



电子科技大学
格拉斯哥学院
Glasgow College, UESTC

Physics Experiment 02

Prelab Report

Experiment Title: Use Hall Effect to measure Magnetic Field

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Date Performed: 2018.6.4

Final Mark:

Score

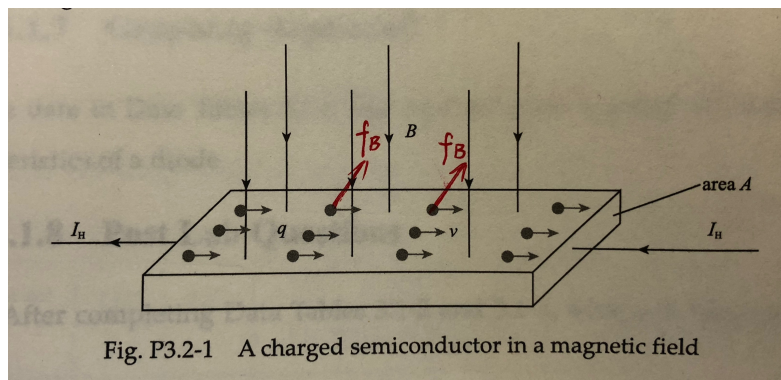
Answers to Questions (20 points)

(1)

i. $I_H = -nqvA$

ii.

- ①The Lorentz force will be exerted on one moving charge carrier;
- ②The magnitude of Lorentz force is $f_B = evB$, where e is the charge of a carrier, v is the velocity of the charge carrier, and B is the applied magnetic field;
- ③The direction of Lorentz force is showed in red color as the diagram below.



iii. Because the moving charge carriers will experience the Lorentz force in the magnetic field, which will force those charge carriers move towards the rear edge so that there will be higher density of negative charge near the rear edge after some time.

iv.

- ①The Lorentz force f_B and the electrostatic force f_E will be exerted on one moving charge.
- ②The electrostatic force f_E must be equal to the Lorentz force f_B to approach equilibrium so that there is no further change in the number of negatively charged particles near the edge.

(2)

- ①No, Edwin Hall wasn't awarded the Noble Prize;
- ②In 1985, Klaus von Klitzing was awarded the Nobel Prize in Physics for his contribution to discovery of the integer quantum Hall Effect. And in 1998, Daniel CheeTsui, Horst L. Störmer and Robert Laughlin were awarded the Nobel Prize in Physics for their contributions to the discovery of the fractional quantum Hall effect.