

**Fill in the appropriate letter**

1. Atmospheric conditions described for **October 18, 2003 at Boston, Massachusetts** are best stated as \_\_\_\_\_.
  - a. dynamic weather
  - b. synoptic weather
  - c. physical weather
  - d. marine weather
  
2. The agency most directly concerned with weather forecasting for U.S. is \_\_\_\_\_.
  - a. NOAA
  - b. FAA
  - c. NWS
  - d. NO
  - e. EPA
  
3. In describing climate, it has been stated as the average weather \_\_\_\_\_.
  - a. by the weather reporting stations
  - b. rainfall and temperature
  - c. both a and b
  - d. in a given place for thirty years
  
4. According to the Kinetic-Molecular Theory of Gases, which of the following is a salient consideration? \_\_\_\_\_.
  - a. gaseous matter is composed of molecules
  - b. molecules are in continuous motion
  - c. high temperature increase velocity
  - d. all of the above
  - e. none of the above
  
5. Of the following, which is not a gas of the heterosphere?
  - a. Se
  - b. N<sub>2</sub>
  - c. O<sub>2</sub>
  - d. He
  - e. H<sub>2</sub>
  
6. The gas molecules making up **90%** of the atmosphere of the earth is (are) \_\_\_\_\_.
  - a. H<sub>2</sub>
  - b. N<sub>2</sub>
  - c. oxygen
  - d. He
  - e. Both b and c
  
7. Warm air: greater water vapor, as cool air is to \_\_\_\_\_.

- a. great rain
- b. less water vapor **available**
- c. **cirrus clouds**
- d. **high winds**
- e. none of the above

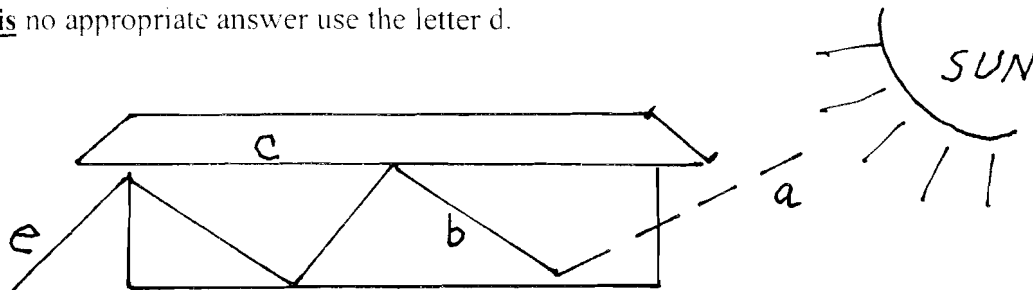
8. If you were to choose one single cause for our weather it would be \_\_\_\_\_.

- a. solar energy
- b. cool **ocean currents**
- c. wind
- d. mountains
- e. none

9. It has been state that 35% of solar energy is reflected back into space. This is described as \_\_\_\_\_.

- a. adiabatic lapse rate
- b. albedo
- c. wet adiabatic
- d. solar insulation
- e. reflection coefficient index

This is a greenhouse. Use the diagram to answer the following questions. With the letters a, b, c, e. If there is no appropriate answer use the letter d.



- 10. Short wave radiation is at point \_\_\_\_\_.
  - 11. **Lowest energy radiation is at point** \_\_\_\_\_.
  - 12. Atmospheric energy heated by long wave radiation. \_\_\_\_\_.
  - 13. High energy radiation is at point \_\_\_\_\_.
  - 14. Condensation occurs at point \_\_\_\_\_.
  - 15. We can safely state that 100% of **earth's weather occurs within the** \_\_\_\_\_.
- a. troposphere
  - b. tropopause
  - c. stratosphere
  - d. ionosphere
  - e. both a and c

16. In the ionospheric levels, which of the following is not a subdivision \_\_\_\_\_.

- a. D
- b. E
- c. F
- d. F<sub>2</sub>
- e. W-1-006

17. You are a partner in a vacation development area in the south-eastern part of sub Sahara Africa. Your prime time is December to March. That is an example of \_\_\_\_\_.

