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🏠   Assessments / Tests   **Review Test Submission: Major-Exam-01**

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User	HASSAN ALALI
Course	222-PHYS-215-02(Introduction to Astronomy)
Test	Major-Exam-01
Started	2/26/23 1:01 PM
Submitted	2/26/23 1:54 PM
Status	Completed
Attempt Score	15.6 out of 20 points
Time Elapsed	52 minutes out of 53 minutes
Results Displayed	All Answers, Submitted Answers, Correct Answers

Question 1

0 out of 0 points

Formulae

$$E = hf$$
$$\lambda f = C$$
$$E = \sigma T^4$$
$$\lambda_{max}T = 2.9 \times 10^7 \; A^oK$$
$$L = 4\pi R^2 \sigma T^4$$
$$A = \pi D^2/4$$
$$\theta_{min} = 0.00206 \; \lambda/D$$
$$b_A = 100^{\frac{m_b - m_A}{5}} b_B$$
$$F = G\frac{m_1 m_2}{R^2}$$
$$\frac{T^2}{a^3} = \left(\frac{4\pi^2}{GM}\right)$$
$$T^2 = a^3 \qquad \text{If } T \text{ in years and } a \text{ in AU}$$

Constants

$$C = 3 \times 10^8 \, \text{m/s}$$
$$h = 6.62607015 \times 10^{-34} \, \text{m}^2\text{kg/s}$$
$$\sigma = 5.670374419 \times 10^{-8} \, \text{W/m}^2\text{K}^4$$
$$1 \, \text{nm} = 1 \times 10^{-9} \, \text{m}$$
$$1 \, A^o = 1 \times 10^{-10} \, \text{m}$$
$$G = 6.67 \times 10^{-11} \, \text{N.m}^2/\text{kg}^2$$
$$1 \, \text{AU} = 1.496 \times 10^{11} \, \text{m}$$
$$\text{Mass of the Sun} = 1.989 \times 10^{30} \, \text{kg}$$

Selected Answer: ✓ True
Answers: ✓ True
                    False

Question 2

0 out of 0.6 points

The Ozone layer exists between which Earth's atmospheric layers

Selected Answer: ❌ a. Troposphere and Stratosphere

Answers: a. Troposphere and Stratosphere

                   ✅ b. Stratosphere and Mesosphere

                   c. None of the above. Ozone is the top layer of the atmosphere.

                   d. Mesosphere and Ionosphere

Question 3

0.6 out of 0.6 points

At any given coastal location on Earth, when the Moon is overhead, high tide occurs
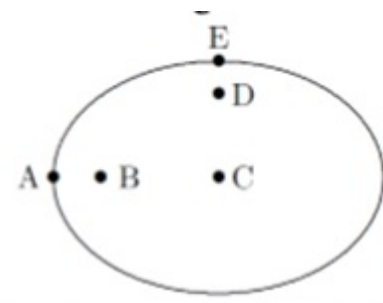
Selected Answer: ✅ d. twice a day

Answers: a. once in a month

                   b. once in 6 hours

                   c. once a day

                   ✅ d. twice a day

Question 4

0.6 out of 0.6 points

The elliptical orbit of a planet around the Sun is shown on the diagram. Which of the following statements is correct?

Selected Answer: ✅ c. the sun might be at point B

Answers: a. the eccentricity of the orbit is much greater than 1

                   b. the eccentricity of the orbit is zero

                   ✅ c. the sun might be at point B

                   d. the planet might be at point D

Question 5

0.6 out of 0.6 points

As measured in the laboratory, the prominent H_α spectral line of hydrogen has a wavelength $\lambda_0 = 656.285$ nm. But in the spectrum of the star Vega this line has a wavelength $\lambda = 656.255$ nm. What can we conclude about the motion of Vega?

Selected Answer: ✓ c. The star Vega is moving towards the Earth.

Answers:
    a. The spectrum of the star Vega is shifted to a longer wavelength

    b. The star Vega is not moving.

    ✓ c. The star Vega is moving towards the Earth.

    d. The star Vega is moving away from Earth.

Question 6

0 out of 0.6 points

Mercury's sidereal rotational period is 59 days, and its orbital period is 88 days. Assume that you live on Mercury and the Sun is overhead now, how many more hours/days do you have to wait to see the Sun overhead again exactly at the same location?

Selected Answer: ✗ c. 118 days

Answers:
    a. 24 days

    b. 59 days

    c. 118 days

    ✓ d. 176 days

Question 7

0.6 out of 0.6 points

The Earth's lithosphere consists of

Selected Answer: ✓ a. the upper mantle and crust

Answers:
    ✓ a. the upper mantle and crust

    b. the outer core and inner mantle.

    c. the mantle and crust.

    d. the crust.

