According to classical theory of electricity and magnetism, what happens if a metal is illuminated with monochromatic light (eg: laser pointer?)

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B) A uniform current will flow in the metal

C) An alternating current will be produced

D) Electrons will fly out of the metal

E) C, which will then lead to D

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A is true at the basic level - almost all the light is reflected off the surface
B is not true at all
C is true - the oscillating electric field in the light will cause electrons close to the surface to oscillate and therefore set up a current
D this is also true - the current will dissipate due to resistance and the energy created will be transfered to the electrons, providing some of them with enough energy to leave the metal
E this is the most true answer

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B) current should stop

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In classical theory, the frequency has very little effect on what is going on, so intensity should be most important and the current should continue flowing.

We just found that for sodium, at wavelength 400nm, the current stops at about 0.8V of retarding potential. This means that

A) The work function of sodium is 0.8eV

B) Each electron was absorbing 0.8eV of energy from the light beam

C) The most energetic electrons leave the cathode with kinetic energy 0.8eV

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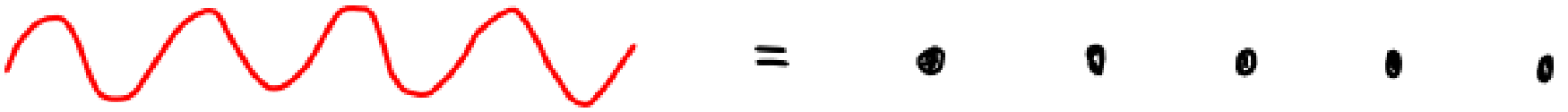
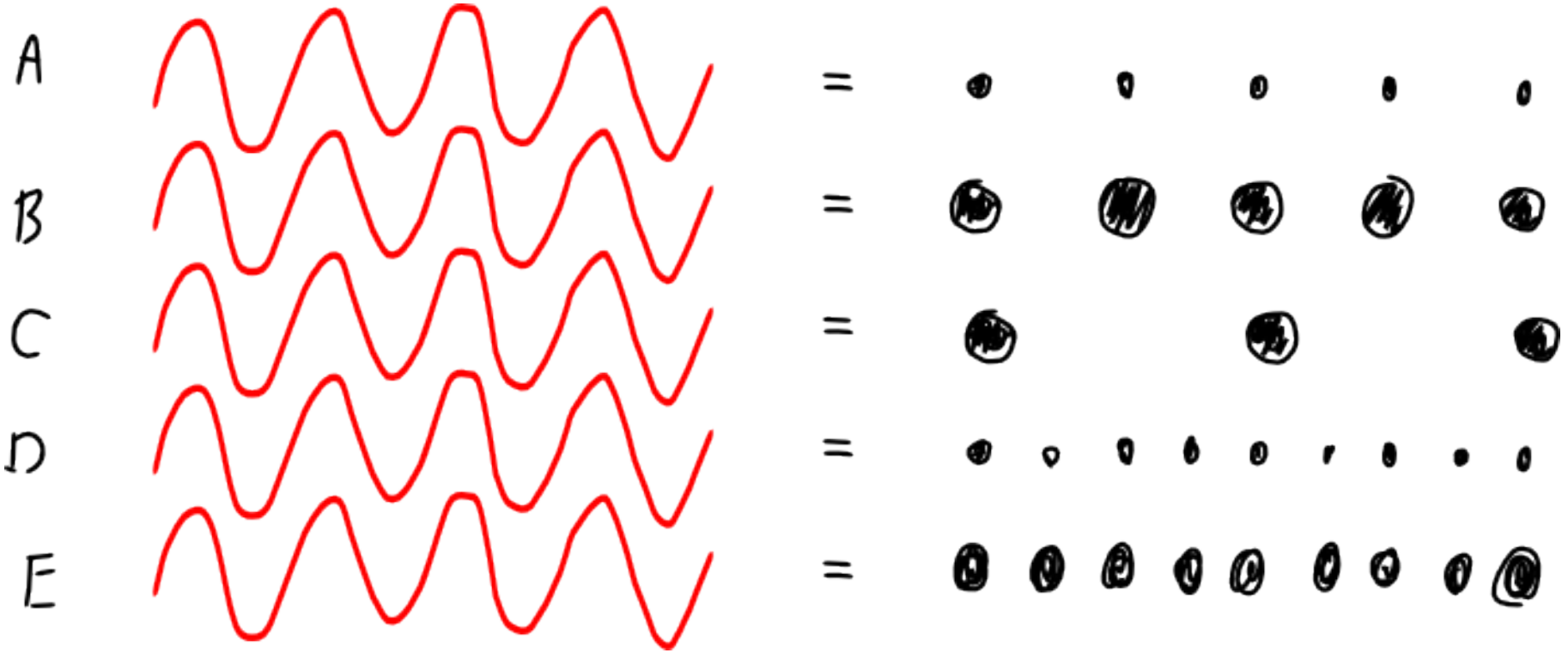
A red beam of light is made up of a stream of photons:



