

AP Physics 2

Name: _____ Score: _____

1. The energy of a single photon is given by:
 - ☐ $E = mc^2$
 - ☐ $E = hf$
 - ☐ $E = \frac{1}{2}mv^2$
 - ☐ $E = IV$
2. In the Bohr model, an electron can have:
 - ☐ any energy at all
 - ☐ only certain fixed energy levels
 - ☐ zero energy always
 - ☐ negative frequency
3. An emission spectrum shows:
 - ☐ dark lines on a rainbow
 - ☐ bright lines on a black background
 - ☐ a smooth rainbow only
 - ☐ nothing
4. As a blackbody gets hotter, its peak wavelength:
 - ☐ gets longer (redder)
 - ☐ gets shorter (bluer)
 - ☐ stays the same
 - ☐ disappears
5. Below the threshold frequency, increasing the brightness of the light:
 - ☐ ejects many electrons
 - ☐ ejects no electrons at all
 - ☐ ejects faster electrons
 - ☐ melts the metal
6. A photon is only absorbed if its energy exactly matches the gap between two levels.
 - ☐ True ☐ False

7. For a given element, its absorption lines fall at the same frequencies as its emission lines.

☐ True ☐ False

8. A hotter blackbody emits more intensity at every wavelength than a cooler one.

☐ True ☐ False

9. Above the threshold, higher-frequency light ejects electrons with more kinetic energy.

☐ True ☐ False

10. Nuclear fusion powers the _____ and the stars.

AP Physics 2

1. $E = hf$

$E = hf$ — Planck's constant times the frequency.

2. **only certain fixed energy levels**

Energy levels are quantised — only certain fixed values are allowed.

3. **bright lines on a black background**

Electrons dropping down emit photons, giving bright lines on black.

4. **gets shorter (bluer)**

A hotter body peaks at a shorter wavelength — the glow shifts toward blue.

5. **ejects no electrons at all**

Below threshold, each photon is too weak — brightness cannot free any electrons.

6. **True**

Only photons matching a level gap can be absorbed or emitted.

7. **True**

Both come from the same energy-level gaps, so they share the same frequencies.

8. **True**

The hotter curve is taller at all wavelengths.

9. **True**

$hf = \phi + KE_{\text{max}}$: more photon energy leaves more kinetic energy.

10. **Sun**

The Sun fuses hydrogen into helium, releasing its energy.