Please provide concise, grammatically correct, neatly written answers to the following questions. All questions can be answered in, at most, a few sentences. Don’t forget to write your name on the paper!!!

NAME:

1) (a) Explain why an increased concentration of CO₂ (carbon dioxide) in the atmosphere could lead to higher global temperatures.

(b) One result of increased global temperatures would likely be more evaporation and therefore more H₂O vapor (water vapor) in the atmosphere. How might this further change the global temperature and why? (10 pts.)

2) (a) Describe the changes we would experience in the summer and winter temperatures in Madison if the tilt of the Earth’s axis increased to 45°. Explain why these changes would occur. Draw a diagram that demonstrates the differences between this hypothetical case and current reality.

(b) If the Earth’s axis were tilted at 45°, would the sun ever rise on Christmas day in Calgary, Alberta Canada? Explain. (10 pts.)

3) The albedo is the fraction of incident solar radiation that is reflected back to space. Ice and snow have a much higher albedo than does bare ground. During the last Ice Age, glaciers extended as far south as Wisconsin. Explain how this circumstance would promote global cooling. (10 pts.)

4) Consider the following observations taken on successive summer mornings. On the first day, an overnight rain had occurred. On the second day, the grass is dry at sunrise. The air temperature is the same at sunrise on both days. On which day is the air temperature warmer ONE HOUR after sunrise? Explain your answer. (10 pts.)