Names:_____

School:_____

Team number:_____

Thrawn's Meteorology Test Key

1.) Describe the Coriolis effect in your own words.(Tiebreaker)

Answers may vary:

The Coriolis effect is the result of Earth's rotation on weather patterns and ocean currents. **The Coriolis effect** makes storms swirl clockwise in the Southern hemisphere and counterclockwise in the Northern Hemisphere.

2.) Describe Obliquity (Tiebreaker)

Answers may vary:

The tilt of Earth's axis relative to a line perpendicular to Earth's orbital plane (the "surface" along which the planet orbits the sun). It is not a fixed quantity. The present value is from 23°2' to 24°27'.

The following questions are multiple choice, please circle the correct answer.

3.) Weather is determined by the conditions in the:
a. Troposphere
b. Stratosphere
c. Mesosphere
d. Thermosphere

4.) Sunspots are generally _____ the sun's photosphere.
a) warmer than
b) colder than
c) about the same temperature as

5.) Thunderstorms have the best chance of reaching severe thresholds when cold, dry air aloft is separated from warm moist air at the surface by:

a) No inversion cap.
b) A very weak inversion cap.
c) An inversion cap that is neither very weak nor very strong.
d) A very strong inversion cap.
e) Inversions do not play any role in whether a thunderstorm is severe or not.

6.) What is generally true about the stratosphere:

a) Has turbulent updrafts and downdrafts.
b) Has either a stable or increasing temperature profile with altitude.
c) Where the auroras occur.
d) Both a) and b).
e) Both b) and c).

7.) Which reason is NOT likely to have caused the Norse settlements in Greenland to die out during the Little Ice Age?
a) Increasing ice made trade outside of Greenland nearly impossible.

b) Famine occurred, because permafrost made growing crops difficult.
c) Rising sea levels made settlements unlivable.
d) Competition over resources with the Inuit people led to hostility.

8.) Isoheight contours indicated on upper air maps are compensated for the elevation of the ground directly below:

a) True.
b) False.

9.) Which on the following is an example of a climate region:
a. Tropical
b. Sunny
c. Alpine
d. Rainy

10.) What describes sleet:

a) Sleet starts out as rain in clouds above freezing and then freezes after hitting ground that has a temperature below freezing.

b) Sleet starts out as snow, completely melts in a warmer mid-altitude layer of air, and then refreezes in a colder layer at the lowest altitudes before hitting the ground.

c) Sleet starts out as snow, partially melts in a warmer mid-altitude layer of air, and then refreezes in a colder layer at the lowest altitudes before hitting the ground.

d) Sleet starts out as snow, partially melts in a warmer mid-altitude layer of air, and then refreezes after hitting ground that has a temperature below freezing.

e) None of the above

11.) Place the following events in order, from the earliest to the most recent.

a) Younger Dryas, Medieval Warm Period, Little Ice Age
b) Younger Dryas, Little Ice Age, Medieval Warm Period
c) Medieval Warm Period, Younger Dryas, Little Ice Age
d) Little Ice Age, Medieval Warm Period, Younger Dryas

12.) The two major controlling factors for deep ocean currents are:
a. Salinity and wind
b. Pressure and salinity
c. Wind and temperature
d. Temperature and salinity

13.) What force is behind all the weather on Earth?
a. Wind
b. Coriolis Force
c. Obliquity
d. Energy from the sun

14.) Which year was known as "The Year Without A Summer" in the Northeast United States, Eastern Canada, and Europe?
a) 1741
b) 1816
c) 1932
d) 1983

15.) The air circulation pattern that is associated with an ENSO is the:
a. Walker Cell
b. Hadley Cell
c. Rossby Wave
d. Gulf Stream

16.) If the temperature measured by a thermometer indicates 64 F, what temperature would be equivalent in another standard unit:

a) 290.7 K.

b) 16.7 C.
c) 15.1 C.
d) 257.2 K.
e) None of the above
17.) What does a psychrometer measure:

a) Surface pressure.
b) Temperature.
c) Humidity.
d) Sunlight.
e) Wind speed.

