held 10.0 gallons at the start of a dry day and 9.25 gallons at the end of the day.

    a) Compute the average pan evaporation rate for this day in in/day and mm/day.
    b) Assuming a pan coefficient of 0.70 for this site, what would be the estimated rate of evaporation from a nearby lake on this day in mm/day?