MULTIPLE CHOICE. (2 Point Each)

1) On average, the atmosphere absorbs roughly this percentage of the solar radiation that reaches the top of the atmosphere:
   A) 50 percent. B) 5 percent.
   C) 25 percent. D) 14 percent.

2) Horizontal pressure changes are _____ than vertical pressure changes.
   A) about the same
   B) greater
   C) less than
   D) None of the above. There are no horizontal pressure changes.

3) This occurs around a high-pressure system when the Coriolis effect exceeds the pressure gradient force, causing air to turn:
   A) subgeostrophic flow.
   B) geostrophic flow.
   C) supergeostrophic flow.

4) The atmospheric window:
   A) is a local phenomenon similar to the ozone hole that opens over Antarctica in winter.
   B) is located at a band of wavelengths between 0.1 and 0.4 micrometers.
   C) allows certain wavelengths of longwave radiation to pass through the atmosphere.

5) In a typical troposphere, air temperature decreases with height at the following rate:
   A) 2.5 degree C per one kilometer
   B) 6.5 degree C per one kilometer
   C) 10.5 degree C per one kilometer

6) Saturation vapor pressure is dependent upon this variable:
   A) temperature.
   B) air composition.
   C) air pressure.

7) The sky is blue because of:
   A) rayleigh scattering.
   B) reflection.
   C) mie scattering.
   D) absorption.
   E) refraction.

8) The Stefan-Boltzmann Law gives the relationship between:
   A) solar energy and distance.
   B) moisture and long-wave radiation.
   C) emissivity and wavelength.
   D) the intensity of radiation and the temperature of an object.

9) The greenhouse effect warms up Earth's surface temperature by:
   A) 13 degree C. B) 33 degree C.
   C) 53 degree C. D) 73 degree C.

10) A geostrophic wind:
   A) flows perpendicular to the pressure gradient force.
   B) is usually not affected by the Coriolis force.
   C) follows the pressure gradient force.

11) The solar constant:
   A) is higher for Earth than for Mars.
   B) varies inversely with the fourth power of an object's distance from the Sun's surface.
   C) is the same throughout the solar system.

12) The pressure gradient force is proportional to:
   A) the slope of the isobars.
   B) the change in temperature expressed in Kelvin degrees.
   C) the change in air density.
   D) the speed necessary to achieve hydrostatic equilibrium.

13) Volcanic outgassing:
A) has had little effect on the earth's atmosphere.
B) created the earth's first atmosphere.
C) emits very little carbon dioxide.
D) emits large amounts of water vapor.

14) Anticyclones:
A) have clockwise winds in the Northern Hemisphere.
B) have air spiraling into them near the surface.
C) are associated with subgeostrophic winds.

15) If the air temperature remains constant, evaporating water into the air will _____ the dew point and _____ the relative humidity.
A) increase, increase.
B) increase, decrease.
C) decrease, decrease.
D) decrease, increase.

16) The maximum concentrations of ozone are found in the:
A) mesosphere. B) troposphere.
C) ionosphere. D) stratosphere.

17) The four layers of the atmosphere from the top down are:
A) thermosphere, stratosphere, mesosphere, troposphere.
B) thermosphere, mesosphere, stratosphere, troposphere.
C) stratosphere, mesosphere, thermosphere, troposphere.
D) troposphere, stratosphere, mesosphere, thermosphere.

18) The average albedo of the Earth is about:
A) 0.3. B) 0.5. C) 0.7. D) 0.9.

19) A missile lunched due south in the Northern Hemisphere will be deflected toward:
A) east. B) west.

20) The radiation emitted by Earth:
A) had its origin in radioactive elements in the earth's interior.
B) is primarily absorbed by the atmosphere.
C) has little effect on the earth's energy budget.
D) is in the form of radio waves.

21) At the theoretical Absolute Zero (Zero degrees Kelvin),
A) all molecular motion stops.
B) molecular motion is at a minimum.
C) atoms implode.

22) The temperature is lowest here:
A) stratosphere. B) mesopause.
C) tropopause. D) stratopause.

23) Sunsets are red for all of the following reasons except:
A) red light has more energy than blue light.
B) Rayleigh & Mie scattering.
C) light has to travel through more atmosphere to reach the observer.

24) Most of the clouds are formed in the:
A) troposphere. B) mesosphere.
C) stratosphere. D) thermosphere.

25) The Coriolis effect is strongest at this latitude:
A) 90 degrees. B) 45 degrees.
C) 15 degrees. D) 0 degrees.

26) Specific humidity:
A) is a useful measure for comparing water vapor at two different locations.
B) is the same as the relative humidity.
C) changes as a given mass of air expands.

27) A "greenhouse" works because:
A) of the difference in the solar constant.
B) all greenhouses face south and into the maximum angle of solar energy.
C) short wave lengths of energy pass through the glass but longer ones can't.
D) the windows of the greenhouse only allow green light wavelengths to pass through.