Question 8

0.6 out of 0.6 points

Venus's surface is exceptionally hot primarily because its atmosphere traps

Selected Answer: ✅ d. Infrared

Answers: a. Ultraviolet

                    b. X-rays

                    c. Microwaves

                    ✅ d. Infrared

Question 9

0 out of 0.6 points

The telescope that observes a wide field of view some $7^o \times 7^o$ is called:

Selected Answer: ❌ c. Cassegrain telescope

Answers: a. Newtonian telescope

                    b. Galilean telescope

                    c. Cassegrain telescope

                    ✅ d. Non of the above

Question 10

0.6 out of 0.6 points

A ground-based telescope to observe x-rays would

Selected Answer: ✅ a. be worthless because x-rays cannot get through the Earth's atmosphere

Answers: ✅ a. be worthless because x-rays cannot get through the Earth's atmosphere

                    b. be worthless because astronomers have not yet devised detectors sensitive to x-rays

                    c. be useful only to study the temperature of hot stars but not planets and moons.

                    d. give astronomers a chance to study the hot interiors of stars and planets

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Question 11

0.6 out of 0.6 points

Which of the following answers makes the statement true? In a vacuum, photons of higher energy

Selected Answer: ✅ d. have higher frequencies and shorter wavelengths than lower-energy photons.

Answers: a. have more mass than lower-energy photons.

                    b. move faster than lower-energy photons.

                    c. are not as likely to become redshifted as lower-energy photons.

✅ d. have higher frequencies and shorter wavelengths than lower-energy photons.

Question 12

0.6 out of 0.6 points

What is the name of the Atmospheric layer (2) in the image below?
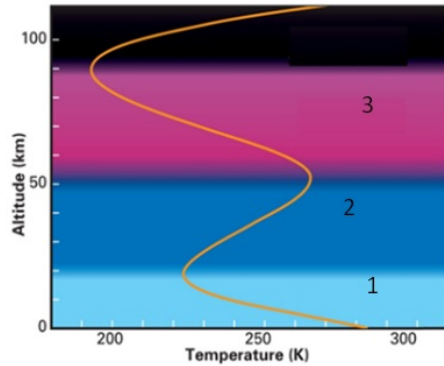
Selected Answer: ✅ d. Stratosphere

Answers: a. Mesosphere

                      b. Troposphere

                      c. Ionosphere

                      ✅ d. Stratosphere

Question 13

0.6 out of 0.6 points

Which of the following is **not true** for moon

Selected Answer: ✅ a. mass concentration near and under maria could be anything but lava

Answers: ✅ a. mass concentration near and under maria could be anything but lava

                      b.
                      The time of rotation of the moon about its axis is the same as the time it takes to revolve around the earth.

                      c. Earth always faces the same side to the moon

                      d.
                      The night and day sides on the moon are separated by a line called the "terminator".

Question 14

0.6 out of 0.6 points

If you want a radio telescope to achieve the same angular resolution as a visible light telescope, then the radio telescope needs to be:

Selected Answer: ✅ a. much larger

Answers: ✅ a. much larger

                       b. in space

                       c. much smaller

                       d. slightly smaller

Question 15

0.6 out of 0.6 points

The table below shows the rises, the highest point in the sky, and sets times for the moon. What should be the times for I, II, III **in order (rises, the highest point in the key, sets)**

Phase/Event	First quarter moon
rises at	I
is highest in the sky at	II
sets at	III

Selected Answer: ✅ d. around noon, around sunset, around midnight

Answers: a. around sunset, around midnight, around sunrise

                       b. around midnight, around sunrise, around noon

                       c. around sunrise, around noon, around sunset

                    ✅ d. around noon, around sunset, around midnight

Question 16

0 out of 0.6 points

Which of the following statements about the terrestrial planets is FALSE?

Selected
Answer: ❌ a.
              Despite being the closest planet to the Sun, some parts of Mercury have a surface temperature far below the freezing point of water.

Answers: a.
              Despite being the closest planet to the Sun, some parts of Mercury have a surface temperature far below the freezing point of water.

              ✅ b.
              Earth's atmosphere allows the Sun's infrared radiation in but doesn't allow much visible light to escape, resulting in the greenhouse effect.

                 c.
              Long ago, Mars probably had a thicker atmosphere than it does now, with sufficiently high temperatures and pressures to allow liquid water to exist on its surface.

                 d.
              Venus is the hottest planet in our solar system, mainly due to an elevated greenhouse effect.

Question 17

0.6 out of 0.6 points

Which of the following is **not true** about the Van Allen Blet?

Selected Answer: ✅ b. Since the earth is spherical, it always has a perfectly spherical shape

Answers: a. It is a charged particle-trapping region in our atmosphere

                 ✅ b. Since the earth is spherical, it always has a perfectly spherical shape

                 c. It is the effect of the earth's magnetic field

                 d. It causes the aura

Question 18

0.6 out of 0.6 points

The hottest planet is

Selected Answer: ✅ b. venus

Answers: a. Mercury

                 ✅ b. venus

                 c. Earth

                 d. Mars

Question 19

0.6 out of 0.6 points

Why does Mars appear reddish-orange from Earth?

Selected Answer: ✅ b. Some rocks on Mars contain reddish-orange iron oxides due to rusting.

Answers: a.
Its surface temperature is lower than that of the Earth, which appears blue, and according to Wien's law Mars is therefore redder.