- a. altitudinal change and sensible heat
- b. K-M Theory of gas
- c. Thermal cycle and latitudinal change
- d. none of the above
- e. summer

18. Low 28.64, as high is to \_\_\_\_\_.

- a. 1004 mb
- b. 14.1 psi
- c. 1016 ft
- d. 14.9 psi
- e. both c and d

19. Barometer: 29.92 as altimeter is to \_\_\_\_\_.

- a. 1004 mb
- b. 14.1 psi
- c. 0.00 ft
- d. 1500 ft
- e. can't tell

20. If my air pressure at sea level was 29.92 inches and I ascended vertically in a helicopter to 3500 ft. my air pressure would then be \_\_\_\_\_.

- a. 29.92
- b. 29.0
- c. 27.10
- d. 26.20
- e. can't tell

21. A mass movement of horizontal air along a thermo-pressure gradient is called \_\_\_\_\_.

- a. adiabatic cooling
- b. normal lapse rate
- c. mental lapse rate
- d. wind
- e. breeze

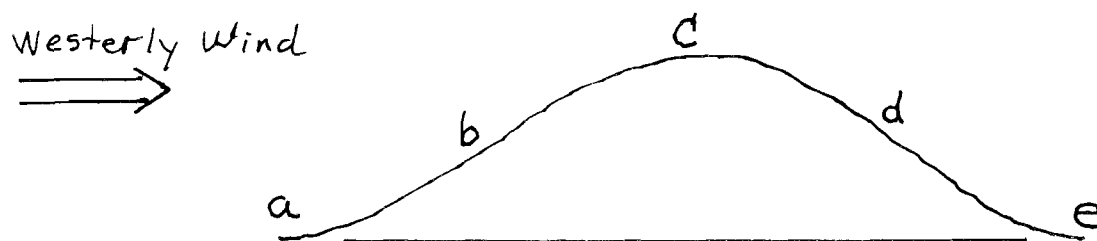
## MATCHING

- |                            |                        |
|----------------------------|------------------------|
| 22. Westerly               | a. 30 - 60 No          |
| 23. NE Monsoon             | b. polar Southeasterly |
| 24. SE                     | c. hot, dry            |
| 25. South West Monsoon     | d. southern wind       |
| 26. High pressure and cold | e. 0 - 5° N and S      |
| 27. Polar Northeasterly    |                        |
| 28. Southwesterly          |                        |
| 29. calm                   |                        |
| 30. Northwesterly          |                        |

31. Liquid: solid, as rain is to \_\_\_\_\_.

- sleet
- hail
- snow
- all of the above
- none of the above

We have a 12,000 ft. mountain drawn below. Study the diagram and answer the following



- Initial compression of air occurs at \_\_\_\_\_.
- Probable area of air saturation \_\_\_\_\_.
- Lowest temperature on mountain \_\_\_\_\_.
- Highest temperature \_\_\_\_\_.
- Region of moderate air expansion \_\_\_\_\_.
- Windward side of mountain \_\_\_\_\_.
- Leeward side of mountain \_\_\_\_\_.

39. In suggesting a wind coming from the North - west, which of the following are operant?

- Ferrel's Law
- Coreolis effect
- Langley
- Pitot
- Both a and b

40. A continental air mass in northern hemisphere in winter would best be described as \_\_\_\_\_.

- cold, wet
- cold, dry
- warm, wet warm, dry
- none of these

41. In an area of air mass meeting with a vertical component of less than 300 ft., the probable response is \_\_\_\_\_.

- a. rain
- b. fog
- c. snow
- d. any none of these

42.  $RH = AH / C$  and your air mass at 80° has a measure of humidity of 11 grains what is the probably absolute humidity? \_\_\_\_\_.

- a. 66.23%
- b. 40%
- c. 40 grains
- d. 33.13%
- e. 50%

### **MATCHING CLOUDS**

- |                  |             |
|------------------|-------------|
| 43. alto cirrus  | a. high     |
| 44. cumulonimbus | b. middle   |
| 45. stratonimbus | c. low      |
| 46. cumulus      | d. vertical |
| 47. fog          |             |
| 48. mares tail   |             |
| 49. c i          |             |
| 50. n s          |             |
| 51. cu           |             |

