

Name: _____ Date: _____

**Geography 120 Earth Systems II. Atmosphere
EXAM 3 (v4). Winds, moisture, and air masses.
Instructor: Dr. Stavros T. Constantinou
Spring Quarter 1994**

Multiple Choice. Select the best answer and mark the appropriate letter on the computer sheet. Each question counts two points for a maximum of 100 points. Should you change your mind, please erase well.

1. On a surface weather map of a cyclone the cold front appears as a:
 - a. series of V-shaped bends in the isobars.
 - b. clear area.
 - c. broad band of stratus clouds and steady precipitation.
 - d. calm area.

2. During the summer monsoon in Southeast Asia:
 - a. weather is usually clear and dry.
 - b. winds blow southward from Central Asia.
 - c. air flows into Asia from the Indian Ocean.
 - d. air flows from low to high pressure.
 - e. a and d.

3. Instrument that measures atmospheric pressure.
 - a. thermometer.
 - b. anemometer.
 - c. barometer.
 - d. thermograph.
 - e. hygrometer.

4. Standard modern unit of atmospheric pressure.
 - a. inch.
 - b. centimeter.
 - c. millimeter.
 - d. foot.
 - e. millibar.

5. Center of high atmospheric pressure.
 - a. cyclone.
 - b. anticyclone.
 - c. depression.
 - d. Hadley cell.
 - e. Rossby wave.

6. The summer monsoon normally is associated with:
 - a. offshore winds.
 - b. a wet season.
 - c. high pressure conditions.
 - d. anticyclonic circulation.

7. Which of the following types of air mass is ordinarily not a factor in the winter weather of North America?
 - a. mT.
 - b. mA
 - c. mP.
 - d. cP.
 - e. cA.

8. The area where the NE trade winds meet the SE trade winds is called:
 - a. Intertropical Convergence Zone.
 - b. Easterly Wave.
 - c. NW Monsoon.
 - d. Subtropical Jet Stream.

9. When density remains constant and the temperature is lowered, the pressure of a gas will _____.
 - a. increase.
 - b. decrease.
 - c. remain the same.
 - d. there is no way of knowing whether the pressure will increase or decrease.

10. An altimeter is an adaptation of the :
 - a. anemometer.
 - b. mercurial barometer
 - c. millibar.
 - d. aneroid barometer.
 - e. none of these.

11. The force that generates wind is:
 - a. Coriolis force.
 - b. gravity
 - c. centrifugal force
 - d. friction.
 - e. none of these.

12. Which of these factors influence the magnitude of the Coriolis force?
 - a. wind speed.

Exam 2 Winds, moisture, and air masses

- b. latitude.
 - c. wind direction.
 - d. all of the above.
 - e. both a and b.
- 13. A steep pressure gradient:**
- a. would be depicted by widely spaced isobars.
 - b. produces strong winds.
 - c. is only possible in the tropics.
 - d. produces light winds.
 - e. none of these.
- 14. If the earth were not rotating:**
- a. the earth would lose its atmosphere.
 - b. air would move directly from higher to lower pressure.
 - c. all air would move in one direction only.
 - d. friction would be eliminated.
- 15. Upper air winds:**
- a. are generally faster than surface winds.
 - b. are unaffected by the Coriolis force.
 - c. are greatly influenced by friction.
 - d. all of these (a, b, and c).
 - e. both a and b.
- 16. High air pressure zones are usually associated with:**
- a. diverging winds.
 - b. descending winds.
 - c. clear weather.
 - d. relatively dry conditions.
 - e. all of these.
- 17. If "fair" weather is approaching, the pressure tendency would probably be:**
- a. steady.
 - b. falling.
 - c. rising.
 - d. pressure tendency has nothing to do with forecasting good or bad weather.
 - e. none of these.

