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WEATHER

A CONCISE INTRODUCTION

Test Bank Questions

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CHAPTER 1

Weather Variables

Temperature

1.1. Temperature is a measure of:

- (A) The visible radiation absorbed by a thermometer.
- (B) The infrared radiation reflected by a substance.
- (C) The average speed of the molecules of a substance.
- (D) The volume occupied by a substance.
- (E) The density of a substance under pressure.

1.2. How does one accurately measure temperature?

- (A) With a barometer.
- (B) With a thermometer exposed to the sun.
- (C) In the shade.
- (D) As a quantity that has both magnitude and direction.
- (E) Both (C) and (D).

1.3. When a thermometer is directly exposed to the sun:

- (A) It accurately measures the temperature of the air.
- (B) It indicates a higher temperature than that of the air.
- (C) It indicates a lower temperature than that of the air.
- (D) It measures the temperature of the sun rather than that of the air.
- (E) It measures the temperature of sunlight.

1.4. The Kelvin temperature scale is based on:

- (A) The freezing and boiling points of water, the difference being divided in 100 increments.
- (B) The lowest possible freezing point of salty water and the boiling point of water, the difference being divided in 100 increments.
- (C) The Celsius scale where only the absolute value of temperature is considered, so as to have only positive numbers.
- (D) The Celsius scale shifted to start at absolute zero.
- (E) The Celsius scale with more increments between the freezing and boiling points of water.
- (F) Absolute zero and the boiling point of water, the difference being divided in 100 increments.
- (G) Absolute zero and the boiling point of water, the difference being divided in 273 increments.

1.5. Absolute zero is:

- (A) The freezing point of water.
- (B) The freezing point of air.
- (C) The theoretical temperature at which the Celsius scale and the Fahrenheit scale intersect.
- (D) The theoretical temperature at which all molecular motion is presumed to cease.
- (E) The point at which we are absolutely sure the temperature is zero.

1.6. Approximate 23°C in degrees Fahrenheit:

- (A) 45°F
- (B) 46°F
- (C) 52°F
- (D) 62°F
- (E) 68°F
- (F) 72°F
- (G) 78°F
- (H) 88°F
- (I) 94°F

1.7. Absolute zero expressed in degrees Kelvin is:

- (A) 0 K
- (B) -32 K
- (C) 32 K
- (D) 0°F
- (E) 0°C
- (F) 273°F
- (G) 273°C
- (H) -273°F
- (I) -273°C
- (J) 273 K

1.8. A temperature of 0°C is equal to:

- (A) 0°F
- (B) 212°F
- (C) 0 K
- (D) 32 K
- (E) -32 K
- (F) 32°F
- (G) -32°F

1.9. Vertical temperature profiles are obtained with:

- A) Radiosondes.
- B) Meteograms.
- C) Doppler radars.
- D) Geostationary satellites.
- E) Anemometers.

Pressure

1.10. Consider a balloon filled with air. If pressure remains constant and temperature increases, the volume of the balloon:

- (A) Decreases.
- (B) Remains constant.
- (C) Increases.
- (D) Cannot be determined from the above information.

1.11. Consider a radiosonde balloon filled with helium.

1.11.1. As the balloon rises through the atmosphere, the volume of the balloon:

- (A) Decreases.
- (B) Remains constant.
- (C) Increases.
- (D) Cannot be determined from the above information.

1.11.2. As the balloon rises through the atmosphere, pressure inside the balloon:

- (A) Decreases.
- (B) Remains constant.
- (C) Increases.
- (D) Cannot be determined from the above information.

1.12. Atmospheric pressure is caused by:

- (A) The temperature of the overlying air.
- (B) The weight of the overlying air.
- (C) The lapse rate in the air column.
- (D) The solar radiation penetrating through the air column.
- (E) The amount of water leaving the air column as precipitation.

1.13. If the atmospheric pressure is 1000 mb at the ground, then the 500-mb level is:

- (A) At the level that is equidistant from the ground and the tropopause.
- (B) Halfway up the total height of the troposphere (or about 5 km up).

- (C) At the height below which half of the mass of the air column is found.
- (D) Halfway up the total height of the atmosphere (which varies with temperature and geographic location).
- (E) At the height where the temperature is half the surface temperature.
- (F) At the height where the density of the air is half the surface density.

