

Brett Robbins Academic Consulting

Physics 30 Practice Test

Unit C: Electromagnetic Radiation

10 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

A weather radar system emits electromagnetic radiation with a wavelength of 2.0 cm.

This radiation is classified as

- | | |
|---------------|--------------------------|
| A) gamma rays | B) ultraviolet radiation |
| C) microwaves | D) infrared radiation |

Question 2

An electromagnetic wave has a frequency of 6.0×10^{14} Hz.

Its wavelength in a vacuum is

- | | |
|---------------------------|---------------------------|
| A) 5.0×10^{-7} m | B) 2.0×10^6 m |
| C) 5.0×10^{-9} m | D) 1.8×10^{23} m |

Question 3

The energy of a photon that has a frequency of 8.6×10^{14} Hz is

(Use $h = 6.63 \times 10^{-34}$ J · s.)

- | | |
|-----------------------------|-----------------------------|
| A) 7.71×10^{-49} J | B) 5.70×10^{-19} J |
| C) 5.70×10^{-20} J | D) 1.16×10^{-18} J |

Question 4

When a beam of light passes from air into glass, one property of the light does not change.

That property is its

- A) speed
- B) wavelength
- C) frequency
- D) direction of travel

Question 5

A metal surface is illuminated by monochromatic light with a frequency above the threshold frequency.

If the intensity of the light is increased while its frequency is kept constant, then

- A) the maximum kinetic energy of the photoelectrons increases
- B) the number of photoelectrons emitted per second increases
- C) the stopping voltage increases
- D) the threshold frequency of the metal decreases

Question 6

Light travelling in air strikes a flat surface of water ($n = 1.33$) at an angle of incidence of 40.0° .

The angle of refraction, to the nearest tenth of a degree, is ____ degrees.

Question 7

Yellow light that has a wavelength of 5.89×10^{-7} m in air enters glass ($n = 1.52$).

The wavelength of this light inside the glass is

- A) 5.89×10^{-7} m B) 8.95×10^{-7} m
C) 3.88×10^{-7} m D) 2.55×10^{-7} m

Question 8

The work function of a metal is 2.30 eV.

The maximum wavelength of light that can eject photoelectrons from this metal, to the nearest nanometre, is ____

(Use $h = 6.63 \times 10^{-34} \text{ J} \cdot \text{s}$, $c = 3.00 \times 10^8 \text{ m/s}$, and $1 \text{ eV} = 1.60 \times 10^{-19} \text{ J}$.)

Question 9

In a Michelson – type experiment to measure the speed of light, a rotating mirror with 8 sides

is used with a stationary mirror placed 25.0 km away. The light signal is next detected

when the rotating mirror has turned through $\frac{1}{8}$ of a revolution during the round trip of the light.

The rotation frequency at which this first occurs is

- A) 750 rev/s
B) 375 rev/s
C) 1.50×10^3 rev/s
D) 3.00×10^3 rev/s

Question 10

An object that is 1.6 m tall is located 6.0 m in front of a concave mirror that has a focal length of 2.0 m.

The height and orientation of the image are

A) Height : 0.80 m

Orientation : erect

B) Height : 0.80 m

Orientation : inverted

C) Height : 3.2 m

Orientation : inverted

D) Height : 0.53 m

Orientation : erect

Answer Key

- | | | |
|------|---------|-------|
| 1. C | 5. B | 9. A |
| 2. A | 6. 28.9 | 10. B |
| 3. B | 7. C | |
| 4. C | 8. 540 | |

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