OCR
Oxford Cambridge and RSA

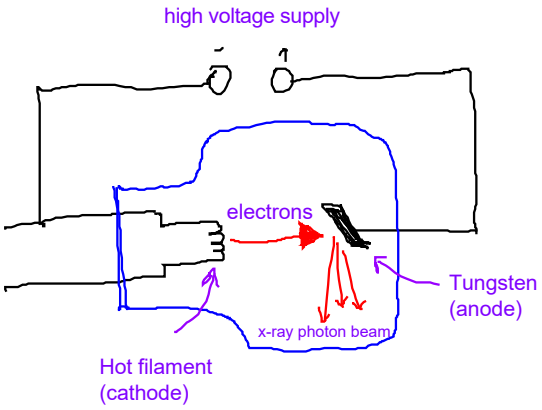
A Level Physics A

H556/02 Exploring physics

Question Set 30

1 (a) Describe the basic structure of an X-ray tube and explain how X-ray photons are produced.
You may draw a labelled diagram.

[3]



- filament is heated, causing thermionic emission of electrons
- Electrons are accelerated across a high p.d.
- Electrons hit tungsten, transferring their KE into heat and X-ray photons

(b) A beam of X-rays is directed at tissues in a patient.
The X-ray photons interact with the atoms of the tissues.

Simple scatter is one of the attenuation mechanisms.

Name and describe **two** other attenuation mechanisms.

[4]

- Photoelectric effect:
photon disappears and electron emitted from metal surface provided the frequency of photon is greater than threshold frequency and it contains energy more than the work function of metal.
- Pair production: photon disappears and electron-positron pair produced.

Total Marks for Question Set 30: 7