1.14. Approximately 50% of the atmosphere lies below the _____ pressure surface.

- (A) 850 hPa.
- (B) 700 hPa.
- (C) 500 hPa.
- (D) 250 hPa.
- (E) 50 hPa.

1.15. Which instrument measures atmospheric pressure?

- (A) The barometer.
- (B) The isobar.
- (C) The bar.
- (D) The millibar.
- (E) The anemometer.

1.16. In a mercury barometer:

- (A) The mercury is held up in the tube by the suction of the vacuum.
- (B) The mercury occupies the entire tube by thermal expansion.
- (C) The mercury contracts under the atmospheric pressure exerted on the tube.
- (D) The weight of the mercury is balanced by atmospheric pressure.
- (E) The mercury is weightless due to the vacuum.

1.17. When compared to mercury, why would water be a poor choice to design a barometer?

- (A) Water does not expand when heated.
- (B) The water level changes would be too small to read.

- (C) The barometer would be more than 10 meters tall.
- (D) Water has a large heat capacity.
- (E) Water is too dense.

1.18. The weight of one atmosphere is approximately equal to the weight of:

- (A) One meter of water.
- (B) The ocean if it were replaced by air.
- (C) Ten meters of water.
- (D) Ten meters of mercury.
- (E) A hundred meters of water.
- (F) A hundred meters of mercury.

1.19. If you dive 30 meters underwater, your body experiences the equivalent of:

- (A) 2 atmospheres of pressure.
- (B) 3 atmospheres of pressure.
- (C) 4 atmospheres of pressure.
- (D) 20 atmospheres of pressure.
- (E) 30 atmospheres of pressure.
- (F) 40 atmospheres of pressure.

1.20. If you climb up to 5.5 km above sea level, the pressure is about:

- (A) One atmosphere
- (B) 5.5 bars
- (C) 5.5 hPa
- (D) 500 hPa
- (E) 2 bars
- (F) 5.5 atmospheres

1.21. In the midlatitudes, atmospheric pressure at sea level is approximately _____, whereas pressure at a height of 5.5 km is approximately _____.

- (A) 1000 hPa, 500 hPa.
- (B) 1000 hPa, 250 hPa.
- (C) 500 hPa, 250 hPa.
- (D) 500 hPa, 1000 hPa.
- (E) 250 hPa, 500 hPa.
- (F) 250 hPa, 1000 hPa.

1.22. Pressure _____ is twice the value of pressure at sea level.

- (A) Halfway up in the atmosphere.

- (B) At the tropopause.
- (C) At the top of Mount Everest.
- (D) 10 meters below the ocean surface.
- (E) 20 meters below the ocean surface.
- (F) At the bottom of the ocean.

1.23. When a midlatitude cyclone is approaching, the level of a mercury barometer:

- (A) Drops.
- (B) Remains constant.
- (C) Rises.

1.24. If a person climbs a mountain to a certain height on a hot summer day and returns to the same spot on a cold winter day, which of the following statements is correct?

- (A) The change in pressure is greater during the winter hike.
- (B) The change in pressure is the same during both hikes.
- (C) The change in pressure is less during the winter hike.

Wind

1.25. A northerly wind blows:

- (A) From the south to the north.
- (B) From the east to the west.
- (C) From the north to the south.
- (D) From the west to the east.
- (E) Perpendicular to the isobars.

1.26. The “easterlies” are:

- (A) Winds that blow from the east.
- (B) Winds that blow to the east.
- (C) Winds that blow from the East Coast.
- (D) Winds that blow toward the East Coast.
- (E) Winds that blow only on Easter.

1.27. Knots are units of:

- (A) Wind speed.
- (B) Wind direction.
- (C) Altitude.

- (D) Pressure.
- (E) Precipitation.

Miscellaneous

1.28. A radiosonde:

- (A) Is used to monitor surface weather conditions from aloft.
- (B) Uses radio waves to measure precipitation.
- (C) Is carried aloft by a balloon and measures weather conditions above the surface.
- (D) Measures radio waves in the ionosphere.
- (E) Measures radiowaves from a geostationary satellite.

1.29. About 99% of the atmosphere lies within _____ of Earth’s surface.

- (A) 3 km.
- (B) 30 km.
- (C) 300 km.
- (D) 3000 km.
- (E) 30000 km.