Meteorology B
Wright State Invite 2012

Team Name Key **Team #** _____

Student Members: _____ **&** _____

Raw Score: _____ / 126 **Rank:** _____

Part I. Multiple Choice. Answer the following questions by selecting the best answer. 2 points each.

D 1. All of the following are major classification types in the Koeppen Classification System EXCEPT
   (a) Continental (b) Moist Tropical
   (c) Humid Mid-Latitude (d) Temperate

C 2. There are _____ major classification types in the Koeppen Classification System.
   (a) 3 (b) 4
   (c) 5 (d) 6

B 3. The Milankovich Theory deals with
   (a) Global Warming due to non-understood mechanisms
   (b) The changing of the axis of rotation of the Earth over time
   (c) The cycle of El Nino/La Nina in the Pacific Ocean
   (d) The seasonal variation in ozone concentration at the south pole

B 4. The eccentricity of a circle is exactly
   (a) 0 (b) 1
   (c) 0.5 (d) 10
   (e) 100

B 5. The current axial tilt of the Earth is most nearly
   (a) 15 degrees (b) 20 degrees
   (c) 30 degrees (d) 40 degrees

B 6. Global Climate Models tend to have grid spacing most nearly
(a) 1 km x 1 km (b) 10 km x 10 km
(c) 100 km x 100 km (d) 1000 km x 1000 km

A 7. Global Forecast Models tend to have grid spacing most nearly
(a) 100 m x 100 m (b) 1 km x 1 km
(c) 10 km x 10 km (d) 100 km x 100 km

B 8. The cycle of sunspot activity on the Sun is most nearly _____ years from max to max.
(a) 5 (b) 10
(c) 15 (d) 20

D 9. The average temperature of Minneapolis, MN is about 1.5 degrees F warmer than the surrounding outstate area at similar latitude and elevation. What describes this phenomena best?
(a) Deforestation (b) Global Warming
(c) Desertification (d) Urban Heat Island Effect

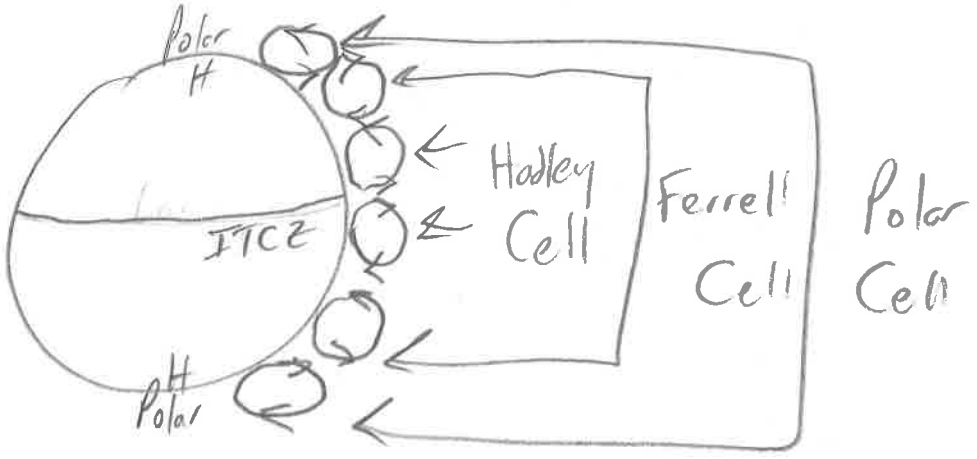
B 10. On average, altitude is _____ related with mean yearly temperature.
(a) Directly (b) Inversely
(c) Not (d) un

Part II. Short Answer. Complete sentences are not necessary.

