

Earth System Science 5: Homework #2 answer sheet (due 4/17/2008)

Name _____ Student ID: _____

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

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Name _____

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

- 1) The solar constant:
 - A) varies inversely with the fourth power of an object's distance from the Sun's surface.
 - B) is higher for Earth than for Mars.
 - C) is the same throughout the solar system.
 - D) is independent of the Stefan-Boltzmann law.
- 2) Convection:
 - A) plays no significant role at night.
 - B) typically transfers heat downward during the day.
 - C) helps circulate heat throughout the atmosphere.
 - D) is less important to making up the atmosphere's radiative energy deficit than is conduction.
- 3) The sky is blue because:
 - A) blue light is not easily absorbed by the atmosphere.
 - B) blue light is reflected off the world's oceans into the atmosphere.
 - C) blue light is not easily scattered by the atmosphere.
 - D) air molecules scatter blue light more readily than other colors of visible light.
- 4) This works primarily on shorter-wavelength radiation:
 - A) Mie scattering.
 - B) Rayleigh scattering.
 - C) nonselective scattering.
 - D) infrared absorption.
- 5) The process by which solar energy interacts with the atmosphere is:
 - A) scattering.
 - B) reflection.
 - C) absorption.
 - D) all of the above
- 6) Mie scattering:
 - A) works best when there are few aerosols in the air.
 - B) occurs often on hazy days.
 - C) diminishes after volcanic eruptions.
 - D) counters the reddening effect responsible for red sunsets and sunrises.
- 7) Absorption:
 - A) is typically greater in desert areas than in humid areas.
 - B) is performed quite well by the atmosphere for visible wavelengths.
 - C) does not prevent most ultraviolet light from reaching Earth's surface.
 - D) is done to differing degrees by different gases.
- 8) The sky is black on the Moon because:
 - A) space reflects all wavelengths of radiation equally.
 - B) the Moon does not have sufficient gravity to attract visible light.
 - C) the Moon contains neither oceans nor vegetation.
 - D) the Moon has no atmosphere.
- 9) Wind systems are generated by:
 - A) the movements of ocean currents.
 - B) different pressures in different places.
 - C) the interaction of the atmosphere with the charged particles of the solar wind.
 - D) the drag on the atmosphere caused by the earth's rotation.

- 10) The atmospheric window:
- A) is caused by the absence of certain gasses.
 - B) is a local phenomenon similar to the ozone hole that opens over Antarctica in winter.
 - C) allows certain wavelengths of longwave radiation to pass through the atmosphere.
 - D) is located at a band of wavelengths between 2 and 6 micrometers.
- 11) On average, the atmosphere absorbs roughly this percentage of the solar radiation that reaches the top of the atmosphere:
- A) 25 percent.
 - B) 14 percent.
 - C) 5 percent.
 - D) 50 percent.
- 12) Net radiation is:
- A) the sole cause of global warming.
 - B) radiation that is left over after a solar flare.
 - C) the solar energy that exceeds the solar constant.
 - D) defined as the difference between absorbed and emitted radiation.
- 13) Insolation reaching the surface of the earth:
- A) is unaffected by Earth's albedo.
 - B) is absorbed by the earth.
 - C) represents about 50 percent of the amount that was at the top of the atmosphere.
 - D) has not yet been affected by backscattering.
- 14) The sky is blue because of:
- A) mie scattering.
 - B) absorption.
 - C) rayleigh scattering.
 - D) reflection.
 - E) refraction.