

Meteorology Key

Holt Invitational
2016

Multiple Choice (each worth 1 point)

Identify the choice that best completes the statement or answers the question. Write your choice on the line.

___B___ 1. The most abundant gas in the stratosphere is:

- a. Oxygen (O₂)
- b. Nitrogen (N₂)
- c. Ozone (O₃)
- d. Carbon Dioxide (CO₂)

___A___ 2. An isobar is a line of constant _____.

- a. Pressure
- b. Temperature
- c. Density
- d. Dew point

___D___ 3. The season's winter, spring, summer and fall are a direct result of what phenomenon?

- a. Shifting of ocean currents
- b. The sun's energy output and the Earth's proximity to the sun
- c. The jet stream
- d. The 23.5° tilt of the Earth

___B___ 4. _____ refers to the horizontal transport of air while _____ is the vertical transport of air.

- a. Convection, advection
- b. Advection, convection
- c. Advection, conduction
- d. Conduction, advection

___A___ 5. When viewed from above the North Pole of the Earth, the Earth rotates _____ and makes a complete turn in 24 hours. This causes low pressure to spin counterclockwise in the Northern Hemisphere.

- a. Counterclockwise
- b. Clockwise

___C___ 6. In a volume of air near the earth's surface, _____ occupies 78% and _____ nearly 21%.

- a. Hydrogen, oxygen
- b. Hydrogen, helium
- c. Nitrogen, oxygen
- d. Nitrogen, water vapor

___C___ 7. In the stratosphere, the air temperature normally:

- a. Both increases and decreases depending on the season
- b. Cannot be measured
- c. Increases with increasing height

d. Decreases with increasing height

___A___ 8. The rate at which temperature decreases with increasing altitude is known as the:

- a. Lapse rate
- b. Sounding
- c. Thermocline
- d. Temperature slope

___B___ 9. Where cold surface air replaces warm air, the boundary separating the different bodes of air is:

- a. A warm front
- b. A cold front
- c. A tornado
- d. A parallel of latitude

___C___ 10. Meteorology is the study of:

- a. Landforms
- b. The oceans
- c. The atmosphere
- d. Outer space

___D___ 11. In July, at middle latitudes in the Northern Hemisphere, the days is _____ long and is _____ with each passing day.

- a. Less than 12 hours; getting shorter
- b. Less than 12 hours; getting longer
- c. More than 12 hours; getting shorter
- d. More than 12 hours; getting longer

___A___ 12. The atmospheric layer in which we live is called the:

- a. Troposphere
- b. Stratosphere
- c. Thermosphere
- d. Exosphere

___D___ 13. Suppose last night was clear and calm. Tonight there will be low clouds. From this we can conclude that tonight's minimum temperature will be:

- a. Above freezing
- b. The same as last night's minimum temperature
- c. Lower than last night's minimum temperature
- d. Higher than last night's minimum temperature

___D___ 14. The term "normal" refers to weather data averaged over:

- a. Several months
- b. At least a day
- c. One year
- d. Thirty years

- ___B___ 15. The Coriolis Force is greatest near:
- The equator
 - The North and South Poles
 - Only near oceans
 - Near the mountains

True and False (each worth 1 point)

Indicate whether the statement is true or false by writing a T or F on the line.

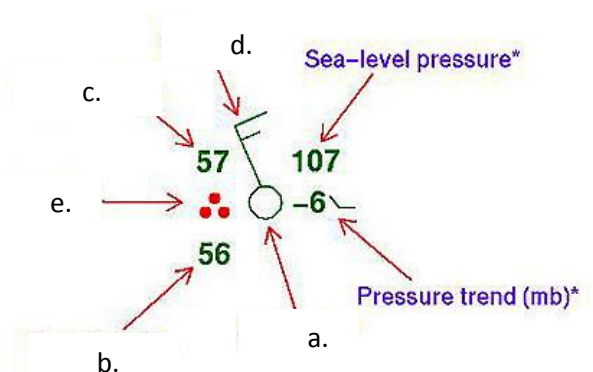
- ___T___ 16. Fog is major hazard to aviation.
 ___F___ 17. On a skew-t, the moist and dry adiabat lines are nearly parallel.
 ___T___ 18. Carbon dioxide is a naturally-occurring component of the atmosphere.
 ___F___ 19. The three energy transfer mechanisms are radiation, conduction, and condensation.
 ___F___ 20. A Chinook wind is formed at the edges of oceans so it is moist and warm.
 ___F___ 21. Cloudy nights are generally cooler than cloudless nights.
 ___T___ 22. The Beaufort Scale measures wind strength.
 ___F___ 23. A sling psychrometer measures wind speed.
 ___T___ 24. An anemometer measures wind speed.

