Review Test Submission: 5 CHAPTER QUIZ

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Course	1501_Stars Galaxies and the Universe [1501_ASTR_1960_00]
Test	5 CHAPTER QUIZ
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Attempt Score	23 out of 25 points
Time Elapsed	13 minutes.
Instructions	

Question 1

1 out of 1 points

How do we get most of our knowledge about our universe?

Selected Answer: c. through observation of light from astronomical objects

Correct Answer: c. through observation of light from astronomical objects

Response Feedback: FEEDBACK: Light carries information about an object's temperature, composition, and speed, and sometimes can even provide clues about the material that the light passed through on its way (page 118).

Question 2

1 out of 1 points

Light is a means of transporting

Selected Answer: a. energy.

Correct Answer: a. energy.

Response Feedback: FEEDBACK: Light is the principal way in which energy emitted or reflected from objects in our universe is carried to Earth (page 118).

Question 3

1 out of 1 points

Why did Galileo fail at obtaining the speed of light when he attempted to calculate it by measuring the time it took to travel between two points?

Selected Answer: a. Light travels too fast.

Correct Answer: a. Light travels too fast.

Response Feedback: FEEDBACK: Galileo did not have an accurate way to measure the fraction of a second that it took for light to travel distances across line-of-sight distances on Earth (page 118).

Question 4

1 out of 1 points

Romer found that he measured different periods of time for the same satellite of Jupiter, demonstrating that

Selected Answer: a. it took light a measurable amount of time to travel.

Correct Answer: d. it took light a measurable amount of time to travel.

Response Feedback: FEEDBACK: Romer measured longer times when Earth was farther from Jupiter and shorter times when Earth was closer. At its farthest distance, Earth was 2 AU farther than at its closest distance. This amounted to a difference of about 16½ minutes, which was just the time that it took light to travel across the 2-AU diameter of Earth's orbit (page 118).

Question 5

1 out of 1 points

A light-year is

Selected Answer: a. the distance traveled by light in one year

Correct Answer: d. the distance traveled by light in one year

Response Feedback: FEEDBACK: A light-year is a unit of distance, not time. A parsec is another unit of distance and is equal to 3.26 light-years. Astronomers sometimes measure shorter distances in a light-minute, which is the distance light travels in one minute (page 119).

Question 6

1 out of 1 points

Light can be generally described as

Selected Answer: a. an electromagnetic wave.

Correct Answer: a. an electromagnetic wave.

Response Feedback: FEEDBACK: Light waves are caused by the disturbance of oscillating electric charges. These disturbances cause changes in the strength of the electric and magnetic fields (page 119).

Question 7

1 out of 1 points

The frequency of a wave is defined as the

Selected Answer: d. number of wave crests passing a pointing space each second.

Correct Answer: a. number of wave crests passing a pointing space each second.

Response Feedback: FEEDBACK: The unit of frequency is cycles per second, or hertz (Hz). Every crest of a wave is a new oscillation, so the frequency of a wave equals the number of oscillations that occur each second (page 119). See also, Light as a Wave, Light as a Photon.

Question 8

1 out of 1 points

As light's wavelength decreases, its

Selected Answer: d. frequency increases.

Correct Answer: c. frequency increases.

Response Feedback: FEEDBACK: Wavelength is equal to the speed of light divided by frequency. The speed of light is a constant, so if wavelength decreases, it must mean that frequency gets larger (page 119). See also, Light as a Wave, Light as a Photon.

Question 9

1 out of 1 points

Which of these ranges of electromagnetic radiation has the longest wavelengths?

Selected Answer: c. radio waves

Correct Answer: c. radio waves

Response Feedback: FEEDBACK: Radio waves are electromagnetic radiation with wavelengths ranging from a few centimeters to hundreds of meters (page 120). See also, EM Spectrum Module

Question 10 1 out of 1 points

Which of these ranges of electromagnetic radiation has the shortest wavelength?

Selected Answer: c. X-rays

Correct Answer: c. X-rays

Response Feedback: FEEDBACK: Of the selections for this answer, X-rays are the shortest wavelength but gamma rays are a category of the electromagnetic spectrum that has even shorter wavelengths (less than 10-10 meter) (page 120). See also, EM Spectrum Module.

Question 11 1 out of 1 points

The energy of light is proportional to its

Selected Answer: b. frequency.

Correct Answer: b. frequency.

Response Feedback: FEEDBACK: Light's behavior can also be explained by describing it as a particle—a photon. A photon packs an amount of energy that is directly proportional to its frequency (page 123). See also, Light as a Wave, Light as a Photon.

Question 12 1 out of 1 points

Which of the following photons of electromagnetic radiation carry the highest energy?

Selected Answer: d. gamma rays

Correct Answer: a. gamma rays

Response Feedback: FEEDBACK: Gamma rays, which have the highest frequency, are also the photons that carry the highest package of energy (page 120). See also, Light as a Wave, Light as a Photon and EM Spectrum Module.

Question 13

0 out of 1 points

Our model of the atom today represents the electrons as clouds surrounding the nucleus. This is a result of the fact that

Selected Answer: d. electrons are orbiting the nucleus in well-defined orbits, like a miniature solar system.

Correct Answer: d. electrons have wave properties, and their location and momentum cannot be known exactly.