52. If  $LCL = T_a - T_p / 4.5$  we can assume \_\_\_\_\_.

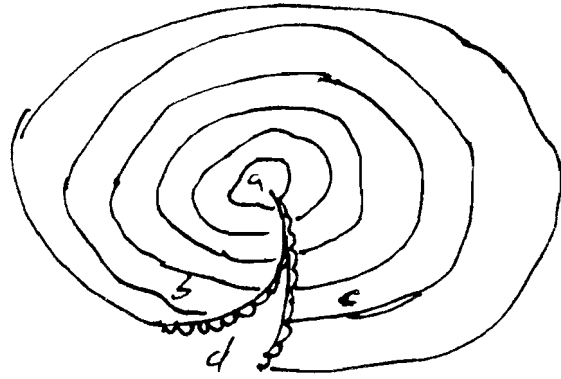
- a. altitude where clouds begin
- b. maximum length of clouds
- c. altitude where clouds end
- d. none of the above
- e. dew point temperature

53. An A C air mass that comes to Boston in the summer is \_\_\_\_\_.

- a. hot and dry
- b. cold and wet
- c. hot and wet
- d. cold and dry

54. A similar situation to question 53, but in winter, would be
- hot and dry
  - cold wet
  - hot and wet
  - cold and dry

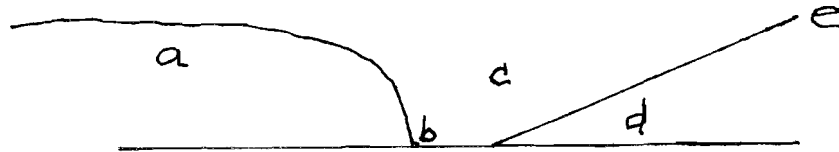
**Diagram for questions 55-58**



- |                |                  |
|----------------|------------------|
| 55. cold front | 56. warm sector  |
| 57. warm front | 58. low pressure |

**In the following diagram choose the appropriate nomenclature for the corresponding letters. (Questions 59-61)**

- cold front
- cirrus clouds
- warm sector
- nimbostratus
- warm front



64. Which of the following are indicative of a warm front?
- average slope 1/100
  - clouds far in advance of front (500-700 miles)
  - stratiform clouds
  - rain increases as front approaches
  - all of the above
65. Which of all the following are indicative of a cold front?
- heavy clouds ahead of front
  - heavy precipitation ahead of front
  - steep slope
  - possible thunder storms
  - all of the above

### Matching

- |                            |                                     |
|----------------------------|-------------------------------------|
| 66. orographic storm       | a. deals with liquid and gas        |
| 67. expanding air-unstable | b. land/sea, mountain and valley    |
| 68. Chinook                | c. shallow gradient                 |
| 69. heat of evaporation    | d. 1, 7, 1, 7                       |
| 70. coreolis effect        | e. cumulo-nimbus                    |
| 71. convection cells       | a. mechanical rise                  |
| 72. synoptic weather       | b. causes deserts                   |
| 73. slow, cold front       | c. cold, cool, warm, quick rain     |
| 74. occlusion              | d. hurricane                        |
| 75. high velocity wind     | e. shallow gradient                 |
|                            | a. wind deformation – right or left |

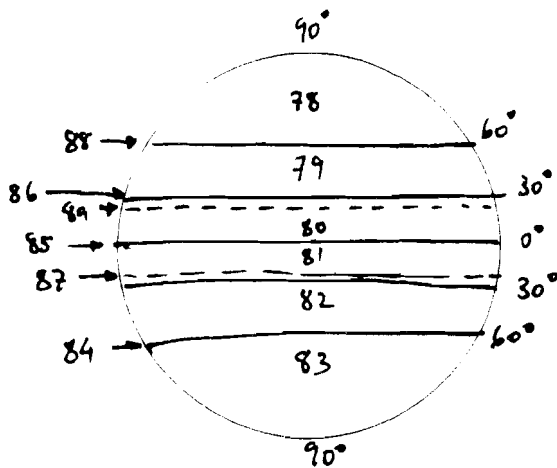
76. Solid - liquid as hail: (best answer)

- a. fog
- b. dew
- c. drizzle
- d. smog
- e. none of these

77. If  $RH = 100 \times \frac{AH}{C}$  and an air mass at 60° and a capacity of 6.24 grains your probable Relative Humidity is \_\_\_\_\_.