If we double the intensity of the beam, how should the stream look (size of dot represents photon energy)



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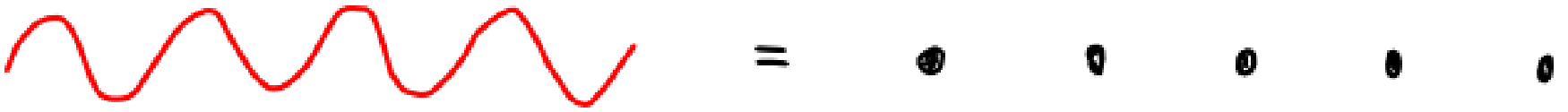

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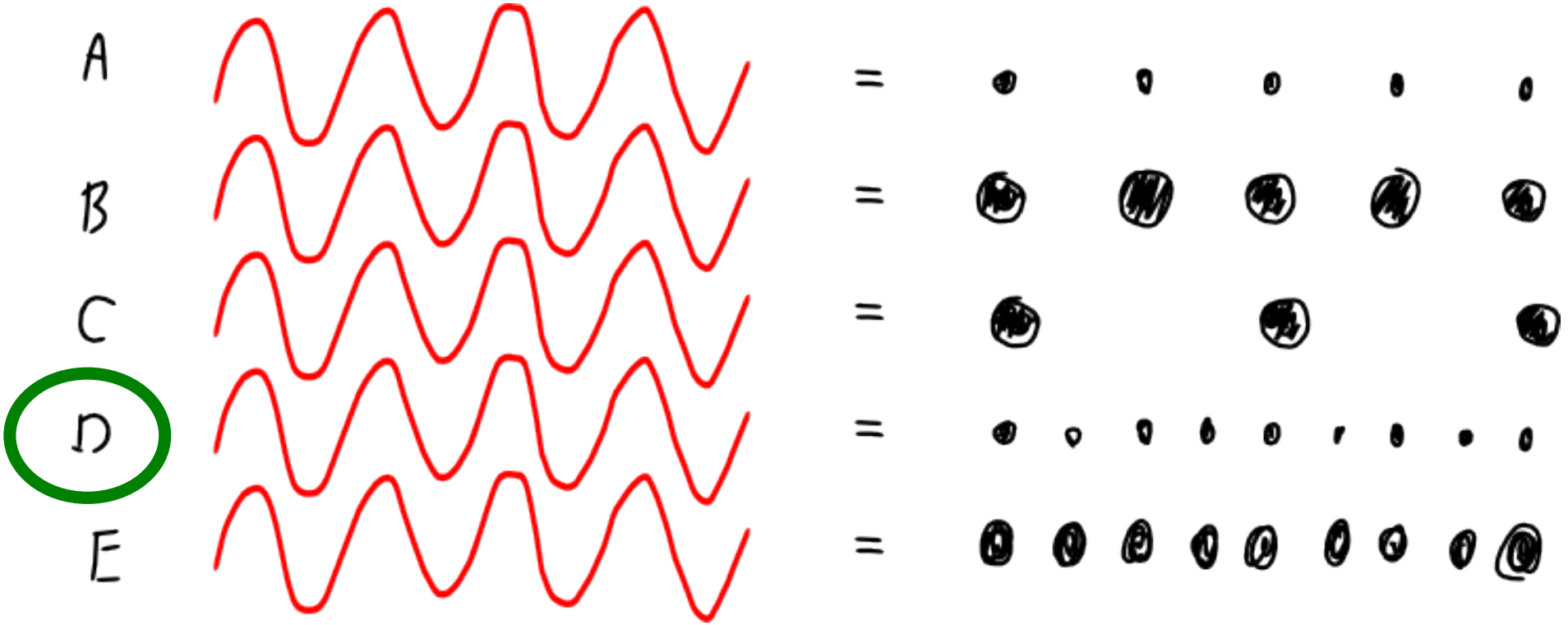

