

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
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**Geography 120. Earth Systems II: Atmosphere.  
EXAM 1. Introduction; solar radiation; and temperature  
Instructor: Dr. Stavros T. Constantinou  
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***Multiple choice questions. Select the best answer by marking the appropriate letter on the computer sheet. Use a no. 2 pencil. Each question counts two points for a maximum of 100 points. Should you change your mind, please make sure you erase well.***

- 1. All of the following are major themes of concern to geographers except**
  - a. man-land relations.**
  - b. regional analysis.**
  - c. spatial analysis.**
  - d. analysis of instabilities.**
  
- 2. Physical geography's major function is to learn about:**
  - a. human activity and the results thereof.**
  - b. the environment and the processes that govern it.**
  - c. the physical and human features of a region.**
  - d. the composition of the earth's crust.**
  
- 3. A map of the world:**
  - a. can never be completely accurate.**
  - b. is only accurate when drawn on a Mercator Projection.**
  - c. is never likely to be accurate in equatorial regions.**
  - d. can be made with extreme accuracy by experienced mapmakers.**
  
- 4. One aspect of the world that is NOT related to the curvature of the earth is:**
  - a. our calendar system.**
  - b. our world-wide time system.**
  - c. variations in temperature around the earth.**
  - d. our geographical grid system.**
  
- 5. In December the Mansfield area is colder than in July because:**
  - a. the earth is closer to the sun in July.**
  - b. the sun gives off more heat in July.**
  - c. the atmosphere is denser in December.**
  - d. the sun's rays strike at a lower angle in December.**

6. Which of the following is not correct?
- in the troposphere temperature increases with an increase in altitude.
  - the ozone layer is found in the stratosphere.
  - the term weather is used to describe the physical state of the atmosphere at a given place and time.
  - the term climate is used to describe the average weather conditions in a particular place over a long period of time, usually more than 30 years.
7. The point on the earth's orbit around the sun when the two bodies are furthest apart is called:
- perihelion.
  - aphelion.
  - ecliptic.
  - equinox.
8. Which of the following is NOT a result of the tilt of the earth's axis of rotation?
- the change in day length through the year.
  - the seasons.
  - the length of the year.
  - the change in day length with changing latitude.
9. The constant plane in which the earth travels in its orbit around the sun is called the plane of the \_\_\_\_\_.
- equinox.
  - inclination.
  - ecliptic.
  - declination.
10. On the date of the summer solstice, which of the following locations has the longest day?
- Mansfield, Ohio ( $41^{\circ}$  N).
  - Anchorage, Alaska ( $61^{\circ}$  N).
  - Brasilia, Brazil ( $16^{\circ}$ ).
  - Mexico City ( $20^{\circ}$  N).
11. On September 23, the length of daylight in the southern hemisphere:
- is increasing.
  - is decreasing.
  - has reached its maximum.

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- d. has reached its minimum.
12. On December 22, the vertical rays of the sun strike:
- the Arctic Circle.
  - the Tropic of Capricorn.
  - the Tropic of Cancer.
  - the Antarctic Circle.
  - the Equator.
13. The "Land of the Midnight Sun" can be:
- North of the Arctic Circle.
  - South of the Antarctic Circle.
  - a and b.
  - at the poles only.
14. A great circle:
- cuts the earth into two hemispheres.
  - is an exact circumference of the earth.
  - provides the shortest routes of travel on the earth's surface.
  - all of these.
15. The circle of illumination divides the earth into two hemispheres known as:
- East and West.
  - North and South.
  - Day and Night.
  - Summer and Winter.
16. The earth's two fixed reference points are:
- the North and South Poles.
  - the North Star and Southern Cross.
  - the Tropics of Capricorn and Cancer.
  - all of these.
17. Maximum latitude is reached at:
- the Prime Meridian.
  - the North and South Poles.
  - the Tropics of Capricorn and Cancer.
  - the Equator.

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- 18. One degree of latitude is approximately equal to:**
- a. 7 miles.**
  - b. 112 miles.**
  - c. 70 miles.**
  - d. 11.2 miles.**
- 19. Lines of latitude:**
- a. converge at the poles.**
  - b. measure distance east and west.**
  - c. are always parallel to one another.**
  - d. cross each other at right angles.**
- 20. The term "parallels" refers to:**
- a. lines of longitude.**
  - b. lines of latitude.**
  - c. lines of meridian.**
  - d. Great Circles.**
- 21. If a person traveling west crosses the International Date Line, this person must:**
- a. turn the calendar back one day.**
  - b. turn the calendar ahead one day.**
  - c. turn his watch 12 hours ahead.**
  - d. turn his watch 12 hours back.**
- 22. One feature that is NOT an advantage of a map is:**
- a. it represents, without distortion, various features and relationships on the earth's surface.**
  - b. it can be reproduced easily and cheaply.**
  - c. it can depict an area in various degrees of detail.**
  - d. it is easy to handle and transport.**
- 23. The major problem encountered in map making is that:**
- a. it is tedious and time consuming.**
  - b. there is a lack of international standardization.**
  - c. it is impossible to show true size and true shape on the same map.**
  - d. there are no major problems.**