1. What are the three principal types of heat transfer? (6 points)

Conduction, Convection, Radiation

2. Draw a schematic drawing of the 3-cell model of atmospheric circulation. Please label each cell in both the northern and southern hemispheres as well as the ITCZ and Polar High Pressure regions. (10 points)

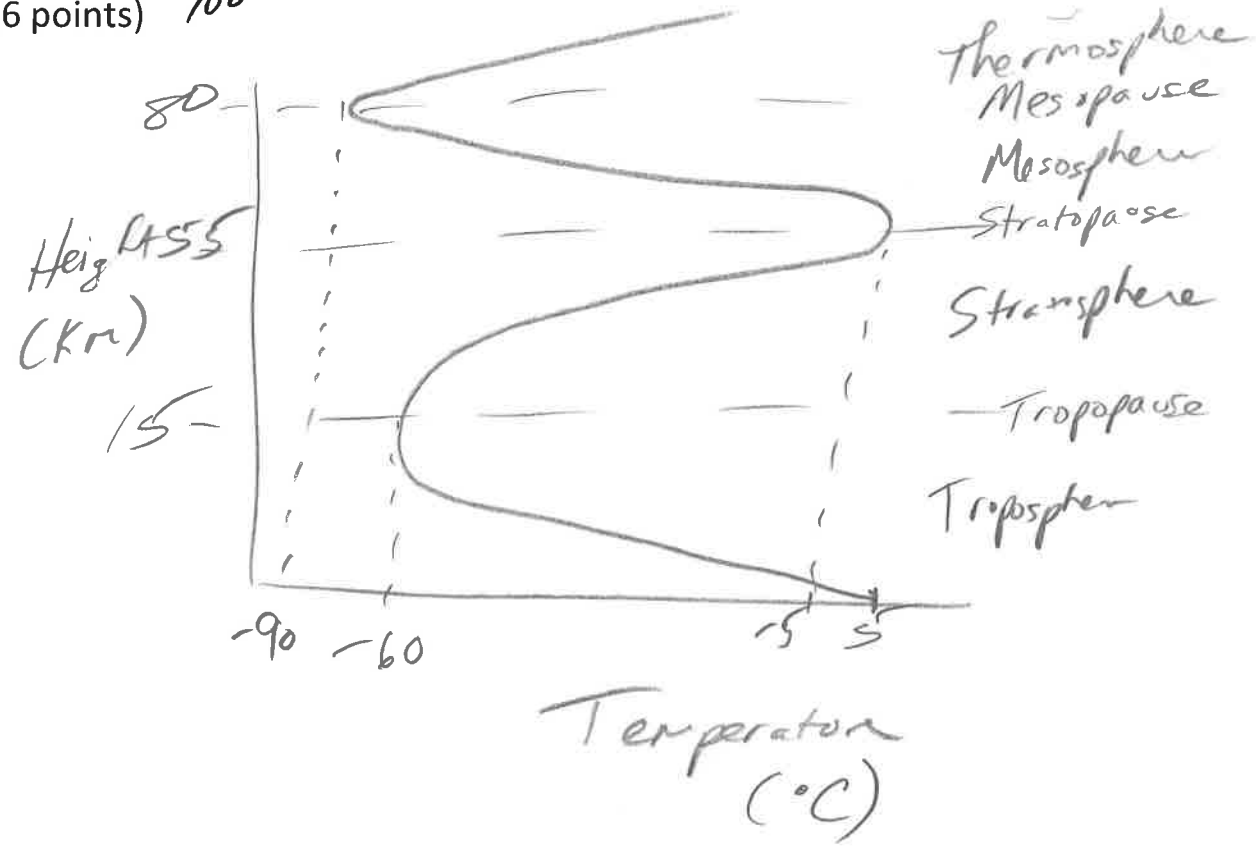


3. Dendochronology is the study of tree rings related to climatology. (2 points)

4. The five primary greenhouse gases in the Earth's atmosphere are: (10 points)

5. Ozone is located in the Stratosphere layer of the atmosphere (2 points)

6. Draw a vertical schematic of the Earth's atmosphere with temperature on the x-axis and height on the y-axis. Be sure to label the four main layers of the atmosphere and their differentiation locations (as differentiated by temperature). (16 points)



