Matching Two Pulses by Energy

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A light display models short pulses of two colors. Each red photon carries 2 model energy units, and each violet photon carries 3. Energy delivered by a pulse is the number of photons multiplied by the energy per photon.

Pulse	Color	Photons arriving
J	Red	12
K	Violet	8
L	Violet	10

1 Which two pulses deliver equal energy even though they contain different numbers of photons?

(1) J and K

(2) J and L

(3) K and L

(4) All three

A model card absorbs half the incoming red photons and three quarters of the incoming violet photons. Each absorbed photon transfers all its energy to the card.

2 Calculate the absorbed energy from J and K. Show how the fraction absorbed changes the comparison. [1]

Answer and work

3 Use J and K to evaluate the claim that equal delivered energy means equal energy absorbed by this card. [1]

Answer and work

4 How many incoming red photons would transfer the same absorbed energy to the card as pulse K? Show your calculation. [1]

Answer and work