

AP Physics 2

Name: _____ Score: _____

1. The energy of a single photon is given by:

☐ $E = mc^2$

☐ $E = \frac{1}{2}mv^2$

☐ $E = hf$

☐ $E = IV$

2. In the Bohr model, an electron can have:

☐ any energy at all☐ zero energy always☐ negative frequency☐ only certain fixed energy levels

3. An emission spectrum shows:

☐ dark lines on a rainbow☐ nothing☐ bright lines on a black background☐ a smooth rainbow only

4. As a blackbody gets hotter, its peak wavelength:

☐ stays the same☐ disappears☐ gets longer (redder)☐ gets shorter (bluer)

5. Below the threshold frequency, increasing the brightness of the light:

☐ ejects many electrons☐ ejects faster electrons☐ melts the metal☐ ejects no electrons at all

6. Compton scattering shows that photons carry _____ as well as energy.

7. Nuclear fusion powers the _____ and the stars.

8. A sample of 80 unstable nuclei has a half-life of 2 years. How many remain after 4 years?

9. Light shows its _____ nature in interference and diffraction.

10. A photon is only absorbed if its energy exactly matches the gap between two levels.

☐ True ☐ False

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. **momentum**

The collision only makes sense if photons carry momentum.

7. **Sun**

The Sun fuses hydrogen into helium, releasing its energy.

8. **20**

4 years = two half-lives: $80 \rightarrow 40 \rightarrow 20$.

9. **wave**

Interference and diffraction are wave behaviours.

10. **True**

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