Same frequency, so same energy per photon, but twice the intensity so twice the number of photons are needed to carry the energy

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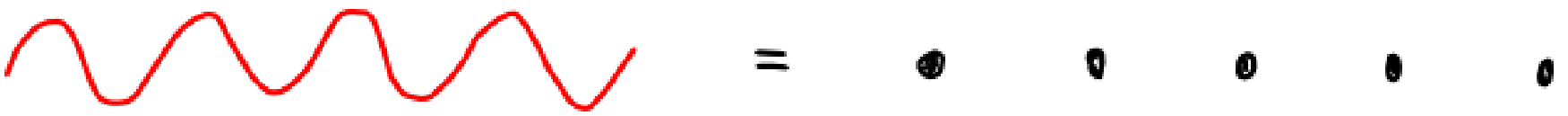

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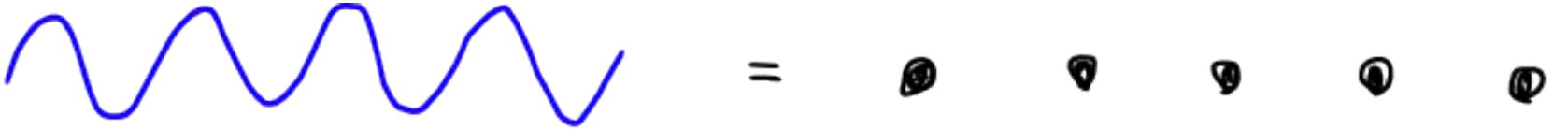
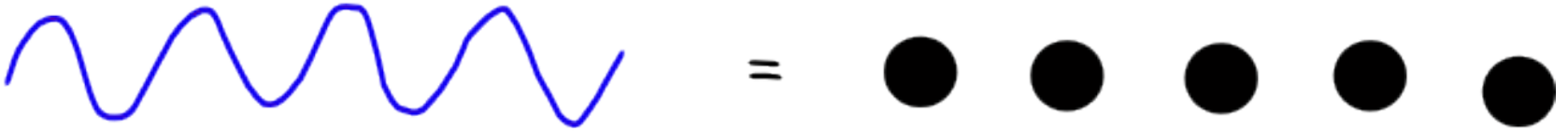
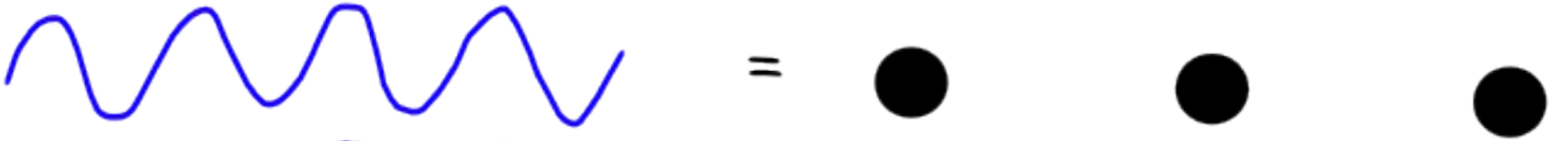
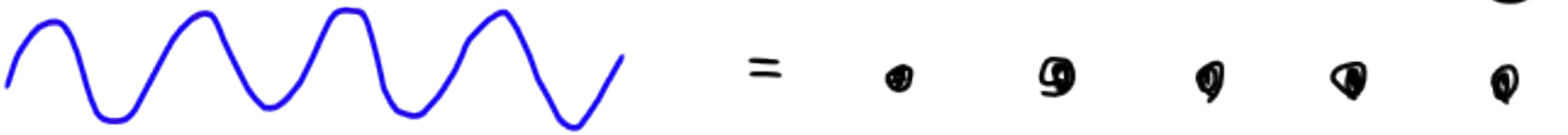
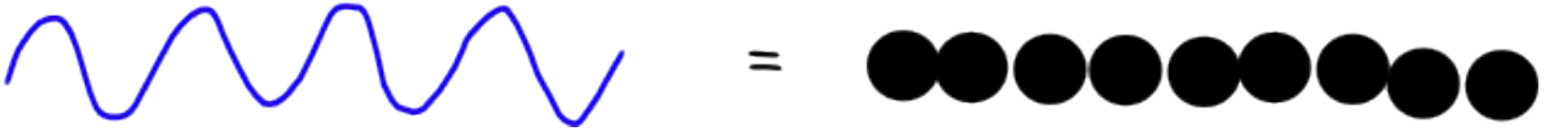
A 