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- 24. If the ozone in the atmosphere were to be destroyed, which of the following effects would you expect NOT to occur?**
- a. the thermal structure of the atmosphere would change.**
  - b. more shortwave radiation would penetrate the atmosphere.**
  - c. decrease in the receipt of ultraviolet radiation at the surface.**
  - d. all of these would occur.**
- 25. Which of the following gases accounts for about 78 percent of the atmosphere's mass?**
- a. water vapor.**
  - b. nitrogen.**
  - c. ozone.**
  - d. carbon dioxide.**
  - e. oxygen.**
- 26. Which of the following is an example of a verbal scale?**
- a. 1:100,000.**
  - b. one inch to ninety miles.**
  - c. !----!----!----!----!----!.**
  - d. none of these.**
- 27. If our earth did not have an atmosphere, temperature extremes between day and night would:**
- a. increase.**
  - b. decrease.**
  - c. stay the same.**
  - d. reverse direction.**
- 28. Longwave radiation,**
- a. refers to the total solar radiation.**
  - b. is the spectrum of earth radiation.**
  - c. is mostly in the visible light range.**
  - d. takes place only when the sun is shining.**
- 29. Which of the following is not a mechanism of heat transfer?**
- a. advection.**
  - b. convection.**

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- c. reflection.
  - d. conduction.
- 30. Identify the incorrect notation from the following**
- a.  $39^{\circ} 55' N 116^{\circ} 23' E$ .
  - b.  $28^{\circ} 43' N 77^{\circ} 18' E$ .
  - c.  $35^{\circ} 41' N 190^{\circ} 22' E$ .
  - d.  $55^{\circ} 45' N 37^{\circ} 37' E$ .
- 31. A plane that flies from Seattle to Tokyo on a great circle route is not likely to fly over**
- a. Unimak.
  - b. Kiská.
  - c. Fox Island.
  - d. New Brunswick.
- 32. Kostopolis is separated from Polis by a ground distance of 15 km. If these two cities are shown as being 5 cm apart, what is the R.F. scale of this map?**
- a. 1:250 000.
  - b. 1:100 000.
  - c. 1:300 000.
  - d. 1:500 000.
- 33. The location of Nicosia, Cyprus is given as  $35^{\circ} 10' N 33^{\circ} 22' E$ . Based on this information, the equivalent standard time for Nicosia is**
- a. 2 hours fast.
  - b. 3 hours slow.
  - c. 1 hour fast.
  - d. 1 hour slow.
- 34. As the earth revolves around the sun, the earth's axis remains parallel to its former positions. This characteristic is called:**
- a. constant inclination.
  - b. parallelism.
  - c. true bearing.
  - d. angle of incidence.

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- 35. If it is 6:00 a.m. Monday in Tokyo (140°E long.), what time is it in Rio de Janeiro (40°W long.)?**
- a. 6:00 p.m. Monday.**
  - b. 6:00 p.m. Sunday.**
  - c. 6:00 p.m. Tuesday.**
  - d. 6:00 a.m. Monday.**
- 36. The latitude of the Tropic of Cancer is :**
- a. 40° N.**
  - b. 33.5°N.**
  - c. 23.5° N.**
  - d. 66 .5° South.**
- 37. What is the solar altitude on summer solstice (June 21) for Mansfield, Ohio(41° N)?**
- a. 17.5**
  - b. 72.5**
  - c. 62.5**
  - d. 23.5**
- 38. The earth's rotational axis is inclined from the plane of the ecliptic.**
- a. 32.5 degrees.**
  - b. 63.5 degrees.**
  - c. 66.5 degrees.**
  - d. 23.5 degrees.**
- 39. Latitude measurement \_\_\_\_\_ as one moves away from the equator.**
- a. increases.**
  - b. decreases.**
  - c. does not vary.**
  - d. increases northwardly, decreases southwardly.**
- 40. Select the odd member from the following group:**
- a. stratosphere.**
  - b. lithosphere.**
  - c. hydrosphere.**
  - d. atmosphere.**

