Name: _____ Class: _____ Date: _____ ID: A

Meteorology Short Study Guide

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

____ 1. Current, short-term variations in the atmosphere are referred to as ____.
a. humidity
b. lapse rate
c. weather
d. the ionosphere

____ 2. The Coriolis effect is due to the ____ of Earth.
a. revolution
b. rotation
c. shape
d. density

____ 3. Low-pressure systems are usually associated with ____ weather.
a. cold and dry
b. cloudy and rainy
c. sunny and dry
d. warm and humid

____ 4. A(n) ____ forecast involves comparing current weather patterns to patterns that took place in the past.
a. real-time
b. digital
c. analog
d. comparative

____ 5. Whether the day will be rainy or dry can be predicted somewhat accurately by a long-term forecast at the ____ range.
a. one- to two-month
b. four- to seven-day
c. one- to three-day
d. one- to two-week

____ 6. Low-pressure systems that heavily influence weather in the middle latitudes are ____.
a. polar easterlies
b. wave cyclones
c. air masses
d. warm fronts

____ 7. A weather instrument that measures the height of clouds and estimates the amount of cloud cover is a(n) ____.
a. hygrometer
b. anemometer
c. ceilometer
d. barometer

____ 8. Polar and tropical regions maintain fairly constant average temperatures because ____.
a. the Sun always strikes these regions at the same angle
b. air masses remain stationary near the poles and equator
c. Earth radiates extra energy back into space
d. the continual motion of air and water reallocates heat energy throughout Earth

____ 9. Lines on a map that connect points of equal or constant values are ____.
a. boundaries
b. isopleths
c. fronts
d. station models

____ 10. The exchange of heat or moisture with the surface over which an air mass travels is known as ____.
a. intertropical convergence
b. air mass modification
c. occlusion
d. air mass exchange

Matching

Match each item with the correct source region below.

a. warm and humid
b. cold and dry
c. cool and humid
d. warm and dry

____ 11. Maritime tropical (Gulf of Mexico)
____ 12. Continental tropical (southwestern desert of the United States)
____ 13. Continental polar (central Canada)

Match each item with the correct statement below.

a. trade winds
b. polar easterlies
c. prevailing westerlies
d. jet streams

____ 14. Winds occurring between 30° north and south latitude and the equator
____ 15. Winds that flow between 30° and 60° north and south latitude

Short Answer

16. Describe how a cool, dry air mass can modify into a warm, moist air mass.
17. Compare and contrast the information produced by Doppler radar and traditional weather radar.
18. What advantages does infrared imagery have over visible-light imagery?

Compare and contrast each pair of related terms or phrases.

19. thermometer, barometer
20. Explain how air masses form, and how they help redistribute energy on Earth's surface.
21. Describe the formation and location of jet streams.
22. What problems are associated with long-term weather forecasts?
23. There are six weather instruments collecting weather data in a city you are about to visit: an anemometer, a barometer, a ceilometer, a hygrometer, a radiosonde, and a thermometer. You need information that will allow you to dress properly when you arrive. You can have the data from just three of the instruments. Which ones would you pick and why?
24. Explain how infrared imagery has the potential to save lives.

A meteorology class has set up a small weather station outside of school. It has a few simple instruments: a thermometer, a barometer, a rain gauge to measure rainfall, and a hygrometer. The students took measurements with the instruments once a day for a week. They then filled in the chart below. The barometer broke, so they were not able to finish collecting air-pressure data.

Use the chart and what you know about weather systems and weather forecasting to answer the following questions.

	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
Average temperature (°C)	23.3	22.2	22.2	15.6	16.7	16.7	17.8
Rainfall (cm)	0	0	3.31	0	0	0	0
Relative humidity	40%	60%	100%	80%	60%	50%	40%
Air pressure (mb)	1000	998	—	—	—	—	—

