OKLAHOMA PHYSICS · UNIT 4 · 25 QUESTIONS

# Light and Modern Physics — Practice Test

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.

**1** **Light travels from air into glass and slows down. The ray bends**

- A toward the normal
- B away from the normal
- C not at all
- D back on itself

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**2** **Light in air hits a boundary at an incidence angle of 20 degrees. If the incidence angle doubles to 40 degrees, the reflection angle**

- A It stays at 20 degrees
- B It halves to 10 degrees
- C It doubles to 40 degrees
- D It becomes 90 degrees

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3 **A ray in a medium of refractive index 1.5 enters air. If sin θ for the incident ray is 0.60, the sine of the refracted angle is**

- A 0.40
- B 0.90
- C 1.50
- D 0.60

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4 **The critical angle is the incidence angle at which the refraction angle is**

- A 0 degrees
- B 45 degrees
- C 180 degrees
- D 90 degrees

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5 **A converging lens can form a real image that is**

- A always upright
- B always virtual
- C always the same size
- D inverted

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6 **An object 6 cm tall is magnified by 2. Its image height is**

- A 3 cm
- B 8 cm
- C 12 cm
- D 4 cm

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**7** **In the photoelectric effect, increasing the light intensity at fixed frequency increases the**

- A maximum kinetic energy of electrons
- B number of electrons emitted per second
- C work function
- D threshold frequency

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**8** **In the photoelectric effect, no electrons are emitted below the**

- A threshold frequency
- B speed of light
- C critical angle
- D work function voltage

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**9** **The energy of a photon is proportional to its**

- **A** wavelength
- **B** frequency
- **C** speed
- **D** mass

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**10** **Use $h = 6.63 \times 10^{-34}$ J s. A photon of frequency $2.0 \times 10^{14}$ Hz has energy about**

- **A** $1.33 \times 10^{-19}$ J
- **B** $3.32 \times 10^{-20}$ J
- **C** $1.33 \times 10^{-48}$ J
- **D** $3.32 \times 10^{-48}$ J

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11 **An atom emits light when an electron moves to a**

A higher energy level

B lower energy level

C unchanged energy level

D zero energy level

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12 **The half life of a sample is 10 years. After 30 years, the fraction remaining is**

A one half

B one fourth

C one third

D one eighth

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13 **In nuclear fission, a heavy nucleus splits into**

A two lighter nuclei

B one heavier nucleus

C only electrons

D only photons

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14 **In nuclear fusion, light nuclei join to form a**

A heavier nucleus

B lighter nucleus

C photon only

D neutron only

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**15** **The energy released when mass is converted follows**

- **A** $E = mc$
- **B** $E = mc^2$
- **C** $E = mv^2$
- **D** $E = mgh$

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**16** **A sample starts with 80 g of a radioactive isotope. After two half lives, the mass remaining is**

- **A** 80 g
- **B** 40 g
- **C** 10 g
- **D** 20 g

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17 **Alpha radiation consists of**

A electrons

B helium nuclei

C photons

D protons alone

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18 **Beta minus radiation consists of**

A helium nuclei

B photons

C electrons

D neutrons

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19 **Gamma radiation consists of**

A electrons

B helium nuclei

C high energy photons

D protons

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20 **White light passing through a prism spreads into colors because different colors**

A have the same speed in glass

B refract by different amounts

C are absorbed equally

D travel in straight lines only

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21 **An object 4 cm tall is magnified by 3. Its image height, in centimeters, is _____**

ANSWER _____

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22 **A sample starts with 64 g of a radioactive isotope. After one half life, the mass remaining, in grams, is _____**

ANSWER _____

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23 **A photon has frequency $1.0 \times 10^{15}$ Hz. Using $E = hf$ and $h = 6.63 \times 10^{-34}$ J s, its energy in joules is 6.63 × 10^_____**

ANSWER _____

Understand It with Pulse | Flag a mistake

24 **Light of wavelength 600 nm in air enters glass of refractive index 1.5. Its wavelength in glass, in nanometers, is _____**

ANSWER _____

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25 **The speed of light in a vacuum divided by the speed of light in a medium gives the medium**

A critical angle

B refractive index

C focal length

D work function

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# ANSWER KEY

| | | | | | |
|---|---|---|---|---|---|
| **1.** | A | **10.** | A | **19.** | C |
| **2.** | C | **11.** | B | **20.** | B |
| **3.** | B | **12.** | D | **21.** | 12 |
| **4.** | D | **13.** | A | **22.** | 32 |
| **5.** | D | **14.** | A | **23.** | -19 |
| **6.** | C | **15.** | B | **24.** | 400 |
| **7.** | B | **16.** | D | **25.** | B |
| **8.** | A | **17.** | B | | |
| **9.** | B | **18.** | C | | |

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