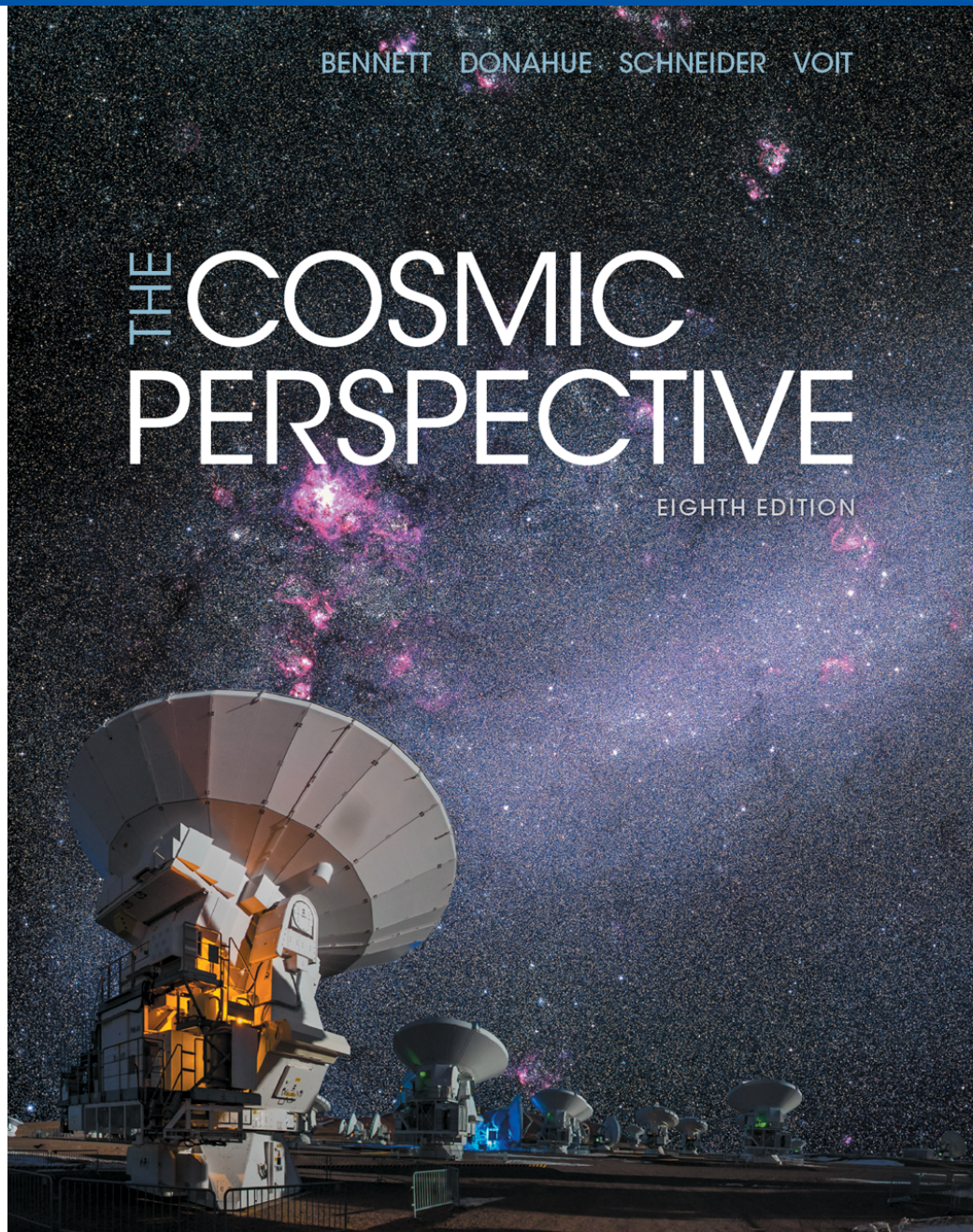
Reading Quiz Clickers

Chapter 5: Light and Matter: Reading Messages from the Cosmos



5.1 Light in Everyday Life

- How do we experience light?
- How do light and matter interact?