Response Feedback: FEEDBACK: The Bohr model, in which the atom is viewed as a positive nucleus surrounded by electrons in well-defined orbits, would result in atoms that would radiate away their energy and vanish. A better model for the atom is one in which electrons behave like waves for which we cannot precisely measure either their position or their momentum (page 126). See also, Atomic Energy Levels and the Bohr Model and Hydrogen Atom Simulator.

Question 14

1 out of 1 points

When an atom's energy decays from an excited state to a lower state,

Selected Answer: c. it emits a photon of light.

Correct Answer: c. it emits a photon of light.

Response Feedback: FEEDBACK: When an atom changes from an excited state to a lower energy state, it must lose the extra energy in some way. Atoms can give away their energy by emitting a photon of light that carries away exactly that energy (page 126). See also, Atomic Energy Levels and Light Emission and Absorption and Hydrogen Atom Simulator.

Question 15

1 out of 1 points

From the absorption lines in the spectrum of a cloud, it is possible to determine the

Selected Answer: c. type of atoms in the cloud.

Correct Answer: c. type of atoms in the cloud.

Response Feedback: FEEDBACK: Each type of atom has a unique set of energy states and therefore a unique set of wavelengths at which it can emit light (page 126). See also, Atomic Energy Levels and the Bohr Model, the Hydrogen Atom Simulator and

Three Views Spectrum Demonstrator.

Question 16 1 out of 1 points

An object that is redshifted is

Selected Answer: b. moving away from us.

Correct Answer: b. moving away from us.

Response Feedback: FEEDBACK: Light from a source that is moving away from us is shifted to longer wavelengths. We call this a redshift because the change in wavelength is toward the red end of the spectrum (page 135). See also, Doppler Effect and Doppler Shift Demonstrator.

Question 17 1 out of 1 points

An object whose absorption lines are of shorter wavelengths than they would be in a stationary laboratory is

Selected Answer: b. moving toward us.

Correct Answer: c. moving toward us.

Response Feedback: FEEDBACK: Light from an object that is moving toward us will be blueshifted, meaning that the wavelengths will be shorter than if we detected the light from that object when it is not moving with respect to us (page 135). See also, Doppler Effect and Doppler Shift Demonstrator.

Question 18 1 out of 1 points

Earth is

Selected Answer: c. receiving heat from the Sun.

Correct Answer: d. receiving heat from the Sun.

Response Feedback: FEEDBACK: Earth absorbs energy from the Sun but also radiates energy back into space (page 137).

Question 19 1 out of 1 points

The average energy involved in individual atoms randomly moving about is expressed in terms of

Selected Answer:

d. temperature.

Correct Answer: a. temperature.

Response Feedback: FEEDBACK: Temperature is defined as a measure of the average kinetic energy of individual atoms making up an object (page 138).

Question 20

1 out of 1 points

Astronomical object A is more luminous than astronomical object B, but both these objects are exactly the same in diameter. What can we conclude?

Selected Answer: c. Object A is at a higher temperature.

Correct Answer: c. Object A is at a higher temperature.

Response Feedback: FEEDBACK: The Stefan–Boltzmann law says that the energy radiated by each square meter of an object emitting thermal radiation is proportional to the fourth power of its temperature (page 138). See also, Blackbody Curves and Blackbody Curves of Melting.

Question 21

1 out of 1 points

We measure the temperature of the Sun by analyzing the

Selected Answer: b. peak wavelength emitted by the Sun.

Correct Answer: b. peak wavelength emitted by the Sun.

Response Feedback: FEEDBACK: For an object emitting thermal radiation, Wien's law states that the peak (highest intensity radiation) of the spectrum is inversely proportional to its temperature (page 139). See also, Blackbody Curves and Blackbody Curves of Melting.

Question 22

1 out of 1 points

A star that is noticeably redder in color than another is likely

Selected Answer: b. at a lower temperature than the other.

Correct Answer: b. at a lower temperature than the other.

Response Feedback: FEEDBACK: A star that emits more light in the red part of the spectrum has a peak at a longer wavelength than a star that appears bluer in color. According to Wien's law, the redder star is cooler (page 140). See also, Blackbody

Curves and Blackbody Curves of Melting.

Question 23 1 out of 1 points

The distance between us and a star affects its

Selected Answer: b. brightness.

Correct Answer: d. brightness.

Response Feedback: FEEDBACK: Brightness is the light energy we receive from a star divided by the surface area over which that light is spread. If we are farther from a star, the sphere that surrounds the star is bigger than if we were closer; therefore the measured brightness of the star is less than if we were closer (page 141). See also, Flux Simulator.

Question 24 0 out of 1 points

The temperature of a planet depends on

Selected Answer: b. the energy it radiates into space.

Correct Answer: c. All the possible answers are correct.

Response Feedback: FEEDBACK: Because planets are at thermal equilibrium, the energy absorbed by a planet is balanced by the energy radiated by a planet (page 143).

Question 25 1 out of 1 points

The fraction of sunlight reflected from a planet is

Selected Answer: c. its albedo.

Correct Answer: c. its albedo.

Response Feedback: FEEDBACK: Albedo is defined as the fraction of sunlight reflected from a planet. An albedo of 0.5 means that the planet reflects half the sunlight it receives (page 143).

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