18.) What is the difference between shortwave and longwave radiation? (1 pt)
a. Shortwave radiation has more energy than longwave radiation.
b. Shortwave radiation has a larger wavelength than longwave radiation.
c. Shortwave radiation has a smaller frequency than longwave radiation.
d. Shortwave radiation is emitted by the Earth while longwave radiation is emitted by the Sun.

19.) What best describes the Planetary Boundary Layer (PBL):

a) Where the troposphere ends and the stratosphere begins.
b) The lowest levels of the troposphere that are more likely to mix because of interaction with obstructions near the ground, turbulence, erratic winds, friction, etc.
c) Is always fixed in height and does not change by time-of-day.
d) Both b) and c).
e) Both a) and c).

20.) A cP air mass has these two characteristics
a. Cold and dry
b. Cold and moist
c. Warm and dry

d. Warm and moist

21.) A “nuclear winter” is a massive cooling of the earth that could occur after a major nuclear war. Which of the following reasons best explains why the earth would cool immediately after a nuclear war?
a) Massive fires would inject smoke into the atmosphere
b) Radiation fallout would reflect sunlight back out to space
c) Cloud cover would increase dramatically from the nuclear explosions 2
d) Desertification of the surface would increase the surface albedo

22.) What is generally not true in a ordinary mass thunderstorm:
a) Precipitation and lightning are usually at their strongest in the dissipation phase.
b) Updrafts dominate in the cumulus phase.
c) The bulk of the visible clouds exist above the freezing line in the dissipation phase.
d) Hydrometeors are largely thought to be responsible for lightning.
e) None of the above.

23.) Which of the following statements is correct about cyclones?
a) cyclones are huge storms caused by winds blowing around a central area of high atmospheric pressure.
b) for a cyclone to develop the sea surface temperature must be below 25 degrees Celsius.
c) in the southern hemisphere their winds blow In a clockwise circle.
d) They do not form storm surges.

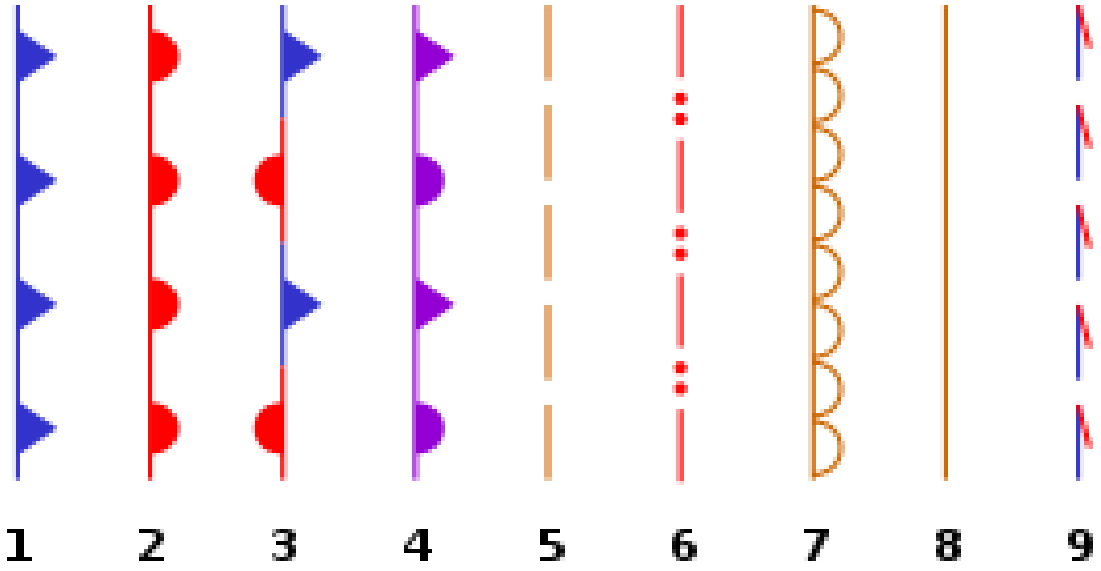
24.) The atmosphere is made primarily of:
a. Carbon Dioxide
b. Oxygen
c. Nitrogen
d. Water Vapor

25.)What state would best describe a tropical continental (cT) environment:

a) Louisiana.
b) Arizona.
c) Oklahoma.
d) Georgia.
e) None of the above.