Exam 2 Winds, moisture, and air masses

- 18. When air moves from the ocean onto land:**
- a. converging winds and ascending air result over the land.**
 - b. divergence and subsidence occur over the land.**
 - c. the winds tend to increase their speed.**
 - d. curved flow is initiated.**
 - e. any or all of these things may occur.**
- 19. In order to use the Beaufort scale, what instrument is necessary?**
- a. wind vane.**
 - b. barograph.**
 - c. anemometer.**
 - d. aneroid barometer.**
 - e. no instrument is necessary.**
- 20. Another name for the subtropic high is:**
- a. doldrums.**
 - b. subpolar calm.**
 - c. trades.**
 - d. horse latitudes.**
 - e. prevailing westerlies.**
- 21. The Sahara and Australian deserts (among others) are associated with which pressure belt?**
- a. equatorial low.**
 - b. subtropical high.**
 - c. subpolar low.**
 - d. polar high.**
- 22. The subpolar low (polar front) is:**
- a. a zone where the trade winds of the two hemispheres meet.**
 - b. the forward edge of the antarctic ice cap.**
 - c. a zone where the polar easterlies and the westerlies converge.**
 - d. the boundary between frozen and liquid ocean.**
- 23. Which of the following factors contributes to the general subsidence in the latitude zone 20° to 35°?**
- a. the Coriolis force.**
 - b. radiation cooling of the air.**
 - c. release of latent heat.**
 - d. all of these (a, b, and c) contribute to subsidence in this zone.**
 - e. both a and b.**

Exam 2 Winds, moisture, and air masses

- 24. Answer the following question by applying Buys Ballott's law: If an observer in the Northern Hemisphere is facing west and the wind is at the observer's back, where is the low pressure?**
- a. north of the observer.**
 - b. south of the observer.**
 - c. east of the observer.**
 - d. west of the observer.**
 - e. none of the these.**
- 25. All of the following statements are true except**
- a. during an El Niño event, the water temperatures in the eastern Pacific rise.**
 - b. the El Niño adversely affects the fish and bird population of coastal Peru, Ecuador, and Chile.**
 - c. when the Southern Oscillation occurs barometric pressure in the Indonesian region rises.**
 - d. major El Niño events primarily affect the weather of the eastern Pacific.**
 - e. none of these.**
- 26. When are upper air winds fastest?**
- a. in summer.**
 - b. in winter.**
 - c. anytime surface temperature gradients are weak.**
 - d. these winds maintain about the same speed throughout the year.**
 - e. both a and c.**
- 27. A Santa Ana (or Chinook or Foehn) wind is a:**
- a. wind associated with a blizzard.**
 - b. cold, damp wind blowing off snow fields.**
 - c. wind that is peculiar to the China mainland.**
 - d. very dry, warm wind coming down a mountain slope.**
 - e. none of these.**
- 28. Which of the following statements about airflow in the middle and upper troposphere is true?**
- a. the predominant flow is from the equator poleward.**
 - b. the predominant flow is easterly in the midlatitudes and westerly in the tropics.**
 - c. except near the equator, the flow is from west to east.**
 - d. the flow is predominantly from the poles toward the equator.**

Exam 2 Winds, moisture, and air masses

- e. none of these.
- 29. The dishpan experiments:**
- a. showed a simple convection cell pattern when the pan was rotated.
 - b. revealed a wavy circulation pattern when the pan was rotated.
 - c. were largely unsuccessful.
 - d. both a and c correctly characterize the dishpan experiments.
 - e. none of these statements relates to the dishpan experiments.
- 30. What option below best characterizes the rainfall distribution at a station located along the equator?**
- a. winter dry season.
 - b. summer dry season.
 - c. dry all year around.
 - d. adequate precipitation all year around.
- 31. What option below best characterizes the rainfall distribution at a station, such as New York City, located at about 40°N. latitude?**
- a. winter dry season.
 - b. summer dry season.
 - c. dry all year around.
 - d. adequate precipitation all year around.
- 32. What option below best characterizes the rainfall distribution at a station located south of the Sahara desert at about 20°N. latitude?**
- a. winter dry season.
 - b. summer dry season.
 - c. dry all year around.
 - d. adequate precipitation all year around.
- 33. What option below best characterizes the rainfall distribution at a station located on an island in the Arctic Ocean at about 80°N. latitude?**
- a. winter dry season.
 - b. summer dry season.
 - c. dry all year around.
 - d. adequate precipitation all year around.

