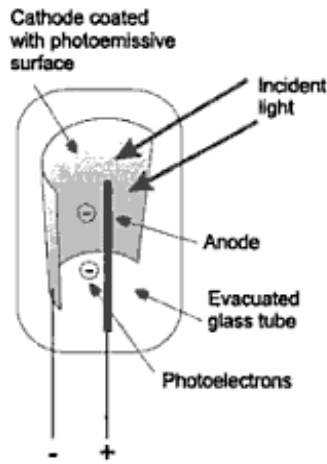




3. The following diagram represents a commonly used device.



4. (a) Outline how this device works.

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(b) Outline an application of this device.

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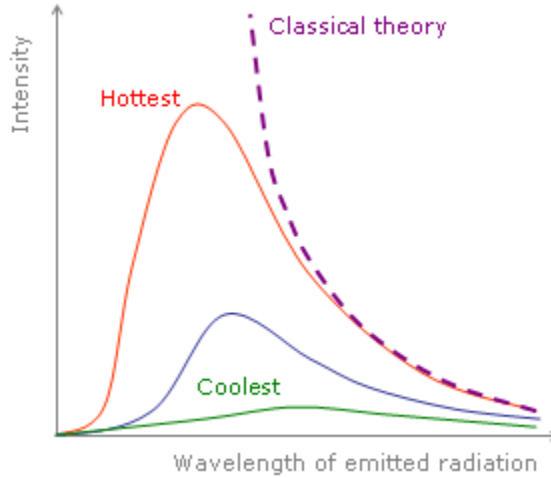
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5. The following graph shows curves that relate the intensity of the radiation emitted from objects at three different temperatures to the wavelength of the electromagnetic waves. The dotted line shows the relationship between intensity of electromagnetic waves and their wavelength, predicted by the classical theory of light.



What hypothesis enabled Planck to develop a model, which successfully predicted the relationship between the wavelength of the radiation and its intensity?

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What is the main feature of the classical theory, as it relates to the emission of radiation from hot objects?

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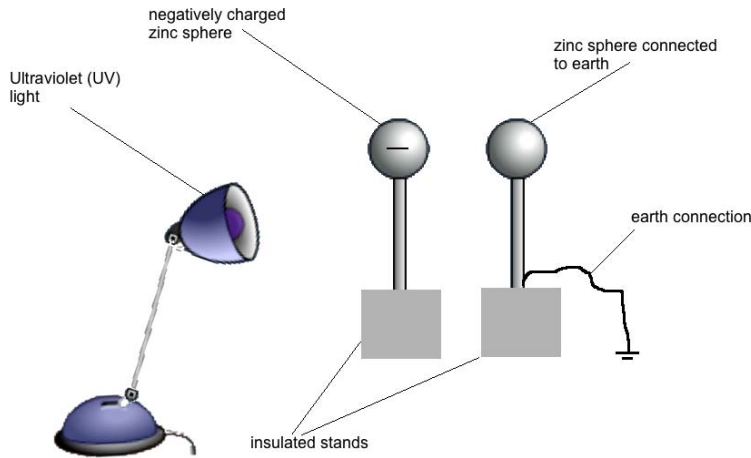
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6. Read the following description of an experiment used to investigate the photoelectric effect.

A metal sphere made of zinc, supported on an insulated stand was given a negative charge. When it was moved gradually closer to an identical earthed, uncharged sphere, a spark jumped the gap from one sphere to the other. The maximum between the spheres was measured when the spark jumped the gap.



Each time this was repeated, the distance that the spark jumped was the same.

(a) Explain why the maximum distance the spark would jump be different if an ultraviolet light was shone onto the two spheres and the experiment was repeated in an otherwise identical manner.

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(b) Why would placing a piece of glass over the front of the ultraviolet lamp change the maximum distance jumped by the spark?

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7. Assess the impact of advances in physics on the development of microprocessors.

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8. Analyse the relationship between Einstein’s contribution to quantum theory and black body radiation.

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