



KEC

# K Education Centre



## AS Quantum Physics

Quantum Phenomena - Energy levels and work function

Assignment Questions

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Year 2021

## Quantum Phenomena :

Planck constant ,  $h = 6.63 \times 10^{-34} \text{ Js}$      $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$      $c = 3 \times 10^8 \text{ ms}^{-1}$

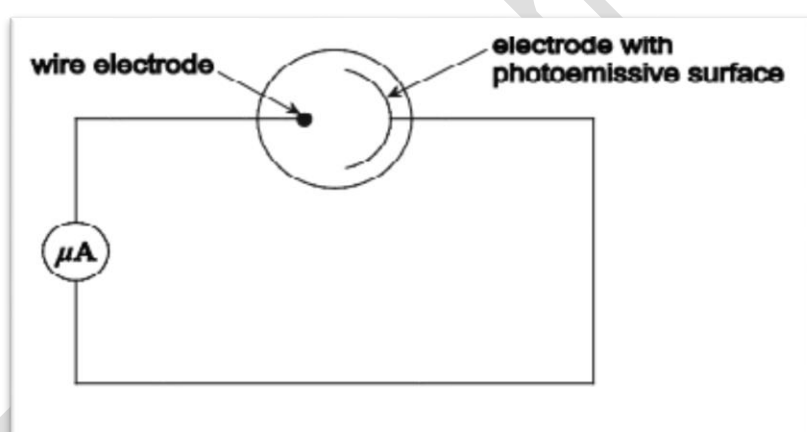
Q1 : With reference to energy levels , describe the process of photon absorption and re-emission in atoms.

Q2: Explain how ultraviolet light is generated in fluorescent tube.

Q3 : Work function of metal is 4.32 eV , work out its threshold frequency for photoelectric emission.

Q4 : A ground- level atomic electron is excited by an incident photon. It then emits a total of two photons , with frequencies  $1.7 \times 10^{14} \text{ Hz}$  and  $3.12 \times 10^{14} \text{ Hz}$  respectively , on its return to the ground level. What was the energy of the incident photon.

Q5 Figure shows a photocell which uses the photoelectric effect to provide a current in an external circuit. Electromagnetic radiation is incident on the photo emissive surface. Explain why there is a current only if the frequency of the electromagnetic radiation is above a certain value.



State and explain the effect on the current when the intensity of the electromagnetic radiation is increased.

For above diagram , the photoemissive surface has a work function of 2.1 eV. The frequency of the electromagnetic radiation used is  $7.23 \times 10^{14} \text{ Hz}$ . Calculate the maximum kinetic energy, in J, of the electrons emitted from the photoemissive surface.