7. Why does the stratosphere warm with height? (3 points)

Ozone Reaction absorbs heat

8. In which layer of the atmosphere does most weather occur? (2 points)

Troposphere

9. Describe three primary effects in the continental U.S. during an El Nino period (6 points).

Fewer Atlantic Hurricanes

Wetter summer in West

Warmer/drier winters West

Reduced snowfall in winter

10. Describe three primary effects in the continental U.S. during a La Nina period (6 points).

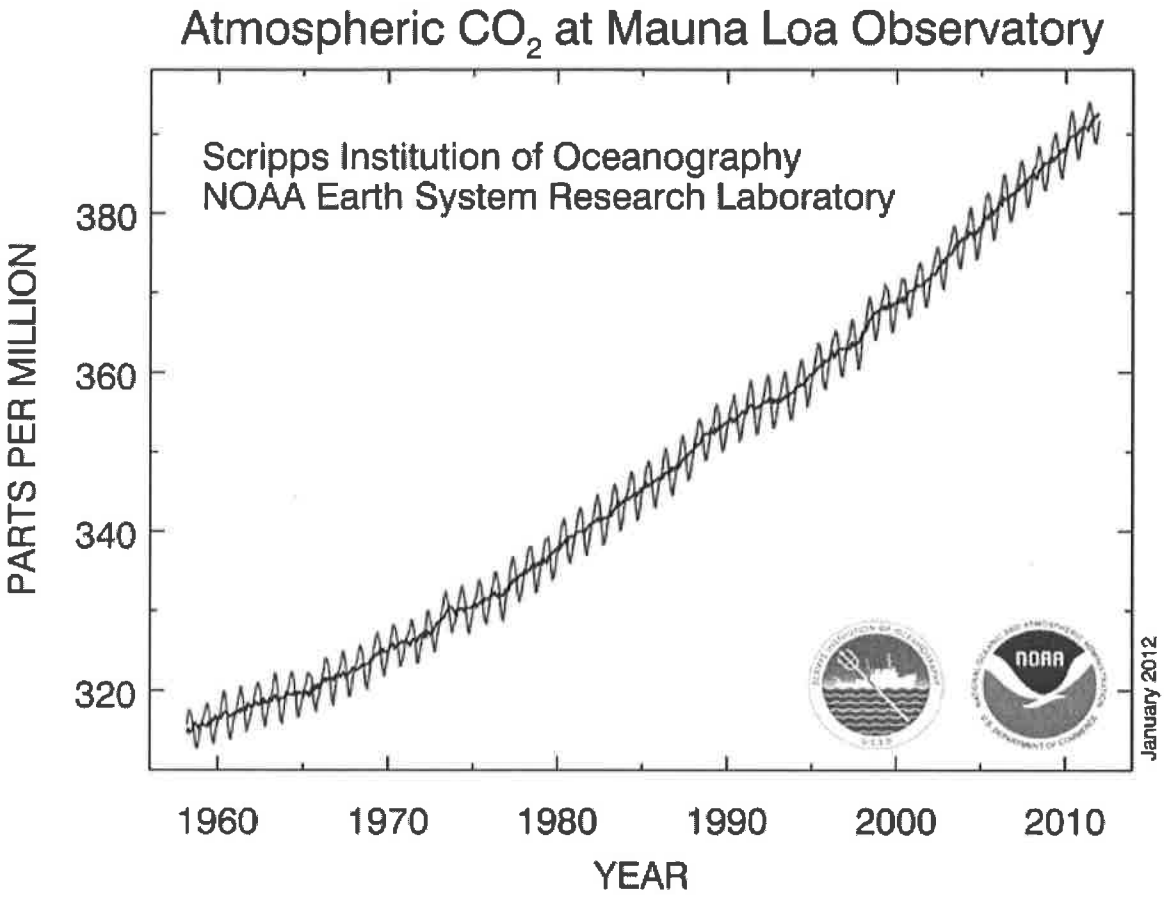
Wetter Midwest

Wetter West

More Atlantic Hurricanes

→ Opposite of El Niño

Use the graph below to answer questions 11-13.



