

Part A: True or False

Instructions: This section is worth a total of 40 points, each answer is worth 2 points. Answer true or false to each of these statements by marking “T” or “F” on the blank line in front of each statement.

T	F	Statement
T	F	1) The method of heat transfer that is responsible for the transmission of energy directly from the sun through the vacuum of space is convection.
T	F	2) Isotherms represent lines of constant temperature on a weather map.
T	F	3) The Earth’s 2nd or “primeval” atmosphere was mostly Hydrogen and Helium and is thought to have escaped from space from Earth’s hot surface.
T	F	4) Water has a low specific heat causing it to heat up and cool down more slowly than land surfaces.
T	F	5) Frost is formed through the process of sublimation.
T	F	6) The sun emits the majority of its energy as infrared radiation.
T	F	7) Aerosols can only be solid particles.
T	F	8) Heating-degree days are used when the temperature is above 65 degrees F.
T	F	9) Carbon Dioxide is the only gas that is responsible for “global warming” and the overall warming of the atmosphere.
T	F	10) Evaporation fog is usually found when the water is colder than the air above it.
T	F	11) The earth, sun, and you all emit Infrared radiation, though at different intensities.
T	F	12) In an absolutely stable atmosphere the air is typically sinking which inhibits the rising of air and formation of convective clouds.

T	F	13) Argon is the third most plentiful gas in the atmosphere.
T	F	14) Winter in the Australia begins in June.
T	F	15) If the Earth's tilt increased from 23.5 our seasons would get more extreme.
T	F	16) Air temperatures are colder on a cloudy night than on a clear night.
T	F	17) Clouds need ample moisture, rising air and CCN in order to form.
T	F	18) The Earth's albedo is 0.5 or 50%.
T	F	19) The current percentage of N ₂ in the atmosphere is 78%.
T	F	20) When light is scattered it is sent in all directions.

Part B: Multiple Choice

Instructions: This section is worth a total of 60 points. Choose the best answer. Each question is worth 2 points. Write the answer on the blank line in front of each question with a CAPITAL letter so it's easy for me to read. If I can't tell the difference between a letter (i.e. a c and an e) I will mark it incorrect.

21) _____ **Which atmospheric gas is not considered a greenhouse gas?**

- a) Methane (CH₄)
- b) Carbon Dioxide (CO₂)
- c) Water Vapor (H₂O)
- d) Nitrogen (N₂)

22) _____ **AM & shortwave radio broadcasts can be heard at great distances from their source locations, especially at night. The layer of the atmosphere that makes this possible is:**

- a) Mesosphere
- b) Troposphere
- c) Ionosphere
- d) Stratosphere

23) _____ **On which day is the northern hemisphere pointed away from the sun while also being located closest to the sun in the Earth's elliptical orbit?**

- a) Autumnal Equinox

- b) Summer Solstice
- c) Winter Solstice
- d) Spring Equinox

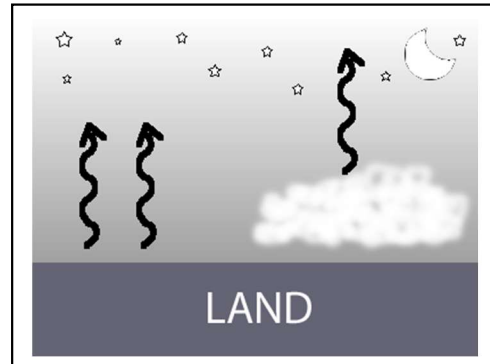
- 24) _____ **Which of the following processes requires the greatest input of energy to occur?**
- a) Converting one gram of liquid water into steam
 - b) Converting one gram of ice into steam
 - c) Converting one gram of steam into ice
 - d) Converting one gram of liquid water into ice
- 25) _____ **The Collision-Coalescence Process is associated with which phenomena:**
- a) cold rain
 - b) warm rain
 - c) evaporation
 - d) snow flakes
- 26) _____ **Snow at the surface occurs when _____**
- a) upper air is cold and surface air is warm
 - b) both surface and upper air are cold
 - c) both surface and upper air are warm
 - d) upper air is warm and surface air is cold
- 27) _____ **The altitude at which you reach saturation & cloud base forms (looks flat) is known as the:**
- a) Lifted Convection Level
 - b) Lifted Condensation Level
 - c) Localized Convection Level
 - d) Localized Convective Lifting
- 28) _____ **Which of the following would decrease the albedo of the earth-atmosphere system?**
- a) less cloud cover
 - b) glacial shrinking
 - c) reduction of snow cover
 - d) all of the above
- 29) _____ **A cirrostratus cloud is recognized mainly by its _____**
- a) obvious vertical dimension
 - b) precipitation
 - c) halo around the sun
 - d) puffy cauliflower features

30) _____ **Which choice lists the types of electromagnetic radiation in the correct order from most energetic to least energetic?**