26.) In degrees Fahrenheit, the world's all-time warmest and coldest temperatures are about:
a) 100F and -70F
b) 120F and -80F
c) 104F and -50F
d) 135F and -120F

27.) The Paleo-Eocene thermal maximum occurred somewhere around _____ years ago.
a. 25 thousand
b. 55 million
c. 75 million
d. 100 thousand



28.) The weather symbol “1” represents:

a) Stationary front.
b) Dryline.
c) Cold front.
d) Surface trough.
e) None of the above.

29.) The weather symbol “2” represents:

a) Tropical wave.
b) Occluded front.
c) Stationary front.
d) Dryline.
e) None of the above.

30.) The weather symbol “3” represents:

a) Cold front.

b) Warm front.
c) Surface trough.
d) Stationary front.
e) None of the above.

31.) The weather symbol “4” represents:
a) Occluded front.
b) Squall line.
c) Surface trough.
d) Stationary front.
e) None of the above.

32.) The weather symbol “5” represents:

a) Warm front.
b) Surface trough.
c) Tropical wave.
d) Dryline.
e) None of the above.

33.) The weather symbol “6” represents:

a) Trowal.
b) Tropical wave.
c) Occluded front.
d) Squall line.
e) None of the above.

34.) The weather symbol “7” represents:

a) Warm front.
b) Trowal.
c) Dryline.

d) Squall line.
e) None of the above.

35.) The weather symbol “8” represents:

a) Cold front.
b) Squall line.
c) Trowal.
d) Tropical wave.
e) None of the above.

39.) The weather symbol “9” represents:

a) Cold front.
b) Squall line.
c) Trowal.
d) Tropical wave.
e) None of the above.

Short answer questions:

40.) The layer of the atmosphere closest to the surface of the Earth is the _troposphere_.

41.) The layer of the atmosphere second closest to the Earth’s surface is the _stratosphere_.

42.) The layer of the atmosphere third closest to the Earth’s surface is the _mesosphere_.

43.) The layer of the atmosphere fourth closest to the Earth’s surface is the _thermosphere_.

44.) A portion of the mesosphere & thermosphere known for its ability to “bounce” radio signals is the __Ionosphere__.

45.) A cP air mass has these two characteristics_Cold and dry_.

46.) Approximately how many hours of daylight does a person standing on the South Pole receive on the summer solstice? _0_.

47.) _Evaporation_ is a process in the water cycle where water vapor rises into the atmosphere

48.) What type of front forms when an active cold front overtakes a warm front, producing a complex weather pattern? _Occluded Front_.

49.) Meteors disintegrate in which layer of the atmosphere? _Mesosphere_.

50.) True or false: the tropopause varies in altitude with latitude; 17 kilometers high at the poles and 9 kilometers high at the equator.
False (9 kilometers at the poles and 17 km at the equator).

51.) Dendrochronology is the study of _tree rings related to climatology_. (Tiebreaker)

52.) What is the dew point? (Tiebreaker)
The dew point is the temperature at which air is saturated and condensation can occur.

53.) IPCC is an abbreviation for what? (Tiebreaker)
Intergovernmental Panel on Climate Change.

54.) How do volcanic eruptions cool the globe? Volcanoes let off carbon dioxide and water, which are two greenhouse gases. Is it possible for a volcanic eruption to

have a warming effect instead? (You may use a diagram to aide the point you are conveying) (Tiebreaker)

(Answers and diagrams may vary)

Participant response: The finest volcanic particles remain in the stratosphere for only a few months, and they have only minor climatic effects. The only major effect on climate occurs when sulfur dioxide reacts with hydroxide and water to form sulfur aerosols which can last in the stratosphere for 2-3 years. These sulfur aerosols absorb and scatter solar radiation and therefore prevent sunlight from reaching the Earth, making the Earth colder and cooler. When volcanoes spew greenhouse gases into the air, this could have a warming effect.