

## CORS221 Module 3 Homework 4

Out: 2010 November 30

Due: 2010 December 7 9:30AM Pacific Standard Time

### 1. Multiple Choice

1. The city of London is as far north as Calgary, yet it never snows there. What keeps London so warm?  
(a) obliquity (b) orbital eccentricity  
(c) greenhouse warming (d) ocean circulation
2. Averaged over the year, which direction do the winds blow in Idaho according to global atmospheric circulation?  
(a) north to south (b) east to west (c) south to north (d) west to east
3. What effect do clouds have on Earth's average temperature?  
(a) they keep it warmer (b) they keep it colder  
(c) they provide a greenhouse effect  
(d) they have no net effect
4. Circulation within ocean basins is usually in a circle. The circle is clockwise in the northern hemisphere, and counterclockwise in the southern hemisphere. Why?  
(a) thermohaline circulation (b) coriolis effect  
(c) gulf stream (d) greenhouse effect
5. What long-term climatic oscillation can cause rainy summers in Moscow, Idaho?  
(a) ozone layer holes (b) El Niño  
(c) interglacial cycle (d) Pacific Decadal Oscillation
6. Industrial emissions of which of the following chemical species cools the Earth??  
(a) CO<sub>2</sub> (b) CH<sub>4</sub> (c) N<sub>2</sub>O (d) SO<sub>2</sub>
7. If the Earth really is getting warmer because of the greenhouse effect, which part of Earth should warm up fastest??  
(a) the poles (b) the river valleys (c) the deserts (d) the rainforests
8. How much has Earth's average temperature increased since the industrial revolution in the 1800s?  
(a) 0.0°C (b) 0.8°C (c) 1.6°C (d) 2.1°C
9. How much has Earth's average temperature increased since the start of continuous satellite observations in 1978?  
(a) 0.0°C (b) 0.1°C (c) 0.4°C (d) 0.8°C
10. How much has Earth's average temperature increased since 2001?  
(a) 0.0°C (b) 0.1°C (c) 0.2°C (d) 0.4°C

## 2. Short Answer

11. Show how the greenhouse effect works. Use both a paragraph and a diagram.
12. For the three days right after 2001 September 11, the weather across the lower 48 states was 1.2 degrees Celsius (2 Fahrenheit) warmer than it usually is. Why?
13. The amount of carbon dioxide in Earth's atmosphere over time goes up and down regularly by about 7 parts per million (ppm) each year. Why is that?
14. Describe the chain of logic behind why it is that we think that carbon dioxide emissions are the cause of global warming.