

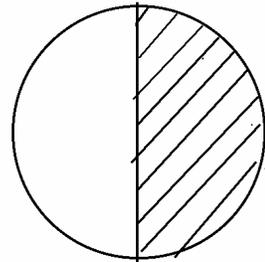
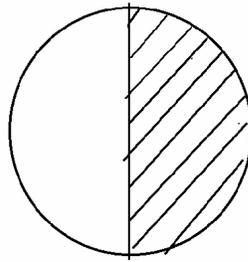
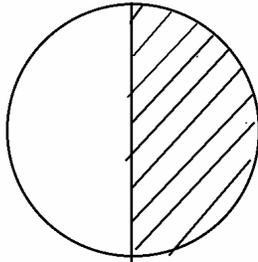
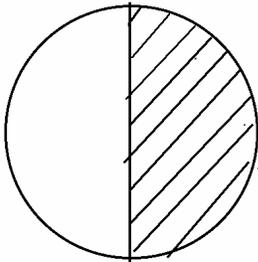
ATM OCN (Meteorology) 100
SUMMER 2004
E.J. Hopkins
HOMEWORK #2

NAME: _____
[Please Print!]
DATE DUE: _____

1. SEASONALITY

Assume that the sun is to the left of this page and produces a circle of illumination (the vertical lines) upon the globe for each of the four dates; daylight is to the left, while night corresponds to the shaded areas on the right of each globe. Upon each globe:

- Mark and label the **North** and **South Poles**.
- Draw and label the **Equator**.
- Draw and label the i.) **Tropics of Cancer** and **Capricorn** and ii.) the **Arctic** and **Antarctic** Circles.
- Mark with the letter "**V**" that latitude where the sun appears to be directly overhead at local solar noon.
- Mark with the letter "**T**" that latitude at the edge of polar night where the sun appears to be just on the local horizon at local solar noon. (*HINT: Where is the edge of polar night?*)



21 MARCH

21 JUNE

23 SEPTEMBER

23 DECEMBER

2. THE SOLAR RADIATION BUDGET -- Please use the appropriate units!

- The currently accepted value of the solar constant for the earth is approximately:
 _____ *[Please include units!]*
- A mythical planet has an orbit with an average planet-sun distance exactly *half* that of the earth's. What would be the solar constant for this mythical planet? [*Hint: make use of your answer from above.*] *[Please show your work for partial credit!]*

- What is the currently accepted value of the planetary albedo of the planet earth?

3. RADIATION LAWS

Object A and Object B are ideal radiators. If A were hotter than B, then:

- Which object would radiate *more* energy? _____
- Which object would radiate more of its energy at a *shorter* wavelength? _____

5. WIND-CHILL EQUIVALENT TEMPERATURE

Using the **New Wind-Chill Chart** in your textbook (pg. 92):

- a. What is the wind-chill equivalent temperature if the ambient air temperature were 15°F and the wind speed were 10 mph? *[Please use the appropriate units!]*

- b. What is the wind-chill equivalent temperature if the ambient air temperature remained at 15°F, but the wind speed increased to 25 mph?

- c. What factor(s) has caused the difference between your answers **a** and **b** above?

Why?

- d. To what temperature does your parked automobile reach in
part **a**? _____
part **b**? _____

6. HEAT AND TEMPERATURE -- [Please use the appropriate units!]

- a. How much energy is required to entirely melt 1 gram of ice at the ice point?

- b. How much energy is required to evaporate 1 gram of liquid water at room temperature?

- c. How would the temperature of 1 kilogram of liquid water originally at 20°C change if 5000 calories were used in the heating process (assume no phase transformations)? If a temperature change would take place, indicate the amount of change (and direction of this temperature change).

[Please show your work and include appropriate units!]

7. WEATHER ON THE WEB -- You will need to go to answer the questions appearing in the Online Homework at <http://www.aos.wisc.edu/~hopkins/aos100/homework/s04hmk02k.html>

- 1. Date _____ Time _____

- 2. Earliest sunset time _____ Date _____
Latest sunset time _____ Date _____