ALBERTA PHYSICS 30 · UNIT C · 10 QUESTIONS

Electromagnetic Radiation — 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 with a frequency of 1.50×10^{15} Hz is incident on a metal, and the stopping voltage for the emitted photoelectrons is 2.48 V. The work function of the metal, to the nearest hundredth of an electron volt, is ____ eV. (Use $h = 6.63 \times 10^{-34}$ J · s and $1\ \text{eV} = 1.60 \times 10^{-19}$ J.)**

ANSWER

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2 **Light travelling in glass (n = 1.50) strikes a boundary with water (n = 1.33) at an angle of incidence of 30.0°. The angle of refraction in the water is**

A 26.4°

B 30.0°

C 34.3°

D 41.8°

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3 **An X-ray photon that has a wavelength of 7.08×10^{-11} m collides with a stationary electron and is scattered at an angle of 90.0°. The wavelength of the scattered photon is (Use $h = 6.63 \times 10^{-34}$ J · s, $c = 3.00 \times 10^{8}$ m/s, and $m_e = 9.11 \times 10^{-31}$ kg.)**

- A 6.84×10^{-11} m
- B 7.32×10^{-11} m
- C 7.08×10^{-11} m
- D 9.51×10^{-11} m

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4 **An electron moves at a speed of 2.0×10^{6} m/s. The de Broglie wavelength of this electron is (Use $h = 6.63 \times 10^{-34}$ J · s and $m_e = 9.11 \times 10^{-31}$ kg.)**

- A 3.64×10^{-10} m
- B 3.64×10^{-16} m
- C 1.82×10^{-10} m
- D 7.28×10^{-10} m

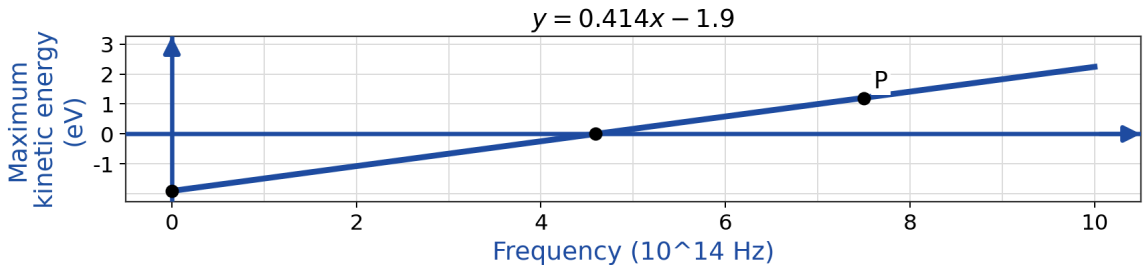
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5 **An object is placed 15.0 cm in front of a concave mirror that has a focal length of 10.0 cm. The image distance, in centimetres, is ____.**

ANSWER _____

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6 **The graph shows maximum kinetic energy against frequency for a metal, with point P marked on the line. The maximum kinetic energy at point P is**



A 1.20 eV

B 1.91 eV

C 3.10 eV

D 0.60 eV

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7 **A laser pulse is directed at the Moon, and the reflected pulse is detected back on Earth. The distance from Earth to the Moon is 3.84×10^8 m. The time between emitting the pulse and detecting its return is (Use $c = 3.00 \times 10^8$ m/s.)**

- **A** 1.28 s
- **B** 2.56 s
- **C** 5.12 s
- **D** 0.64 s

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8 **Light that has a frequency of 5.09×10^{14} Hz enters a piece of quartz that has an index of refraction of 1.46. The wavelength of the light in the quartz, to the nearest nanometre, is ____ nm. (Use $c = 3.00 \times 10^8$ m/s in a vacuum.)**

ANSWER _____

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9 **White light is passed through a cool, low-density gas and then through a prism. The spectrum produced by this arrangement will consist of**

A a continuous spectrum that is identical to the spectrum of the original light

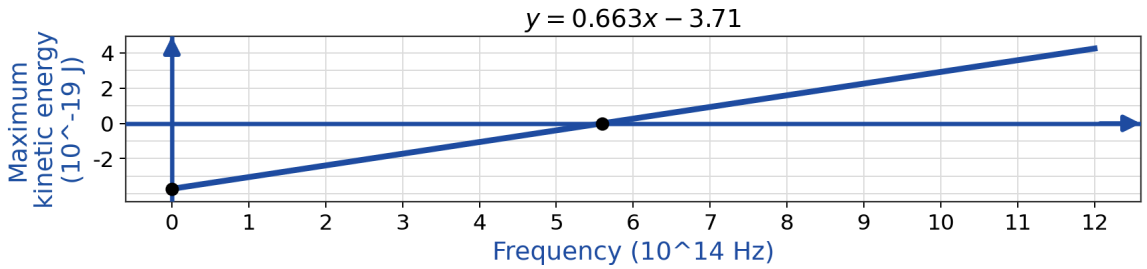
B bright coloured lines on a dark background

C dark lines at specific wavelengths against a continuous spectrum

D a continuous spectrum with the red end missing

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10 **The graph shows maximum kinetic energy against frequency for a metal. The work function of the metal used in the experiment is (Use $h = 6.63 \times 10^{-34}$ J · s.)**



A 1.86×10^{-19} J

B 7.42×10^{-19} J

C 5.30×10^{-19} J

D 3.71×10^{-19} J

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ANSWER KEY

1. 3.74
2. C
3. B
4. A
5. 30
6. A
7. B
8. 404
9. C
10. D

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