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- 41. Select the incorrect statement from the following.**
- a. visible light occupies areas that range between 0.4 and 0.7 microns in the electromagnetic spectrum.**
  - b. solar radiation travels in long waves and ground radiation is in the form of short waves.**
  - c. the midnight sun is visible in locations at 78°N.**
  - d. changes in the sun angle cause variations in the amount of solar energy reaching the earth's surface.**
- 42. Scattering results because of the presence of**
- a. gas molecules in the atmosphere.**
  - b. cloud particles.**
  - c. dust particles.**
  - d. X rays and ultraviolet rays.**
- 43. A map scale of 1/31,250 means that one inch on the map represents what on the ground?**
- a. 31,250 inches.**
  - b. 31,250 feet.**
  - c. 31,250 yards.**
  - d. 31,250 miles.**
- 44. All of the following statements are true except**
- a. insolation is the interception of solar energy by an exposed surface.**
  - b. albedo is the coefficient of electromagnetic radiation.**
  - c. return radiation is longwave radiation of atmosphere returned to the earth.**
  - d. the subtropical zone covers the area between 25 and 35N.**
- 45. If the earth-sun distance were the only significant factor involved in the surface temperature of the earth, which of the following days would you expect to be warmest in Mansfield, Ohio?**
- a. July 4.**
  - b. September 23.**
  - c. January 3.**
  - d. December 15.**

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- 46. The annual temperature range at most latitudes in the Southern Hemisphere is much smaller than that in the Northern Hemisphere. The reason for this is that:**
- a. the earth is closest to the sun during the Southern Hemisphere summer.**
  - b. less area is covered by desert in the Southern Hemisphere.**
  - c. rainfall and cloudiness are greater in the Southern Hemisphere.**
  - d. a greater proportion of the land surface is mountainous in the Southern Hemisphere.**
  - e. there is greater percentage of water surface in the Southern Hemisphere.**
- 47. Minimum insolation occurs in the midlatitude zone of the southern hemisphere on:**
- a. March 21.**
  - b. June 22.**
  - c. September 23.**
  - d. December 22.**
- 48. On March 21 (Spring Equinox) the number of hours of daylight in Mansfield, Ohio is approximately**
- a. 6.**
  - b. 12.**
  - c. 9.**
  - d. 15.**
- 49. A small-scale map:**
- a. shows small areas of the earth's surface.**
  - b. includes greater detail.**
  - c. has a small denominator in its representative fraction**
  - d. all of these.**
  - e. none of these.**
- 50. Which of the following is NOT a climatic element?**
- a. solar energy.**
  - b. altitude.**
  - c. precipitation.**
  - d. wind.**
- 51. Seasons are caused by:**
- a. the earth's angle of inclination alone.**
  - b. the earth's angle of inclination and position in orbit.**

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- c. **The earth's angle of inclination, position in orbit, and distance from the sun.**
  - d. **none of these.**
- 52. Two reasons the tropics get so hot during their summer solstices are that:**
- a. **the sun's rays are intense and they are in close proximity to the equator.**
  - b. **they are located in regions of warm ocean water and the day is long.**
  - c. **the day is long and the sun's rays are intense.**
  - d. **they are located in regions of warm ocean water and are near the equator.**
- 53. At the equator the sun at noon is never more than a certain number of degrees away from a line that is perpendicular to the earth's surface. How many degrees is this?**
- a. **30.**
  - b. **66.5.**
  - c. **23.5.**
  - d. **90.**
- 54. Maximum longitude is:**
- a. **180° E.**
  - b. **180° W.**
  - c. **90° N.**
  - d. **a and b only.**
  - e. **all of these.**
- 55. If the maximum temperature for a particular day is 26°C and the minimum temperature is 14°C, the daily mean would be:**
- a. **40°C**
  - b. **13°C**
  - c. **12°C**
  - d. **20°C**
  - e. **the daily mean cannot be determined with the data provided**
- 56. Heat:**

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- a. is the same as temperature.
  - b. refers primarily to intensity ("degree of hotness")..
  - c. always flows from colder objects toward warmer objects.
  - d. is a form of energy.
  - e. none of the above statements about heat is correct.
- 57. The number of degrees separating the ice point and the steam point:**
- a. is identical for both the Celsius and the Fahrenheit scales.
  - b. is identical for both the Kelvin and the Celsius scales.
  - c. is greater for the Celsius scale than for the Fahrenheit scale.
  - d. is identical for the Fahrenheit, Celsius, and Kelvin scales.
  - e. none of these.
- 58. Two cities are located at the same latitude (40°). City A is in the Southern Hemisphere and City B is in the Northern Hemisphere. Assume the two cities reflect the general characteristics of the hemispheres where they are located. Which city should have the warmer winter temperatures?**
- a. City A.
  - b. City B.
  - c. both cities should have the warmer winter temperatures.
  - d. both should have nearly identical annual temperature range.
- 59. All of the following statements are true except:**
- a. the seasonal shift isotherms is greater over the continents than over the ocean.
  - b. the Southern Hemisphere is also referred to as the water hemisphere.
  - c. negative values are not possible on the Celsius temperature scale.
  - d. isotherms are lines that connect points of equal value.
  - e. a Celsius degree is larger than a Fahrenheit degree by a factor of 1.8.
- 60. A poleward moving (northward moving in the Northern Hemisphere) ocean current is:**
- a. a warm current.
  - b. a cold current.

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- c. either a warm or cold current.**
- d. warm in summer and cold in winter.**
- e. none of the above .**