B 

C 

D 

E 

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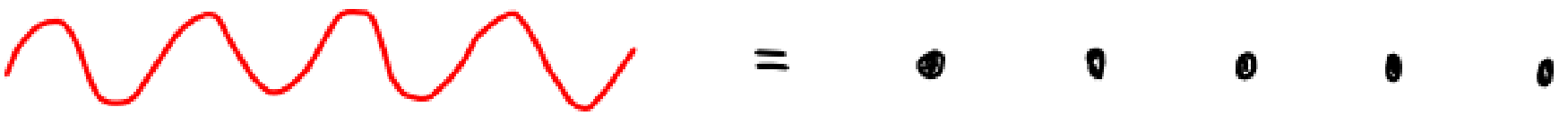

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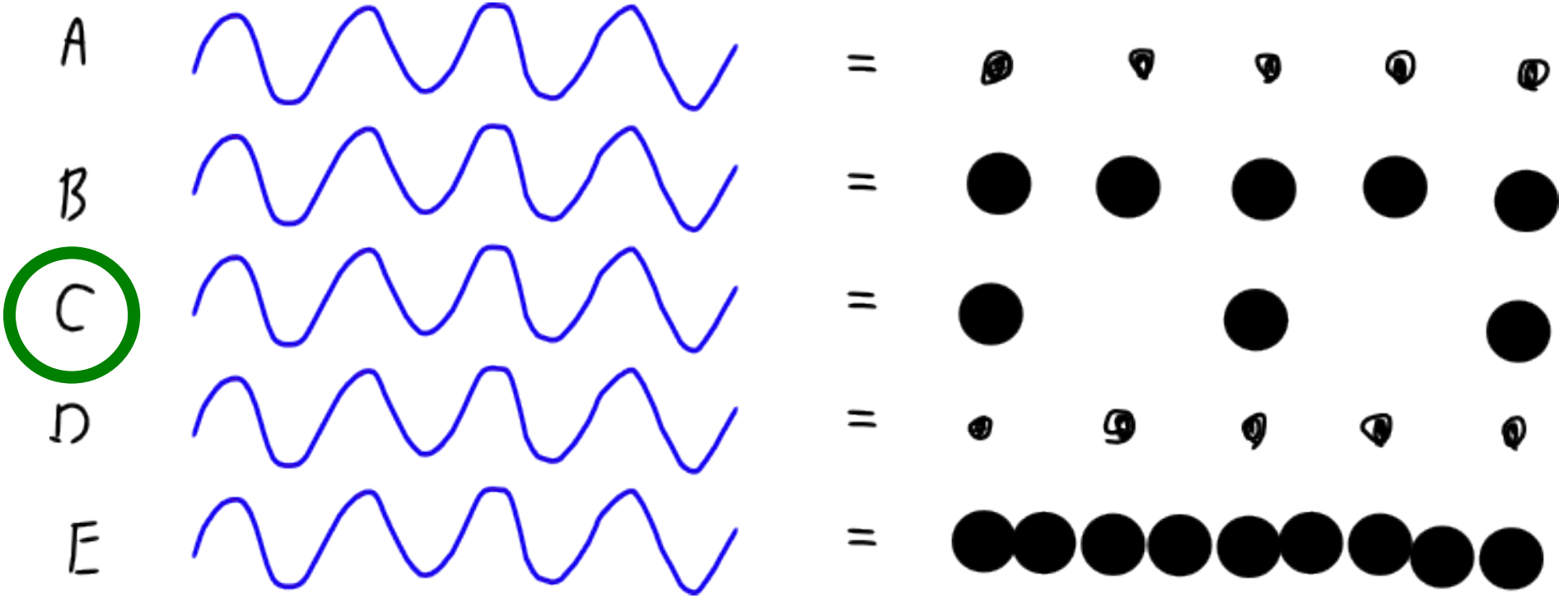

Each photon carries twice the energy, but the total intensity of the beam is the same so there must be half as many photons.