- a. 27%
- b. 14.7 psi
- c. 1013.2 mb
- d. 147 gr
- e. .014 gr

### PLANETARY WINDS (78 - 89)



- a. calm
- b. easterly
- c. westerly
- d. Tropic of Capricorn
- e. Tropic of Cancer

Winds Referred to in (78 - 89)

- 90. Polar northwesterly
- 91. Southwesterly
- 92. Northeasterly
- 93. Southeasterly
- 94. Northwesterly
- 95. Polar Southeasterly

- a. relatively warm wind
- b. relatively cold wind
- c. can't tell

96. Donora: Meuse: \_\_\_\_\_ as smog: geographic location

- a. Washington
- b. Moscow
- c. London
- d. Boulder
- e. None

97. Primary pollution occurs in the atmosphere because of interactions between among secondary sources

A. True

B. False \_\_\_\_\_

98. The greatest source of VOC's are industrial processes.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

99. Over 2/3 of Carbon Monoxide pollution comes from internal combustion engines and stationary power plants.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

100. Sulfur dioxide is a leading cause in acid rain.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

101. Nitrogen oxides form smog and contributes to acid rain.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

102. A photochemical reaction that irritates eyes, damages vegetation and may cause asthma is

\_\_\_\_\_

a. P AH

b. BLAH

c. PAN

d. POD

e. DEM

103. The primary agency in the US concerned with air pollution is \_\_\_\_\_

a. NOAH

b. NASA

c. ASA

d. EPA

e. DEM

104. Temperature inversions and occlusions may contribute to air pollution.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

105. Acid: Base as \_\_\_\_\_: 14

a. 2

b. 4

c. 6

d. 8

e. all except d



106. Tropical cyclones with winds in excess of 100 mph are \_\_\_\_\_.

- a. tornadoes
- b. hurricanes
- c. water spouts
- d. gales
- e. all of those

107. Tropical cyclones with winds in excess of 130 km are \_\_\_\_\_.

- a. cyclones
- b. typhoons
- c. hurricanes
- d. all of them
- e. none of them

108. Eye walls of hurricanes are areas of high winds, low pressure and calm.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

109. Tropical hurricanes: tropical storm: tropical depression as fastest: fast : \_\_\_\_\_.

- a. standing
- b. stopped
- c. slow
- d. surging
- e. stalled

110. In many instances more deaths occur from storm surges than winds in tropical hurricanes.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

111. Hurricane watch suggests imminent danger.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

112. Rank 1-5

a. Five

113. cumulus

b. Howard

114. high

c. Saffir – Simpson

115. cold front

d. Bjerkens

116. Cloud Classification

e. synoptic weather

117. warm front

118. Cirrus

119. Hurricane intensity

120. Catastrophic

121. WMO

122. NWS

123. NWP

124. Remotes Sensing weather satellites provide visible weather images and are referred to as GOES.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

### MATCHING

- |                      |                    |
|----------------------|--------------------|
| 125. type of cloud   | a. weather element |
| 126. air pressure    | b. smog            |
| 127. cloud cover     | c. dew             |
| 128. humidity        | d. albedo          |
| 129. wind speed      | e. latitude        |
| 130. precipitation   |                    |
| 131. wind direction  |                    |
| 132. air temperature |                    |

133. Ozone or O<sub>2</sub> is concentrated in the troposphere, and protects humans from infrared burning rays of the sun.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

134. CFC's deplete ozone and may lead to earth temperatures cooling.

A. True \_\_\_\_\_

B. False \_\_\_\_\_

135. The warmest layer of the atmosphere that is the closest to earth is

- a. atmosphere
- b. mesosphere
- c. stratosphere
- d. troposphere
- e. both b and c

136. Aphelion: Apogee as Perihelion: \_\_\_\_\_

- a. perigee
- b. pingree
- c. eclipse
- d. solar eclipse
- e. none of these

137. During Southern hemisphere winter, the circle of illumination would cover 180 degrees from \_\_\_\_\_ to \_\_\_\_\_ degrees.

- a. 66 ½° S to 66 ½° N
- b. 66 ½° S to 23 ½° N
- c. 23 ½° S to 66 ½° N
- d. 23 ½° N
- e. all except a and b

138. With reference to question #137 answers; the vertical rays of the sun are probably located at \_\_\_\_\_

### MATCHING

- 139. Molecular conductivity
- 140. Atom in contact with surface
- 141. Gases in motion
- 142. boiling water
- 143. IR and UV
- 144. black body absorber
- 145. 1g of H<sub>2</sub>O to 1 °C
- 146. water standard
- 147. measuring device
- 148. Celsius
- 149. infers heat value of substance
- 150. may be liquid, metallic or electrical

- a. conduction
- b. convection
- c. radiation
- d. specific heat
- e. thermometer