Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic: Particle And Radiation

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Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Q1.

(a) The mercury atoms in a fluorescent tube are excited and then emit photons in the ultraviolet region of the electromagnetic spectrum.

(i) Explain how the mercury atoms become excited.

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(3)

(ii) Explain how the excited mercury atoms emit photons.

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(2)

(b) Explain how the ultraviolet photons in the tube are converted into photons in the visible part of the electromagnetic spectrum.

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(2)
(Total 7 marks)

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Q2.

(a) Name the only stable baryon.

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(1)

(b) (i) When aluminium-25($^{25}_{13}$Al) decays to magnesium-25 (Mg-25) an electron neutrino (ν_e) and another particle are also emitted.

Complete the equation to show the changes that occur.

$$^{25}_{13}\text{Al} \rightarrow {}^{25}_{\cdots\cdots}\text{Mg} + {}^{\cdots\cdots}_{\cdots\cdots}\cdots\cdots + \nu_e$$

(2)

(ii) Name the exchange particle responsible for the decay.

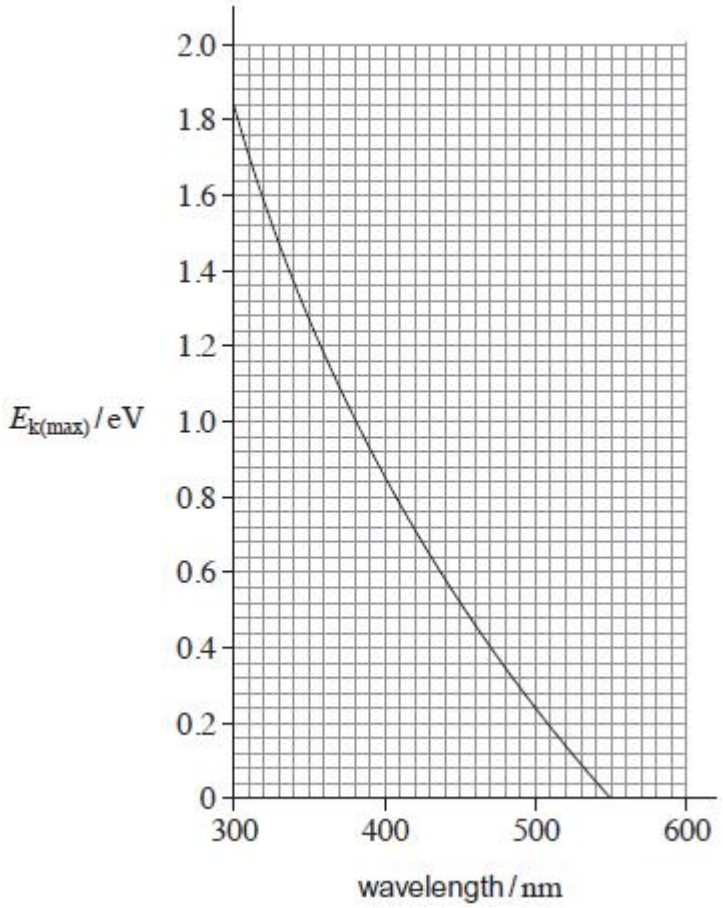
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(1)

(Total 4 marks)

Q3.

The maximum kinetic energy, $E_{k(max)}$, of photoelectrons varies with the wavelength of electromagnetic radiation incident on a metal surface.
This variation is shown in the graph.



(a) (i) Define the term work function.

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(2)

(ii) Show that the work function of the metal is approximately 4×10^{-19} J.

Use data from the graph in your calculation.

(3)

(b) Monochromatic radiation is incident on the metal surface.
Photoelectrons are ejected with a maximum speed of 4.6×10^{5} m s^{-1}.

Determine the wavelength of the incident radiation.

wavelength _____ m

(3)

(Total 8 marks)

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