

Earth System Science 5: Homework #3 answer sheet (due 4/24/2008)

Name \_\_\_\_\_ Student ID: \_\_\_\_\_

**Turn in only this answer sheet.  
Keep the homework problem sheets.**

1)		13)	
2)		14)	
3)		15)	
4)		16)	
5)		17)	
6)		18)	
7)		19)	
8)		20)	
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10)			
11)			
12)			

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 1) Horizontal pressure changes are \_\_\_\_\_ than vertical pressure changes.
  - A) about the same
  - B) less than
  - C) greater
  - D) None of the above. There are no horizontal pressure changes.
- 2) The Coriolis force:
  - A) causes a deflection to the right in the Southern Hemisphere.
  - B) has a greater effect the longer it acts.
  - C) operates independently of Newton's Second Law.
  - D) determines the motion in which water will spiral down a drain.
- 3) This prevents wind from following the direction of the horizontal pressure gradient force:
  - A) the earth's magnetic field.
  - B) interaction with the solar wind.
  - C) friction with the ground.
  - D) the Coriolis effect.
- 4) Wherever you find a mercury barometer, you'll also find a(n):
  - A) thermometer.
  - B) home testing kit for mercury poisoning.
  - C) anemometer.
  - D) meteorologist.
- 5) This occurs around a high-pressure system when the Coriolis effect exceeds the pressure gradient force, causing air to turn:
  - A) geostrophic flow.
  - B) supergeostrophic flow.
  - C) non-gradient flow.
  - D) subgeostrophic flow.
- 6) The Coriolis effect is strongest at this latitude:
  - A) 90 degrees.
  - B) 45 degrees.
  - C) 15 degrees.
  - D) 0 degrees.
- 7) Anticyclones:
  - A) have air spiraling into them at lower elevations.
  - B) have clockwise winds in the Northern Hemisphere.
  - C) are associated with subgeostrophic winds.
  - D) do not have winds in the upper atmosphere that follow height contours.
- 8) The Coriolis force:
  - A) is caused by pressure gradient forces.
  - B) affects the direction of motion.
  - C) affects the speed of motion.
  - D) is constant.
- 9) Given that the circumference of a circle is 360 degrees, it follows that the earth rotates about this many degrees per hour:
  - A) 10.
  - B) 15.
  - C) 36.
  - D) 360.
- 10) The effect of friction on air:
  - A) increases with height.
  - B) increases the Coriolis force.
  - C) increases wind speed.
  - D) is relevant only within the planetary boundary layer.
- 11) Cyclones:
  - A) experience Coriolis effects that deflect air to the right in the Southern Hemisphere.
  - B) are typically regions of fair weather.
  - C) are associated with supergeostrophic winds.
  - D) are associated with low-pressure systems.

- 12) A geostrophic wind:
- A) flows perpendicular to the pressure gradient force.
  - B) curves around to flow toward its original source.
  - C) follows the pressure gradient force.
  - D) is usually not affected by the Coriolis force.
- 13) Barometric pressure is a measure of:
- A) air density.
  - B) atmospheric moisture.
  - C) the weight of the atmosphere.
  - D) pressure gradient force.
- 14) Geostrophic flow:
- A) occurs when the pressure gradient force equals the Coriolis force.
  - B) can occur in all levels of the atmosphere.
  - C) occurs in atmospheric levels with substantial friction.
  - D) undergoes a constant, or near constant, acceleration.
- 15) An observer would most likely measure the highest air pressure:
- A) on a high mountain top during a heavy thunderstorm.
  - B) anywhere on the surface of Mars.
  - C) on top of Mount Everest.
  - D) on a sunny day on a Hawaiian island beach.
- 16) The four factors that are totally responsible for wind are:
- A) the pressure gradient force, the Coriolis force, the centripetal acceleration, moisture content.
  - B) friction, centripetal acceleration, pressure gradient force, moisture content.
  - C) the Coriolis force, friction, the centripetal acceleration, the pressure gradient force.
  - D) the centripetal acceleration, moisture content, friction, Coriolis force.
- 17) Hydrostatic equilibrium occurs when:
- A) large air masses are moving either up or down.
  - B) the force of gravity and the vertical pressure gradient both act to push air upward.
  - C) the force of gravity and the vertical pressure gradient have equal value and oppose each other.
  - D) the force of gravity and the vertical pressure gradient both act to push air downward.
- 18) Gravity is:
- A) an acceleration.
  - B) an attraction between any two masses.
  - C) a force.
  - D) all of the above
- 19) In the northern hemisphere, a low pressure system:
- A) has counterclockwise flow in at the surface and out at the top of the system.
  - B) has counterclockwise flow in at the top of the system and out at the surface.
  - C) has clockwise flow in at the surface and out at the top of the system.
  - D) has clockwise flow in at the top of the system and out at the surface.
- 20) The Equation of State (Ideal Gas Law) gives a relationship between:
- A) pressure and wind speed.
  - B) pressure, moisture content, and density.
  - C) pressure, temperature, and density.
  - D) pressure, density, and temperature.
  - E) none of the above