Labeling (each worth 1 point)

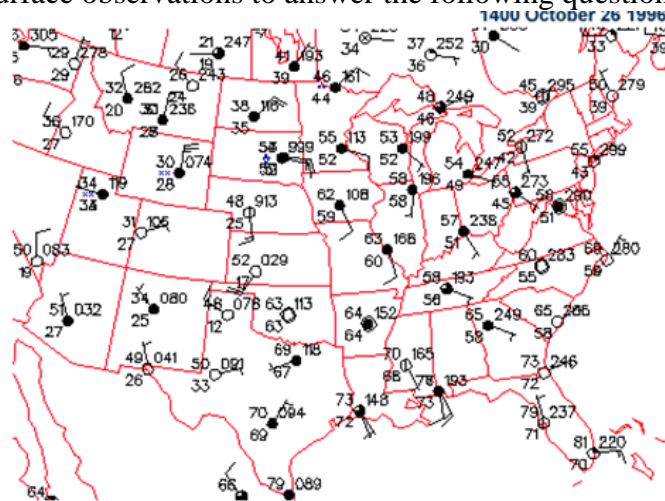
Make sure to write very clearly. If your handwriting can not be read it will be marked wrong.

25. Label what type of meteorological data is represented by each letter.

- CLOUD COVER
- DEW POINT TEMPERATURE
- TEMPERATURE
- WIND BARB OR DIRECTION
- PRESENT WEATHER (RAIN, SNOW, ETC)



26. Use the map of surface observations to answer the following questions.



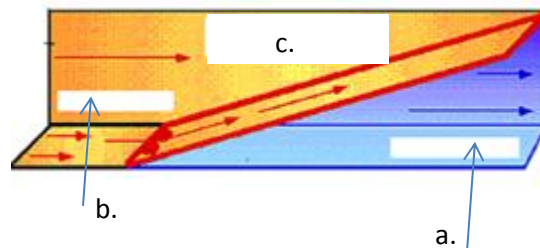
- a. What is the temperature in Des Moines, Iowa? **62° F**
- b. What is the dew point temperature in Phoenix, Arizona? **27° F**
- c. What is the pressure in Dallas, Texas? **1011.8 MILLIBARS (MB)**
- d. What is the report of cloud cover in Chicago, Illinois? **OVERCAST OR 100%**
- e. What is the speed and direction of wind in Miami, Florida? **EAST** and **15 KNOTS**

27. Read each scenario and determine whether precipitation will be likely or unlikely. *Write likely or unlikely on the line.*

- UNLIKELY** a. A cold front is approaching from the west, but the air both ahead of and behind the front is very dry.
- LIKELY** b. A warm front is approaching and the air behind and ahead of the front is very moist.
- LIKELY** c. Upslope winds are expected in Boulder, Colorado and the air has been very moist for the past couple of days.

28. The diagram below is a vertical cross-section through two air masses and the frontal boundary separating them. Fill in the missing components (where the letters a, b and c are).

