Test Form: A **Exam 1: Spring 2011**

Instructions:

- Write your name (last name and first name) on your bubble sheet.
- Write your student identification number on the bubble sheet, and **fill in the bubbles corresponding to your student id number** (starting from the left box and leaving the last box blank)
- **Fill in the bubble that corresponds to the Test Form letter listed at the top of this page.**
- When answering the questions, select the one letter that **BEST** completes the statement or answers the question and mark this letter on your bubble sheet.
- All questions are worth equal weight (2 points each).

Remember to read each question and all of the answers carefully before answering the question.

Good Luck!!!

1. The seasons are caused by the _____, which in the summer hemisphere causes there to be 24 hours of _____ at the poles.
a) distance between the earth and the sun, sunlight
b) distance between the earth and the sun, darkness
c) tilt of the earth, sunlight
d) tilt of the earth, darkness

2. On average you would expect the temperature to _____ as you move up in height through the troposphere.
a) increase
b) decrease
c) remain constant

3. The kinetic energy (speed) of air molecules is _____ at a temperature of 40 deg Celsius than at 0 deg Celsius.
a) less
b) greater
c) equal
d) cannot determine based on the information provided

4. A temperature of 10 deg Celsius would be _____ in Fahrenheit.
a) 32 deg F
b) 10 deg F
c) 18 deg F
d) 50 deg F

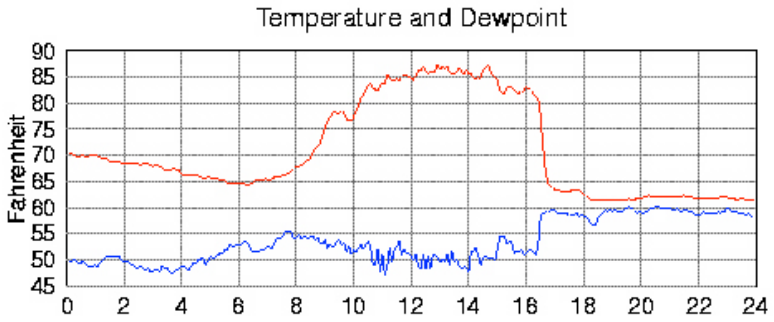
5. A temperature of 0 deg Celsius would be _____ in Kelvin units.
a) 32 K
b) 100 K
c) 273 K
d) 373 K

6. True or false: Pressure decreases with altitude in the troposphere but increases with altitude in the stratosphere.
a) true
b) false

7. If the temperature is equal to the dewpoint temperature the air is said to be _____ and the relative humidity is equal to _____.
a) saturated, 0%
b) unsaturated, 0%
c) saturated, 100%
d) unsaturated, 100%

8. True or false: Vapor pressure is an absolute measure of the amount of water vapor in the atmosphere.
a) true
b) false

Use the following meteogram to answer question 9. Times noted are in local time (MST) on a 24-hour clock (i.e. military time).



9. At what time of this day was the relative humidity the highest?
a) 2 am (2)
b) 8 am (8)
c) 2 pm (14)
d) 8 pm (20)

Use the following weather observations in this table to answer questions 10 and 11.

	Boulder, CO	**New York, NY**
Temperature	90°F	90°F
Dewpoint Temperature	50°F	65°F
Relative Humidity	26%	44%

10. Which location has the most water vapor in the air?
a) Boulder, CO
b) New York, NY
c) Both have the same amount of water vapor in the air
d) Not enough information is provided to answer this question

11. Which location has the higher saturation vapor pressure?
a) Boulder, CO
b) New York, NY
c) Both have the same saturation vapor pressure
d) Not enough information is provided to answer this question

12. During which phase changes is latent heat released into the atmosphere?
a) melting and freezing
b) evaporation and melting
c) condensation and freezing
d) evaporation and condensation