- a) Microwaves, X-rays, Ultraviolet, Visible, Infrared
- b) X-rays, Ultraviolet, Visible, Infrared, Microwaves
- c) Ultraviolet, Visible, Microwaves, Infrared, X-rays
- d) X-rays, Microwaves, Ultraviolet, Visible, Infrared

31) _____ **Identify which type of fog is shown in the diagram to the right:**

- a) Advection Fog
- b) Radiation Fog
- c) Evaporation Fog
- d) Upslope Fog
- e) Steam Fog



32) _____ **What type of atmospheric stability is expected when the environmental lapse rate is in between the dry adiabatic and moist adiabatic lapse rate?**

- a) Conditionally Unstable
- b) Absolutely Unstable
- c) Conditionally Stable
- d) Absolutely Stable

33) _____ **Which of the following is not a property of water?**

- a) Water vapor is responsible for most of the Earth's natural greenhouse effect.
- b) Atmospheric water is responsible for weather as we know it.
- c) Water takes up less volume as it freezes.
- d) Water can exist in a supercooled state.

34) _____ **Dry ice is carbon dioxide in solid form. In the process of reverting back to a gas, it does not leave a puddle (hence the term 'dry ice'). This is an example of:**

- a) evaporation
- b) melting
- c) deposition
- d) sublimation

35) _____ **Which is NOT a property of the troposphere?**

- a) temperature decreases with altitude
- b) the majority of weather events happen within it
- c) the tropopause separates it from the stratosphere
- d) its increase in temperature with height is due to the presence of ozone

- 36) _____ **If the environmental lapse rate is larger (e.g. cools quicker with height) than the wet adiabatic lapse rate the atmosphere is:**
- a) conditionally unstable
 - b) absolutely stable
 - c) absolutely unstable
 - d) conditionally stable
- 37) _____ **The rate of change of temperature with height for the dry adiabatic lapse rate is:**
- a) 6°C per 1000 m
 - b) 10°C per 100 m
 - c) 10°C per 1000 m
 - d) 6°C per 100 m
- 38) _____ **How many cooling degree days would I have earned if today's temperature was 95°C?**
- a) 30
 - b) 25
 - c) 15
 - d) 35
- 39) _____ **What type of stability can be expected if a parcel of air wants to sink towards the surface.**
- a) environmental
 - b) stable
 - c) unstable
 - d) dry adiabatic
- 40) _____ **The thermosphere is the top-most layer of the atmosphere and _____**
- a) has decreasing temperatures, and overlaps with the ionosphere
 - b) has decreasing temperatures, and overlaps with the mesosphere
 - c) has increasing temperatures, and overlaps with the mesosphere
 - d) has increasing temperatures, and overlaps with the ionosphere
- 41) _____ **The majority of the sun's radiation is emitted in the _____ range. This is different than the earth which predominately emits _____ radiation.**
- a) shortwave; longwave
 - b) visible; longwave
 - c) longwave; shortwave
 - d) longwave; longwave

- 42) _____ **Which term below is the ratio of the actual amount of water vapor in the air and the maximum amount of water vapor it can hold?**
- a) absolute humidity
 - b) mixing ratio
 - c) relative humidity
 - d) water vapor pressure
- 43) _____ **What is the standard atmospheric pressure at sea level?**
- a) 1013.25 mb
 - b) 101.25 mb
 - c) 1031.25 mb
 - d) 1051.23 mb
- 44) _____ **At what altitude below which can you find more than 50% of the atmosphere?**
- a) 15 km
 - b) 5.5 miles
 - c) 15 miles
 - d) 5.5 km
- 45) _____ **Which temperature scale has 180 divisions between freezing and boiling?**
- a) Celsius
 - b) Fahrenheit
 - c) Kelvin
 - d) Absolute
- 46) _____ **Which method of heat transfer is most important for weather phenomena?**
- a) Heat
 - b) Radiation
 - c) Convection
 - d) Conduction
- 47) _____ **Over a 24 hour period when would you expect the warmest temperatures?**
- a) right before dawn
 - b) at exactly noon
 - c) slightly after noon around 2-3 pm
 - d) at sunset

- 48) _____ **In order to calculate the daily range of temperature for my apartment I would:**
- a) add together the daily minimum and maximum temperatures and then divide by 2
 - b) add together the monthly minimum and maximum temperatures and then divide by 2
 - c) subtract the daily minimum temperature from the daily maximum temperature
 - d) subtract the monthly minimum temperatures from the daily maximum temperatures

- 49) _____ **Land and Ocean heat up and cool off differently. Which is not one of the reasons why:**
- a) water has a lower specific heat than land
 - b) land is not a fluid so there is no mixing
 - c) land is not transparent and the ocean is
 - d) land surfaces are more variable than ocean surfaces

- 50) _____ **Which type of cloud is show in the picture:**
- a) stratocumulus
 - b) cirrus
 - c) cumulus
 - d) cumulonimbus