- a. **COLD DRY AIR MASS**
- b. **WARM FRONT**
- c. **WARM MOIST AIR MASS**



#1 Light [Symbol]	#2 Light [Symbol] Moderate [Symbol]	#3 Light [Symbol] Moderate [Symbol]
#4 Heavy [Symbol]	[Symbol] Heavy [Symbol]	#5 [Symbol]
Light Shower [Symbol]	#6 Moderate Shower [Symbol]	FREEZING RAIN Light [Symbol]
Moderate Shower [Symbol]	[Symbol]	Moderate [Symbol]
#7 Heavy T-storm [Symbol]	OTHER Haze [Symbol]	Ice Crystals [Symbol]

1. RAIN

2. SNOW

3. DRIZZLE

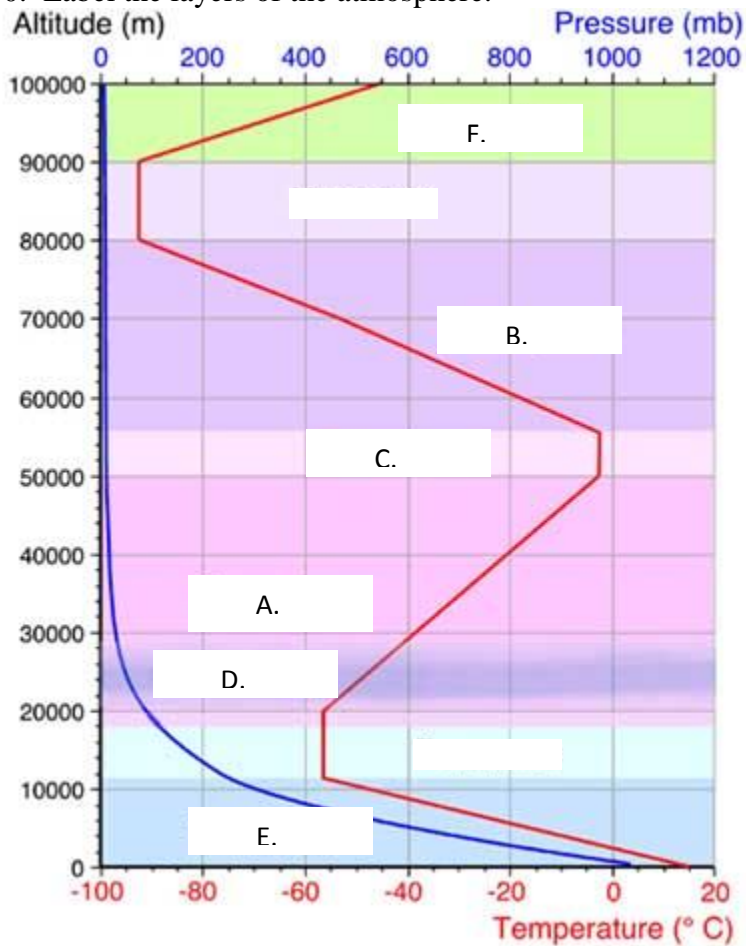
4. MODERATE RAIN

5. HEAVY DRIZZLE

6. LIGHT SNOW SHOWER

7. THUNDERSTORM

30. Label the layers of the atmosphere.



a. STRATOSPHERE

b. MESOSPHERE

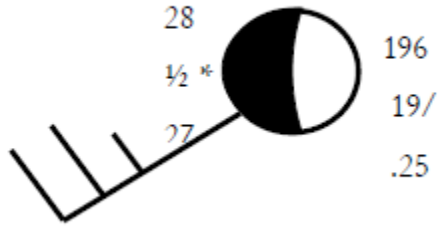
c. STRATOPAUSE

d. OZONE LAYER

e. TROPOSPHERE

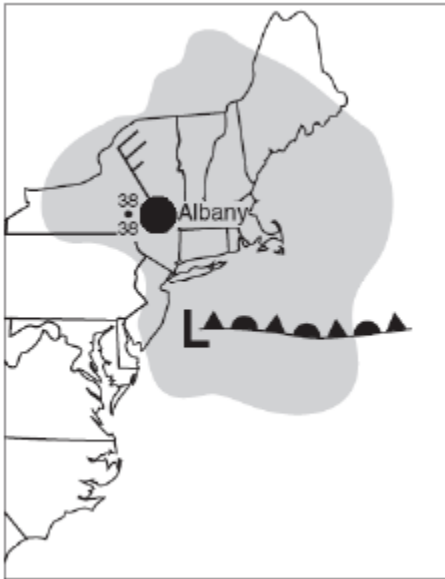
f. THERMOSPHERE

31. Using the following weather station, complete the information in the table.



Amount of cloud cover **50%**
Precipitation (past 6 hours) **0.25 IN**
Temperature (F°) **28 °F**
Direction of the wind **SW**

32. Use the weather map to answer the questions. The L is the center of the low. The shaded portion represents an area of precipitation.



