PHYSICS · ARIZONA

Physics
Practice Test

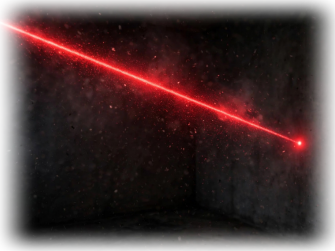
Unit 4: Light and Modern Physics

25 Questions

Original practice test based on the Arizona curriculum. Work through each question, then check your answers at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

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Question 1

Use $hc = 1240$ eV nm. A photon of red light of wavelength 620 nm has energy

A) 0.5 eV

B) 2 eV

C) 4 eV

D) 1 eV

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Question 2

Light of frequency 6×10^{14} Hz travels at 3.0×10^{8} m/s. Its wavelength is

A) 50 nm

B) 5 nm

C) 1800 nm

D) 500 nm

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Question 3

In hydrogen, level 3 has energy -1.51 eV and level 2 has energy -3.40 eV. A photon emitted in a 3 to 2 transition has energy closest to

A) 0.44 eV

B) 1.51 eV

C) 4.91 eV

D) 1.89 eV

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Question 4

Light from a galaxy moving away from Earth is redshifted, which means its wavelength is

A) the same

B) zero

C) shorter

D) longer

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Question 5

In the photoelectric effect, increasing the intensity of light above the threshold frequency mainly increases the

A) number of electrons emitted per second

B) maximum kinetic energy of each electron

C) wavelength of the light

D) threshold frequency

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Question 6

In the photoelectric effect, no electrons are emitted when the light frequency is below the

A) speed of light

B) threshold frequency

C) amplitude

D) intensity

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Question 7

A magnifying glass, which is a converging lens, forms a real image when the object is placed

A) inside the focal length

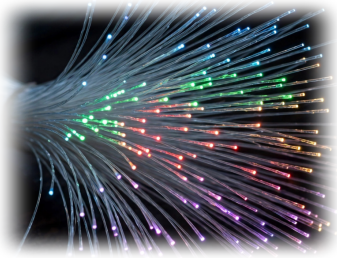
B) at the lens

C) at the focal point

D) outside the focal length

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Question 8

In a fibre – optic strand, total internal reflection can happen when light travels from

A) a vacuum to air

B) air to glass

C) glass to air above the critical angle

D) air to water

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Question 9

When light enters a glass of water from air at an angle, it slows down and bends

A) away from the normal

B) toward the normal

C) back along its path

D) not at all

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Question 10

When a wave passes through a narrow opening, it spreads out. This effect is called

A) refraction

B) reflection

C) diffraction

D) polarization

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Question 11

When two waves meet crest to crest, they add up to give a brighter result. This is

A) constructive interference

B) destructive interference

C) absorption

D) scattering

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Question 12

An alpha particle consists of

A) two protons and two neutrons

B) one proton and one electron

C) four electrons

D) two protons only

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Question 13

In beta decay, a neutron in the nucleus changes into a proton and emits an

A) alpha particle

B) electron

C) photon only

D) extra neutron

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Question 14

A sample of 80 g of a radioactive material decays through two half lives. The mass remaining is

A) 160 g

B) 40 g

C) 20 g

D) 10 g

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Question 15

A sample of 160 g of a radioactive material decays through three half lives. The mass remaining, in grams, is ____

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Question 16

Nuclear fission is the process in which a heavy nucleus

A) splits into smaller nuclei

B) joins with another nucleus

C) loses only electrons

D) becomes stable by gaining mass

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Question 17

Nuclear fusion is the process in which light nuclei

A) split apart

B) join together

C) emit only electrons

D) stop moving

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Question 18

The equation $E = mc^2$ shows that even a small amount of mass can be converted into a

A) small amount of energy

B) large amount of energy

C) fixed amount of charge

D) fixed amount of volume

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Question 19

In the Bohr model of the atom, electrons occupy

A) random positions everywhere

B) the nucleus only

C) allowed energy levels

D) one fixed orbit only

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Question 20

For a moving particle, as its momentum increases, its de Broglie wavelength

A) increases

B) decreases

C) stays the same

D) becomes zero at once

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Question 21

As the frequency of a photon increases, its energy

A) decreases

B) stays the same

C) increases

D) becomes zero

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Question 22

Use $hc = 1240$ eV nm. A photon of wavelength 400 nm has energy, in electron volts, of ____

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Question 23

Light of frequency 5×10^{14} Hz travels at 3.0×10^{8} m/s. Its wavelength, in nanometers, is ____

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Question 24

A concave mirror can form a real image when the object is placed beyond the

A) mirror surface

B) focal point

C) center of the mirror

D) image itself

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Question 25

Each element gives off a unique pattern of bright lines in its emission spectrum, which can be used to

A) identify the element

B) measure its mass directly

C) change its atomic number

D) make it radioactive

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ANSWER KEY

1.	B	**10.**	C	**18.**	B
2.	D	**11.**	A	**19.**	C
3.	D	**12.**	A	**20.**	B
4.	D	**13.**	B	**21.**	C
5.	A	**14.**	C	**22.**	3.1
6.	B	**15.**	20	**23.**	600
7.	D	**16.**	A	**24.**	B
8.	C	**17.**	B	**25.**	A
9.	B				

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