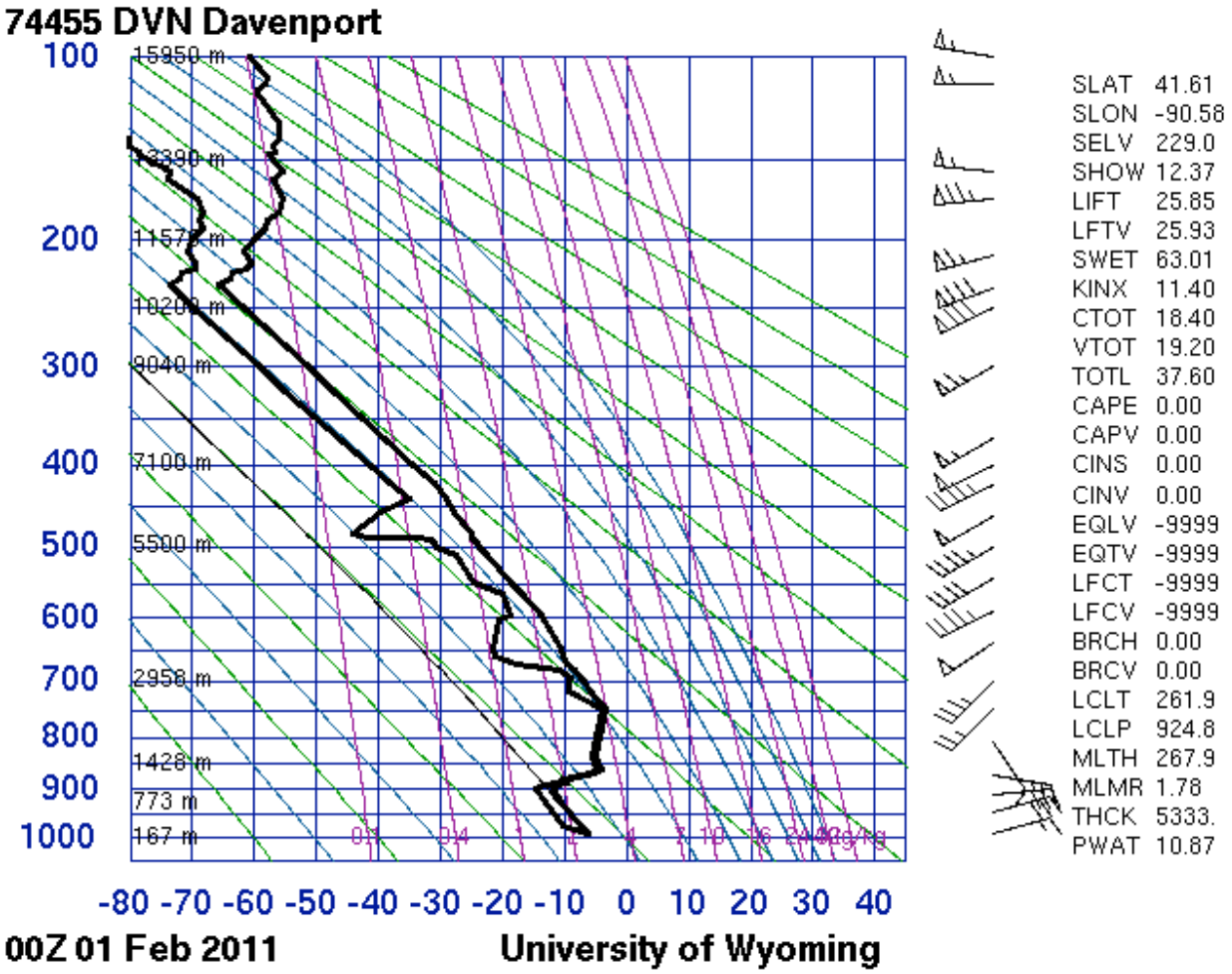
13. A north wind means that the wind is blowing from the:
a) the south to the north
b) the north to the south
c) the east toward the north pole
d) lower pressure toward higher pressure

14. It is currently 2PM July 21st Mountain Daylight savings time (MDT). What UTC time does this correspond to?
a) 14 UTC July 21st
b) 20 UTC July 21st
c) 08 UTC July 21st
d) 14 UTC July 22nd

15. If we are looking at an upper air map that is dated 00Z December 10th, what local time (in MST) would that correspond to?
a) 7:00am December 10th
b)12:00am (midnight) December 10th
c) 6:00pm December 9th
d) 5:00pm December 9th

16. A Doppler radar is capable of measuring:
a) the location of precipitation
b) the intensity of precipitation
c) radial winds
d) all of the above
e) only a and b

Use the following rawinsonde sounding from Davenport, IA to answer questions 17 through 19.