A. What type of front extends eastward from the low-pressure center?

OCCLUDED FRONT

B. Complete the weather data for Albany, New York based on the station model shown on the map.

Relative humidity (%) **100%**
Wind direction from **NW**
Wind speed (knots) **25**
Present weather **RAIN**

33. Write what the following weather instruments measure:

a. Thermometer:

TEMPERATURE

b. Anemometer:

WIND SPEED

c. Barometer:

ATMOSPHERIC PRESSURE

34. What information do you need in order to calculate:

a. wind chill: **CURRENT AMBIEN TEMPERATURE AND WIND SPEED**

c. Heat index: **AIR TEMPERATURE AND RELATIVE HUMIDITY**

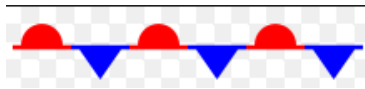
35. Draw the following weather symbols:
a. warm front



b. cold front



c. stationary front

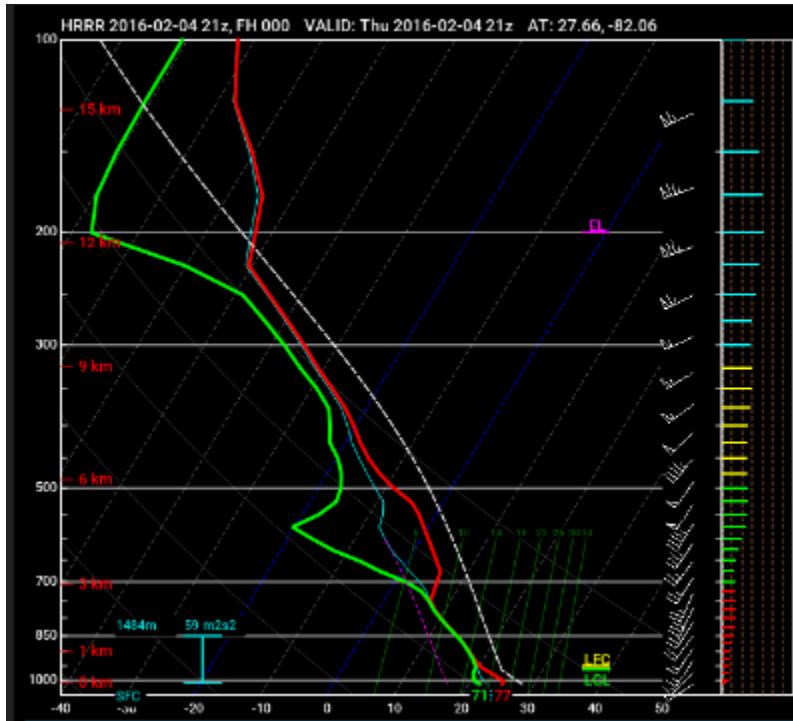


d. Occluded front



Tie Breakers: Fill out both questions. These will only be used in order to break a tie.

Tie Breaker #1: Looking at the skew-t diagram, is it likely or unlikely this area will have precipitation? Explain how you know.



IT IS LIKELY BECAUSE WHEN IT THE TWO LINES ARE CLOSE TOGETHER OR OVER LAPPING UNDER 700 MILLIBARS

Tie Breaker #2: IPCC is an abbreviation for what?

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Tie Breaker #3: What is a radiosonde?

A BATTERY POWERED INSTRUMENT CARRIED INTO THE ATMOSPHERE BY A WEATHER BALLOON. IT MEASURES ATMOSPHERIC PARAMETERS AND TRANSMITS THEM BY RADIO TO A GROUND RECIEVER.