What is the average power consumption of a human?

a) 1 joule/s
b) 1 watt
c) 100 watts
d) 1000 watts
e) A and B

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What is a spectrum?

a) A spectrum is the pattern of colors produced when light shines through a prism.
b) A spectrum is the pattern of colors produced when light shines through a diffraction grating.
c) A spectrum is a device used to study the constituent colors of light.
d) A spectrum is the pattern of directions that light travels after reflecting off a surface.
e) A and B

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A red chair appears red to the eye because

a) it emits red light.
b) it transmits red light.
c) it absorbs red light.
d) it reflects red light.
e) all of the above

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The speed of light is

a) about 30,000 km/s.
b) the product of its wavelength and its frequency.
c) dependent on the strength of the electromagnetic field.
d) all of the above

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5.2 Properties of Light

- What is light?
- What is the electromagnetic spectrum?

Light with a short wavelength

a) has a lower frequency than light with a long wavelength.
b) is redder than light with a long wavelength.
c) has less energy than light with a long wavelength.
d) all of the above
e) none of the above

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How does visible light compare to radio waves?

a) Visible light is a form of light wave while radio waves are not.
b) Radio waves are a form of electromagnetic wave, while visible light is not.
c) Visible light waves have a shorter wavelength than radio waves.
d) Radio waves have a higher frequency than visible light waves.
e) All of the above

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A photon with a longer wavelength

a) is more energetic than a photon with a short wavelength.
b) travels slower than a photon with a short wavelength.
c) is more blue than a photon with a short wavelength.
d) has a lower frequency than a photon with a short wavelength.
e) All of the above

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Turning up the intensity of a light source

a) increases the number of photons it emits per second.
b) decreases the frequency of the photons it emits.
c) increases the frequency of the photons it emits.
d) increases the speed of the photons it emits.
e) none of the above

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5.3 Properties of Matter

- What is the structure of matter?
- What are the phases of matter?
- How is energy stored in atoms?

What is the atomic mass number of carbon-13 (6 protons, 7 neutrons, 6 electrons)?

a) 6
b) 7
c) 13
d) 19
e) 12

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A molecule is

a) a collection of protons and neutrons.
b) a collection of protons, neutrons, and electrons.
c) two or more atoms linked together.
d) an atom that is missing one or more electrons.

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Which lists the phases of matter in order of increasing temperature?

a) solid, gas, plasma, liquid
b) solid, liquid, plasma, gas
c) plasma, gas, liquid, solid
d) plasma, liquid, gas, solid
e) solid, liquid, gas, plasma

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A plasma is a

a) gas of ions.
b) charged solid.
c) neutral liquid.
d) neutral gas.
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What is the pressure exerted by Earth's atmosphere on the surface of Earth?

a) 273 Kelvin
b) 14.7 pounds per square inch
c) 273 pounds per square inch
d) 1 pound per square inch
e) 147 pounds per square inch

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How do electrons in an atom change energy?

a) Electrons can only gain energy by leaving the atom (creating an ion).
b) Electrons move between discrete energy levels, or escape the atom if given enough energy.
c) Electrons can have any energy below the ionization energy within the atom, or escape if given enough energy.
d) Electrons can have any energy within the atom, and cannot be given enough energy to cause them to escape the atom.
e) Electrons move between discrete energy levels within the atom, and cannot accept an amount of energy that causes them to escape the atom.

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5.4 Learning from Light

- What are the three basic types of spectra?
- How does light tell us what things are made of?
- How does light tell us the temperature of planets and stars?
- How does light tell us the speed of a distant object?

The spectrum from an incandescent (with a filament) light bulb is a(n)

a) continuous spectrum.
b) emission line spectrum.
c) absorption line spectrum.
d) combination of A and B.
e) combination of B and C.

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The wavelengths of emission lines from a gas depend on

a) the electron energy levels of atoms in the gas.
b) how ionized the gas is.
c) the rotation and vibration energy levels of molecules in the gas.
d) all of the above.
e) none of the above.

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Wien's Law states that

a) hotter objects produce more emission lines than cooler objects.
b) hotter objects produce emission lines at shorter wavelengths than cooler objects.
c) hotter objects are brightest at a shorter wavelength than cooler objects.
d) all of the above.
e) none of the above.

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How does the Doppler effect affect an emission line spectrum if the emitting object is rotating?

a) It does not change.
b) The emission lines get broader.
c) The emission lines get narrower.
d) The emission lines move closer to each other.
e) The emission lines move further from each other.

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