ALBERTA PHYSICS 30 · UNIT D · 10 QUESTIONS

Atomic 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 **In a nuclear fission reactor, the moderator is used to**

- **A** absorb excess neutrons so that the chain reaction stops
- **B** slow down neutrons so that they are more likely to cause fission
- **C** speed up neutrons so that fission occurs more rapidly
- **D** act as the fuel for the chain reaction

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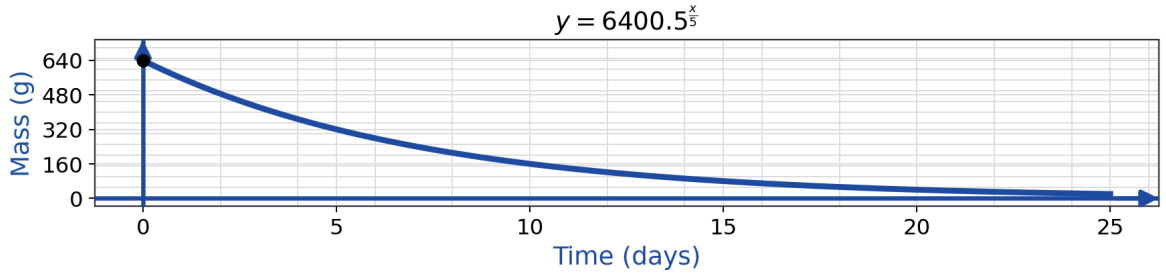
2 **The graph shows the mass of a radioactive sample against time. The half-life of the sample, in days, is**



ANSWER _____

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3

A metal surface is illuminated by light with a frequency above the threshold frequency of the metal. When the intensity of the light is increased, the observation is that

A more electrons are emitted per second, but the maximum kinetic energy of the emitted electrons is unchanged

B the maximum kinetic energy of the emitted electrons increases

C electrons are emitted even if the frequency falls below the threshold frequency

D the threshold frequency of the metal increases

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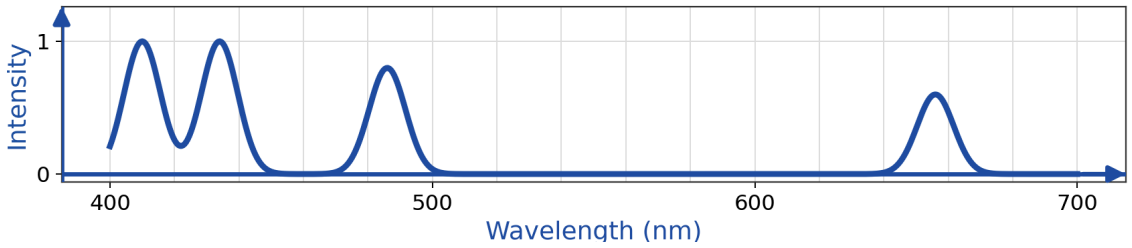
4 **The graph shows intensity against wavelength for light from hydrogen gas. The bright lines shown are in the visible region. These transitions end at the**



A n = 1 level

B n = 3 level

C n = 2 level

D n = 4 level

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5 **One of the postulates of the Bohr model is that an electron in a hydrogen atom can occupy only those orbits in which its**

- **A** speed is equal to the speed of light
- **B** energy changes continuously as it orbits
- **C** orbital radius can have any value
- **D** angular momentum is an integer multiple of $\underline{h}$

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6 **Light with a wavelength of 4.00×10^{-7} m is incident on a metal with a work function of 2.30 eV. Use $h = 6.63 \times 10^{-34}$ J · s, $c = 3.00 \times 10^{8}$ m/s, and 1 eV = 1.60×10^{-19} J. The maximum kinetic energy of the emitted photoelectrons, to the nearest hundredth of an electron volt, is**

ANSWER _____

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7 **Carbon-14 undergoes beta negative decay according to $^{14}_{6}C \rightarrow X + {}^{0}_{-1}e$. The nucleus X is**

- **A** $^{14}_{5}B$
- **B** $^{14}_{7}N$
- **C** $^{10}_{4}Be$
- **D** $^{14}_{6}C$

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8 **The mass defect of a nucleus is 0.500 u. Use 1 u = 931.5 MeV/c². The binding energy of the nucleus is**

- **A** 466 MeV
- **B** 46.6 MeV
- **C** 932 MeV
- **D** 233 MeV

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9 **Carbon-14 has a half-life of 5730 years. An ancient bone sample contains $\frac{1}{16}$ as much carbon-14 as a living organism. The age of the bone sample, in years, is**

ANSWER _____

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10 **The binding energy per nucleon is greatest for a nucleus of**

A $^{1}_{1}H$

B $^{4}_{2}He$

C $^{56}_{26}Fe$

D $^{238}_{92}U$

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ANSWER KEY

1. B
2. 5
3. A
4. C
5. D
6. 0.81
7. B
8. A
9. 22920
10. C

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