17. In this sounding the tropopause is located at a pressure level of approximately:
a) 950 mb
b) 700 mb
c) 400 mb
d) 250 mb

18. In this sounding an inversion is located at a pressure level of approximately:
a) 900 mb
b) 700 mb
c) 500 mb
d) 300 mb

19. In this sounding, a cloud layer would likely be located at a pressure level of approximately:
a) 950 mb
b) 800 mb
c) 600 mb
d) 300 mb

20. Rawinsondes are launched _____ time(s) per day, at _____ local daylight savings (MDT) time.
a) One, 12am (midnight)
b) One, 12pm (noon)
c) Two, 6am and 6pm
d) Two, 7am and 7pm
e) Two, 12am and 12pm

21. You notice that the radar reflectivity over Boulder is 55 dBZ and that the radar reflectivity over Denver is 25 dBZ. What can you say about the precipitation occurring at these two locations?
a) The intensity of the precipitation is the same in both locations
b) The intensity of the precipitation is greater in Denver than it is in Boulder
c) The intensity of the precipitation is greater in Boulder than it is in Denver

22. A bright region on a visible satellite image could be _____?
a) thick clouds
b) snow covered ground
c) a forest
d) all of the above
e) both a and b

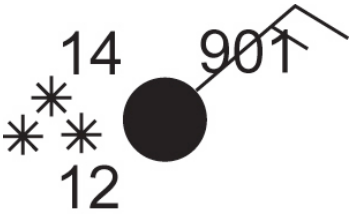
23. A bright region on a black and white infrared satellite image _____?
a) is a cold object
b) is a warm object
c) can only be a cloud
d) can only be snow

24. An isobar is a contour line of _____.
a) constant pressure
b) constant temperature
c) constant dew point temperature
d) constant wind speed

25. An area of high heights on a constant pressure map is referred to as _____.
a) a ridge
b) a trough
c) a jetstreak
d) a front

26. If you wanted to look for the jetstream and jetstreaks, which map would be best to look at?
a) surface map
b) 850 mb map
c) 500 mb map
d) 300 mb map

Using the following US surface station model to answer questions 27 through 30.



27. What is the dewpoint temperature reported by this station model?
a) 14 deg F
b) 14 deg C
c) 12 deg F
d) 12 deg C
e) 90.1 deg F

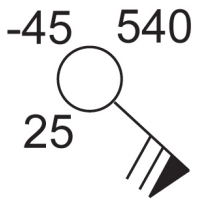
28. What is the sea level pressure reported by this station model?
a) 12 mb
b) 14 mb
c) 901 mb
d) 990.1 mb
e) 9901 mb

29. What is the wind direction reported by this station model?
a) northeast
b) southeast
c) southwest
d) northwest

30. What is the current significant weather reported by this station model?
a) no significant weather
b) moderate rain
c) moderate snow
d) tornado

31. True or false: On a surface weather map, a strong pressure gradient exists where isobars are packed closely together.
a) true
b) false

Using the following US upper air station model to answer questions 32 through 33.



32. What is the temperature reported by this upper air station model?
a) -45 deg F
b) 25 deg F
c) 540 deg F
d) -45 deg C
e) 25 deg C