11. What has been the general trend in carbon dioxide concentration in the atmosphere over the past 50 years in Hawaii? (3 points)

Increase over time

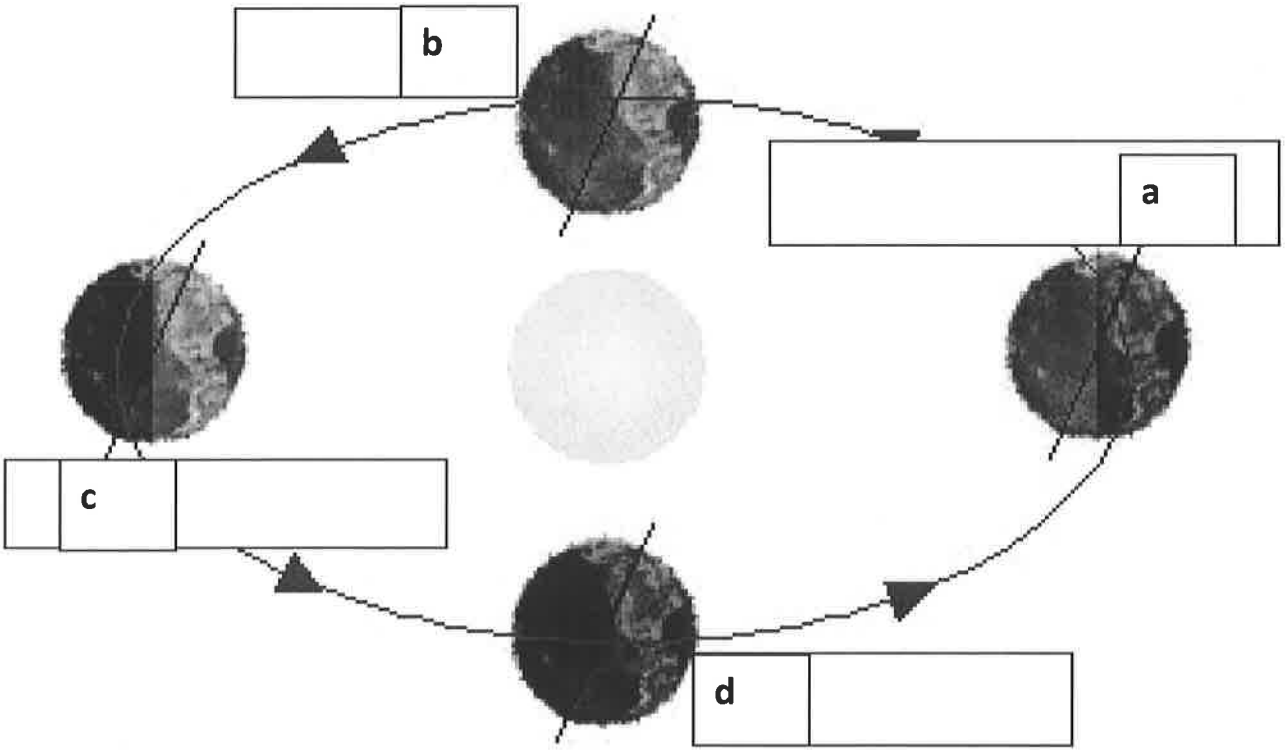
12. Why is there a significant within-year variability in the concentration of carbon dioxide in the atmosphere over the past 50 years? (3 points)

Seasonal variation — vegetation → using CO_2

13. How can this data be incorporated into the Global Warming discussion? (5 points)

Increase in CO_2 → a greenhouse gas
No discussion why... industry? fossil fuels?...

Use the image below to answer questions 14-20.



14. According to the map above, at which location is the winter solstice for the northern hemisphere? (3 points)

A

15. What is the seasonal transition day for the southern hemisphere at (a)? (3 points)

Summer Solstice

16. In what month is the image in (d) occurring? (3 points)

September

17. In what month is the image in (c) occurring? (3 points)

June

18. What season occurs between (b) and (c) in the northern hemisphere? (4 points)

Spring

19. What season occurs between (b) and (c) in the southern hemisphere? (4 points)

Fall

20. What is the period of revolution of the Earth around the sun to the nearest day? (2 points)

365 days

21. What term can be applied to the main reason why land (or soil) warms and cools much warmer than water? (5 points)

Specific Heat → Water - high spec heat
→ land - low spec heat

Differential Warming

22. What is the Gulf Stream? How does it affect the weather in the mid-Atlantic states of the United States? (6 points)

Ocean current that keeps area warmer / just off coast.
goes all the way to UK

23. Name and describe three different methods that are used by paleoclimatologists to study the climate in different parts of the Earth in the past. (9 points)

- Tree Rings
- Ice Cores
- Mineral / Rock Cuts
- Coral Studies