Exam 2 Winds, moisture, and air masses

- 34. What option below best characterizes the rainfall distribution at a nondesert station located immediately to the north of the Sahara desert?**
- a. winter dry season.**
 - b. summer dry season.**
 - c. dry all year around.**
 - d. adequate precipitation all year around.**
- 35. When an area is experiencing several consecutive days of rather constant weather, it is experiencing:**
- a. warm-front weather.**
 - b. cold-front weather.**
 - c. air-mass weather.**
 - d. occluded front weather.**
 - e. none of these.**
- 36. An air mass form the Gulf of Mexico is called:**
- a. cP.**
 - b. mP.**
 - c. cT.**
 - d. mT.**
- 37. A cT air mass is:**
- a. cold and dry.**
 - b. cold and humid.**
 - c. warm and dry.**
 - d. warm and humid.**
 - e. none of these.**
- 38. An mP air mass is:**
- a. dry and cold.**
 - b. humid and cold.**
 - c. dry and warm.**
 - d. humid and warm.**
 - e. none of these.**
- 39. The air masses that have the greatest influence on weather conditions in the Midwestern United States are:**
- a. cP and mT.**
 - b. mp and cP.**
 - c. cT and mA.**
 - d. mP and mA.**

Exam 2 Winds, moisture, and air masses

- e. mT and cT.
40. An air mass source region:
- a. is best typified by the central United States.
 - b. is generally an area characterized by a cyclone circulation pattern.
 - c. may consist of both land and water.
 - d. is characterized by a general stagnation of atmospheric circulation.
 - e. any or all of these.
41. Which of the following is not an air mass that influences North America?
- a. mT.
 - b. mA.
 - c. mP.
 - d. cP.
 - e. cA.
42. When an air mass is warmer than the surface over which it is moving:
- a. the letter k is added after the air mass symbol.
 - b. the air becomes more stable.
 - c. the lapse rate in the air mass is increased.
 - d. visibility within the air mass is usually very good.
 - e. all of these.
43. The _____ air mass may produce an occasional "northeaster" in the winter.
- a. mT
 - b. cP
 - c. mP
 - d. cT
 - e. none of these
44. In North America the _____ air mass forms only in the summer.
- a. mT
 - b. cP
 - c. mP
 - d. cT
 - e. none of the above.
45. The _____ air mass provides much of the moisture for precipitation in the central and eastern United States.

Exam 2 Winds, moisture, and air masses

- a. mT
 - b. cP
 - c. mP
 - d. cT
 - e. none of these
46. "Lake-effect" snow is associated with the _____ air mass.
- a. mT
 - b. cP
 - c. mP
 - d. cT
 - e. none of these
47. The _____ air mass often originates as a different air mass in Siberia and is subsequently altered.
- a. mT
 - b. cP
 - c. mP
 - d. cT
 - e. none of these.
48. In 1918, J. Bjerknes published what came to be known as the polar front theory. Which one of the following statements is correct regarding this theory?
- a. Although it was useful at the time, it is no longer a useful model.
 - b. The main features of the theory remain an important part of present-day meteorological thought.
 - c. It was shown to be applicable only to winter storms in the Southern Hemisphere.
 - d. The polar front theory was largely incorrect from the very beginning.
 - e. none of the above.
49. If you were 200 kilometers ahead of the surface position of a warm front, you would find the frontal surface at the height of _____ km overhead.
- a. 0.5
 - b. 1
 - c. 1.5
 - d. 2
 - e. 2.5

Exam 2 Winds, moisture, and air masses

- 50. Another common term for the wave cyclone is:**
- a. tropical cyclone.**
 - b. anticyclone.**
 - c. polar front cyclone.**
 - d. intertropical convergence zone.**
 - d. none of these.**
- 51. On a weather map, _____ fronts are shown with triangular points on one side of the front and semicircles on the other.**
- a. warm**
 - b. cold**
 - c. occluded**
 - d. stationary**
- 52. When the center of a mature wave cyclone passes to the south, you should expect:**
- a. to be influenced by an occluded front.**
 - b. to experience a backing wind shift.**
 - c. generally fair weather.**
 - d. all of these (a, b, and c).**
 - e. both a and b.**
- 53. Rain long foretold, long last; short notice, soon past. The first five words of this weather proverb:**
- a. refer to a cold front.**
 - b. refer to a warm front.**
 - c. refer to an anticyclone.**
 - d. have no basis in fact.**
 - e. refer to the formation of cumulonimbus clouds,**