                 ✅ b. Some rocks on Mars contain reddish-orange iron oxides due to rusting.

                 c. Its thick atmosphere consists of reddish-orange clouds.

                 d. It is moving away from us rapidly and hence is Doppler redshifted.

Question 20

0.6 out of 0.6 points

Spherical aberration is a problem in telescopes and it refers to,

Selected Answer: ✅ c. reflecting: differing focal points from different parts of the lens.

Answers: a. refracting: the smearing of light due to atmospheric turbulence

b. reflecting: the smearing of light due to atmospheric turbulence.

✅ c. reflecting: differing focal points from different parts of the lens.

d. refracting: differing focal lengths for different wavelengths of light.

Question 21   0.6 out of 0.6 points

Mercury's transit across the Sun means

Selected   ✅ b.
Answer: About 15 times per century, Mercury can be seen as a black dot crossing the Sun.

Answers: a. Mercury is moving in an elliptical orbit around the Sun

                  ✅ b.
                  About 15 times per century, Mercury can be seen as a black dot crossing the Sun.

                      c. Mercury has a very thin atmosphere.

                      d. Mercury rises and sets almost at the same time as the Sun.

Question 22   0.6 out of 0.6 points

A star has a surface temperature of 6,000 K, in what part of the electromagnetic spectrum is this peak?

Selected Answer: ✅ a. Visible

Answers: ✅ a. Visible

                       b. Ultraviolet

                       c. X-rays

                       d. Infrared

Question 23   0.6 out of 0.6 points

Suppose the peak of a particular star's spectrum occurs at about 6,000 Å. What is the star's surface temperature?

Selected Answer: ✅ d. 4,800 K

Answers: a. 5,800 K

                       b. 48,000 K

                       c. 6,000 K

                    ✅ d. 4,800 K

Question 24   0.6 out of 0.6 points

The surface of Venus is best observed using:

Selected Answer: ✅ d. Radar.

Answers:
    a. Ultraviolet satellites

    b. Large optical telescopes.

    c. Large radio telescopes

    ✅ d. Radar.

Question 25

0.6 out of 0.6 points

The correct order to arrange (X-rays, Infrared, Ultraviolet, and Visible) parts of the electromagnetic spectrum from longer to shorter wavelengths is:

Selected Answer: ✅ c. Infrared, Visible, Ultraviolet, X-rays

Answers:
    a. X-rays, Infrared, Ultraviolet, Visible

    b. Ultraviolet, Visible, Infrared, X-rays

    ✅ c. Infrared, Visible, Ultraviolet, X-rays

    d. X-rays, Infrared, Visible, Ultraviolet

Question 26

0.6 out of 0.6 points

Which one of the following statements about electromagnetic waves is false?

Selected Answer: ✅ d.
If electromagnetic wave A has twice the wavelength of electromagnetic wave B, then A also has twice the frequency of B.

Answers:
    a.
The measured speed of an electromagnetic wave is independent of the speed of its source relative to the observer.

    b.
Human eyes are able to detect only a tiny fraction of all possible electromagnetic waves.

    c.
"White light" such as sunlight actually consists of many electromagnetic waves, having different wavelengths, mixed together.

    ✅ d.
If electromagnetic wave A has twice the wavelength of electromagnetic wave B, then A also has twice the frequency of B.

Question 27

0 out of 1 points

If a star has three times the radius of the Sun and three times the flux of the Sun. Find the star's luminosity in Watts (W). The Sun's radius is 6.96×10^8 m, and the Sun's energy flux is 6.41×10^7 Wm$^-$^{2}

Selected Answer: ❌ c. 3.12×10^{27}

Answers:
    a. 2.50×10^{28}

    b. 3.90×10^{26}

    c. 3.12×10^{27}

    ✅ d. 1.05×10^{28}

Question 28
0 out of 1 points

What is the diffraction-limited resolution (in arcsec) for red light with wavelength 640 nm in a telescope on 6 m objective lens?

Selected Answer: ❌ d. 0.061

Answers:
    ✅ a. 0.020

    b. 0.031

    c. 0.015

    d. 0.061

Question 29
1 out of 1 points

A star radiates a spectrum of electromagnetic radiation with its peak at the wavelength of 414 nm. Assuming the star is a blackbody, estimate its surface temperature.

Selected Answer: ✅ c. 7000 K

Answers:
    a. 8500 K

    b. 7500 K

    ✅ c. 7000 K

    d. 8000 K

Question 30
1 out of 1 points

A certain small asteroid (a rocky body a few tens of kilometers across) takes **eight years** to complete an orbit around the Sun. What is the semimajor axis of the asteroid in AU?

Selected Answer: ✅ c. 4.0

Answers:
    a. 7.4

    b. 6.3

c. 4.0

d. 5.2

Question 31

1 out of 1 points

Find the energy of a photon of electromagnetic radiation of wavelength 180 nm.

Selected Answer:

✓ d. 1.10×10^{-18} J

Answers:

a. 1.99×10^{-18} J

b. 1.32×10^{-18} J

c. 6.62×10^{-18} J

✓ d. 1.10×10^{-18} J

Thursday, June 8, 2023 3:21:55 AM AST

← **OK**