28) The troposphere makes up what fraction of the atmosphere's mass?
A) 30%. B) 50%.
C) 60%. D) 80%.

29) The four factors that are totally responsible for wind are:
A) the pressure gradient force, the Coriolis force, the centripetal acceleration, moisture content.
B) the centripetal acceleration, moisture content, friction, Coriolis force.
C) friction, centripetal acceleration, pressure gradient force, moisture content.
D) the Coriolis force, friction, the centripetal acceleration, the pressure gradient force.

30) This is NOT a variable gas:
A) ozone. B) carbon dioxide.
C) argon. D) water vapor.

31) The dew point temperature:
A) tells us how cold the air is.
B) tells us how moist the air is.
C) can be larger or smaller than the air temperature.

32) Cyclones:
A) experience Coriolis effects that deflect air to the right in the Southern Hemisphere.
B) are associated with supergeostrophic winds.
C) are typically regions of fair weather.
D) are associated with low–pressure systems.

33) As the air temperature increases, with no addition of water vapor to the air, the relative humidity will:
A) remain the same.
B) increase.
C) decrease.

34) Hydrostatic equilibrium occurs when:
A) the force of gravity and the vertical pressure gradient both act to push air downward.
B) large air masses are moving either up or down.
C) the force of gravity and the vertical pressure gradient both act to push air upward.
D) the force of gravity and the vertical pressure gradient have equal value and oppose each other.

35) If object A is at 400 K, and object B is at 800 K, then the radiation intensity of object A will be this amount of that the radiation intensity of object B:
A) one–fourth. B) one–sixteenth.
C) one–eighth. D) one–half.

36) In this atmospheric layer, the temperature is relatively constant for the first 10 kilometers, then it increases:
A) stratosphere. B) mesosphere.
C) troposphere. D) thermosphere.

37) The "stratosphere" warms because of:
A) the injection of moisture by meteors.
B) the injection of moisture by high–flying jet aircraft.
C) the interaction of ozone and ultraviolet light.
D) dust and dirt deposited by volcanoes.

38) Most of the outgoing terrestrial radiation at the top of the atmosphere are emitted from:
A) the atmosphere B) Earth's surface

39) Which of the following will increase in a rising parcel of air?

A) saturation vapor pressure.
B) relative humidity.
C) air temperature.

40) Water vapor in the atmosphere is an important source of:

A) ozone pollution. B) sunlight.
C) carbon dioxide. D) heat.

41) Wind systems are generated by:

A) the interaction of the atmosphere with the charged particles of the solar wind.
B) different pressures in different places.
C) the drag on the atmosphere caused by the earth's rotation.
D) the movements of ocean currents.

42) Which of the following gases is not a greenhouse gas:

A) carbon dioxide.
B) nitrous oxide.
C) water vapor.
D) methane.
E) oxygen.

43) Geostrophic flow:

A) occurs in atmospheric levels with substantial friction.
B) occurs when the pressure gradient force equals the Coriolis force.
C) can occur in all levels of the atmosphere.

44) The highest temperatures are typically found in the:

A) stratosphere. B) troposphere.
C) mesosphere. D) thermosphere.

45) Choose the correct listing of radiation from the <u>longest</u> wavelengths to the shortest wavelengths:

A) x–rays, ultraviolet, infrared, gamma rays, visible, radio.
B) radio, infrared, visible, ultraviolet, x–rays, gamma rays.
C) gamma rays, radio, ultraviolet, infrared, visible, x–rays.
D) radio, gamma rays, ultraviolet, visible, infrared, x–rays.

46) Relatively speaking, the earth's atmosphere is:

A) very thin when compared to the earth's diameter.
B) very thick when compared to the earth's diameter.
C) stops when we reach "space".
D) stops at the top of the troposphere.

47) The Coriolis force:

A) is caused by pressure gradient forces.
B) affects the speed of motion.
C) is constant.
D) affects the direction of motion.

48) The atmosphere is a(n):

A) blackbody absorber.
B) inferior absorber of x–rays.
C) absorber of all radiation equally.
D) selective absorber.

49) The mixing ratio has the most in common with this measure of water vapor:

A) saturation vapor pressure.
B) absolute humidity.
C) specific humidity.
D) relative humidity.

50) Of the following planets, which has the most massive atmosphere?

A) Mars B) Earth C) Venus

Answer Key
Testname: MIDTERM.2008.VERSION_C.TST

MULTIPLE CHOICE. (2 Point Each)

1) C
2) C
3) C
4) C
5) B
6) A
7) A
8) D
9) B
10) A
11) A
12) A
13) D
14) A
15) A
16) D
17) B
18) A
19) B
20) B
21) A
22) B
23) A
24) A
25) A
26) A
27) C
28) D
29) D
30) C
31) B
32) D
33) C
34) D
35) B
36) A
37) C
38) A
39) B
40) D
41) B
42) E
43) B
44) D
45) B
46) A
47) D
48) D
49) C
50) C