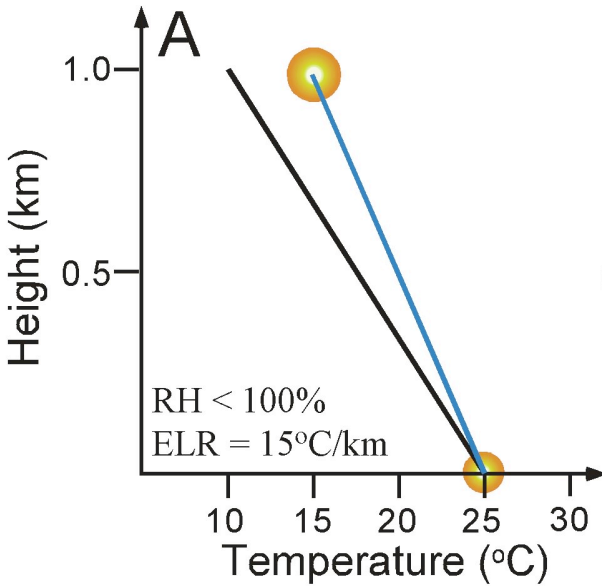
33. What is the wind speed reported by this upper air station model?
a) calm
b) 50 kts
c) 70 kts
d) 100 kts

34. According to this upper air station model, we know that the dew point temperature is:
a) 25 deg F
b) 25 deg C
c) 25 deg F cooler than the air temperature
d) 25 deg C cooler than the air temperature

35. If an air parcel is displaced vertically and it returns to its original position, the atmosphere in that layer would be described to be _____.
a) Stable
b) Unstable
c) Neutral

36. True or false: An air parcel compresses and cools as it rises, and expands and warms as it sinks.
a) true
b) false

Use this figure to answer questions 37 and 38.



37. An air parcel rising in the conditions depicted in this figure would cool at the _____ lapse rate.
a) Moist adiabatic
b) Dry adiabatic
c) Environmental

38. The stability of the atmosphere depicted in the above figure would be:
a) Stable
b) Unstable
c) Conditionally unstable
d) Neutral

39. Measurements from a rawinsonde indicate that the environmental lapse rate in a layer of the atmosphere is **8 deg C / km**. Based on this information the stability of this layer of the atmosphere would be _____.
a) Stable
b) Unstable
c) Conditionally unstable
d) Neutral if saturated, stable if unsaturated
e) Neutral if unsaturated, unstable if saturated

40. Which of the following are mechanisms in which air parcels can be lifted in the atmosphere?
a) Along frontal boundaries
b) By convergence of air at the surface
c) By mountains
d) All of the above
e) Only a and c

41. True or false: Clouds cannot form in the earth's atmosphere, even when the air is at saturation, without the presence of cloud condensation nuclei.
a) true
b) false

42. A nimbostratus cloud might form in a(n) _____ environment, and by definition _____.
a) Stable, is precipitating
b) Stable, is NOT precipitating
c) Unstable, is precipitating
d) Unstable, is NOT precipitating

43. What type of cloud over a surface weather station might cause a surface station model to have the following symbol for significant weather at the station?

a) Nimbostratus
b) Cirrus
c) Altostratus
d) Cumulonimbus

44. A layer in the atmosphere that always has a negative environmental lapse rate is the _____.
a) troposphere
b) stratosphere
c) mesosphere

45. The moist adiabatic lapse rate is always _____ the dry adiabatic lapse rate.
a) less than
b) greater than
c) equal to

46. If an air parcel is lifted, it will first form clouds at the _____ and become buoyant (unstable) at the _____.
a) level of free convection, tropopause
b) tropopause, level of free convection
c) level of free convection, lifting condensation level
d) lifting condensation level, level of free convection

Use the following information to answer questions 47 through 49.
At an altitude of 0 km the temperature of the environment, an unsaturated, and a saturated air parcel are all equal to 20 deg C. At an altitude of 1 km the temperature of the environment is 13 deg C.

47. What is the temperature of the unsaturated air parcel if it is lifted from 0 km to 1 km?
a) 10 deg C
b) 14 deg C
c) 20 deg C
d) 26 deg C
e) 30 deg C

48. What is the temperature of the saturated air parcel if it is lifted from 0 km to 1 km?
a) 10 deg C
b) 14 deg C
c) 20 deg C
d) 26 deg C
e) 30 deg C

49. If a saturated air parcel in this example is lifted from 0 km to 1 km, it will _____.
a) continue to rise
b) sink back to 0 km
c) remain at 1km
d) cannot tell from the information provided

50. Did you enter you student id number, starting from the left box, and your test form letter on your scantron sheet?
a) yes (this is the correct answer)
b) no