25. Given the relative humidity on Thursday, would you expect clear or cloudy skies?

Problem

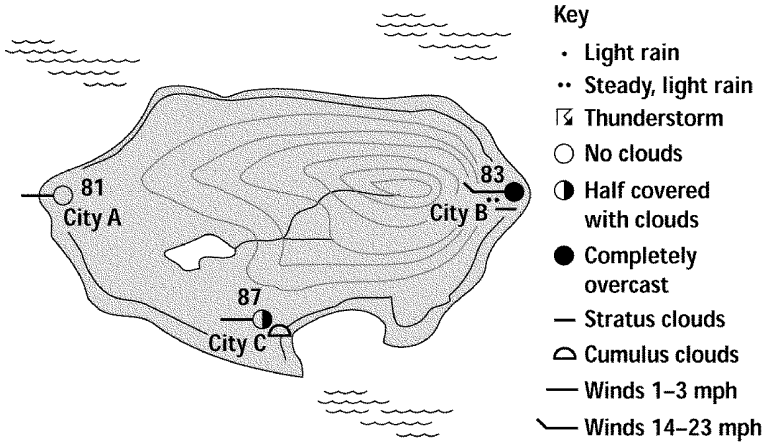
26. Fill in the chart below with the correct type of front. Use the following terms: *cold front, occluded front, stationary front, warm front.*

Movement of air masses	Type of front
An advancing warm air mass displaces a cold air mass and glides over the top of it.	a.
Two air masses with similar temperatures and pressures meet, and neither advances into the other's territory.	b.
A cold, dense air mass displaces a warm air mass and forces the warm air to rise steeply.	c.
A warm air mass is squeezed upward between two cold air masses.	d.

27. Fill in the chart below with the names of the correct weather instruments. Use the following terms: *anemometer, barometer, ceilometer, hygrometer, radiosonde, thermometer.*

What weather instrument does	Weather instrument name
Measures relative humidity	a.
Measures temperature	b.
Measures height of cloud layers and estimates percentage of sky covered by clouds.	c.
Measures wind speed	d.
Measures air pressure	e.

Answer the following questions based on the weather chart below.



28. In which city is it raining?

29. Describe the weather at City A.

30. Describe the weather at City C.

Meteorology Short Study Guide
Answer Section

MULTIPLE CHOICE

1. C
2. B
3. B
4. C
5. C
6. B
7. C
8. D
9. B
10. B

MATCHING

11. A
12. D
13. B

14. A
15. C

SHORT ANSWER

16. A cool, dry air mass could move over a warm, moist part of Earth's surface, such as a warm body of water. The air mass would then take on characteristics of the new surface beneath it, becoming warmer and moister.
17. Both allow meteorologists to gather data about areas of precipitation. Traditional weather radar allows meteorologists to track the location of precipitation, whereas Doppler radar allows meteorologists to estimate wind speeds associated with areas of precipitation, including those in thunderstorms and tornadoes.
18. Visible-light imagery doesn't work in darkness, while infrared imagery does. Unlike visible-light imagery, infrared imagery allows meteorologists to detect differences in thermal energy that can pinpoint cloud location and type, including large cumulonimbus clouds that can mean severe weather. Infrared imagery can also map surface temperatures, which visible-light imagery cannot detect.
19. Both are weather instruments. A thermometer measures temperature, while a barometer measures air pressure.
20. A large mass of air takes on the temperature and humidity characteristics of the land or water under it. An air mass redistributes energy by moving from place to place, transferring energy from one area to another.

21. Jet streams are narrow bands of fast, high-altitude westerly winds that form as a result of great differences in temperature and pressure between the boundaries of the major wind systems. They form in the midlatitudes between the polar easterlies and the prevailing westerlies, and between the prevailing westerlies and the trade winds.
22. Forecasts become less reliable when they attempt to predict long-term changes in weather. This is because many factors affect the weather and, over time, all these factors interact to create progressively more complicated scenarios that are difficult to predict.
23. Possible response: Anemometer, thermometer, hygrometer, or ceilometer; these instruments would give you data on wind speed, temperature, relative humidity, or cloud cover, which would be useful in choosing clothing. The data from the barometer (air pressure) and radiosonde (high-level data) would be much less useful.
24. It allows meteorologists to determine the temperature of a cloud. From this, they can infer the cloud type and estimate its height. Because the strength of a thunderstorm is related to its height, infrared imagery gives data that can predict a storm's potential severity. When people have advance warning of a severe storm, they can take precautions.
25. The high relative humidity indicates cloudy skies.

PROBLEM

26. a. warm front
    b. stationary front
    c. cold front
    d. occluded front
27. a. hygrometer
    b. thermometer
    c. ceilometer
    d. anemometer
    e. barometer
28. City B
29. It is clear, 81° Fahrenheit, with light winds blowing at 1–3 mph. Students do not have to know wind direction.
30. It is partly cloudy with about half the sky covered by clouds, 87° Fahrenheit, with light winds blowing at 1–3 mph. Students do not have to know wind direction.