Science of Magic

Section B

Experimental technique

Name_____

14

Electromagnets are used in magic shows and in industry.

A student was given an iron bolt, as shown on the right, a one metre length of wire and a 6 Volt battery to construct an electromagnet.

The student conducted an investigation to test the relationship between coils of wire and strength of magnetic field. The student conducted 7 tests and the results shown below.

Coils of wire	Number of nails picked up
10	0
30	58
60	125
110	215
170	60
200	410
230	465

a) What is a possible hypothesis that is being tested?

1 mark

b) What is the independent variable?

1 mark

c) What is the dependent variable?

1 mark

d) Which of the following can change after each test?

i)	The type of bolt	Yes/No
ii)	The type of wire	Yes/No
iii)	The number of loops	Yes/No
iv)	The type of battery	Yes/No
v)	The type of nails	Yes/No

5 marks

e) Represent the data in the table above as a properly labelled graph, using a line of best fit. Use the graph paper provided.

5 marks

f) A factory producing nails needs the packaging of nails automated. Packaging of 900 nails per box is required. How should the electromagnet be constructed to achieve this automation?

1 mark