2001 HIGHER SCHOOL CERTIFICATE EXAMINATION

Physics

Section I – Part B (continued)

Centre Number

Student Number

Marks

Question 24 (6 marks)

Sir William Bragg and his son Sir Lawrence Bragg shared the Nobel prize for physics in 1915 for their work on X-ray diffraction and crystal structure analysis.

(a) Describe ONE way in which an understanding of crystal structure has impacted on science.

2

By the way Crystals structure and understanding the way they structure was a huge analysis for science and basically everything is structure, once these structures are revealed then science cabl be understood better

(b) Outline the methods of X-ray diffraction used by the Braggs to determine the structure of crystals.

4

Both Sir William and Lawrence Braggs used methods such as X Ray diffraction eg. radiation, alpha, beta, gamma to diffract and determine the structure of crystals.
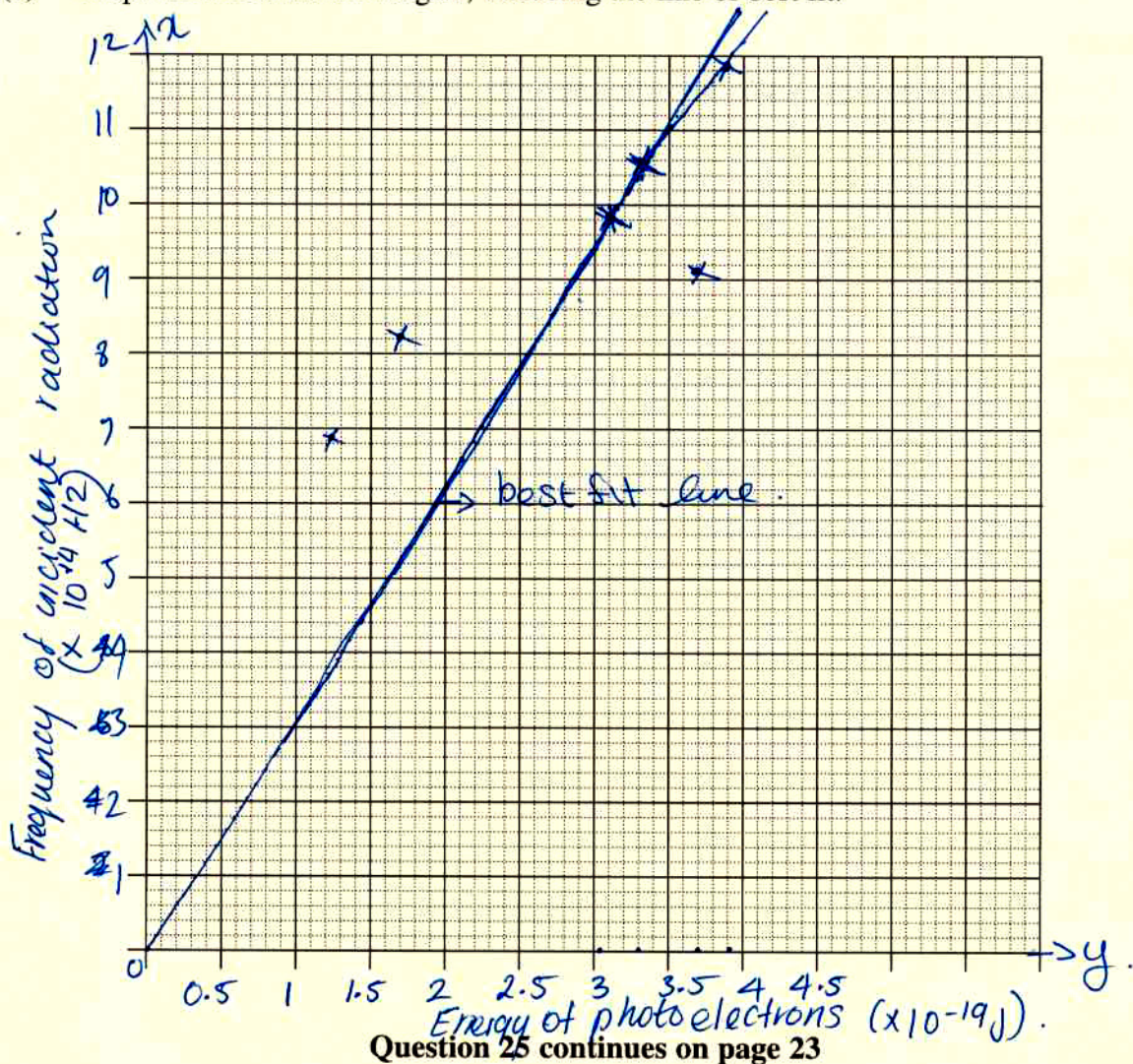
Marks

Question 25 (6 marks)

A student carried out an experiment on the photoelectric effect. The frequency of the incident radiation and the energy of the photoelectrons were both determined from measurements taken during the experiment.

The results obtained are shown in the table:

Frequency of incident radiation ($\times 10^{14}$ Hz)	Energy of photoelectrons ($\times 10^{-19}$ J)
6.9	1.22
8.2	1.70
9.1	3.70
9.9	3.05
10.6	3.38
11.8	3.91

(a)   Graph these results on the grid, including the line of best fit.   **4**

– 22 –

Marks

Question 25 (continued)

(b)   How could the reliability of the experiment be improved?   **2**

By getting the right reading to make it
to ~~fit~~ get the straugh line on the graph

Question 26 (8 marks)

In the context of semiconductors, explain the concept of *electrons* and *holes*.   **8**

In a semiconductor holes begun to
for because of a shertage of electrons. So
when a hole forns the electron Next in
line moves in and takes its place, but
when doing this that electron who
filled the hole has now left a
hole were, it once was. and so th
Next electron in line moves in to fill it
up but its spec is now a hole and
So on, a continuous movig hole gaing.
Though a Semiconductor.