PRACTICAL EXERCISES

NAME: _____

DATES: _____

THE ELECTROMAGNET:

Equipment Supplied: mass carrier, 50g & 25g masses, 2m length of twine or fishing line, set of primary & secondary coils with iron core, piece of iron that can be attracted by an electromagnet, pulley with clamp to attach to bench, a metre rule, 2 electrical leads, power pack.

WARNING **– Ask your teacher for the voltage to use with the coils. DO NOT leave the coils on for extended periods of time. This can damage the coils.**

TASK: Use the equipment supplied to construct an electromagnet. Use this electromagnet to pull a mass attached to the end of a piece of a string threaded over a pulley through a distance of 20 cm off the floor. Test the limit of the electromagnet's lifting ability, without exceeding the safe operating voltage.

DIAGRAM: Draw a labelled diagram of your experimental set-up.

Maximum mass lifted =

MODEL HOUSEHOLD CIRCUIT:

Equipment Supplied: DC voltmeter & ammeter, 4 light globes, 12 electrical leads, 4 switches, power pack.

TASK: Construct a model of a household lighting circuit by arranging three globes in parallel, each with its own switch. Draw a diagram of your circuit.

With all switches closed, measure the voltage across each globe and the current flowing through each globe. Tabulate your results below.

Does opening a switch in one parallel arm of the circuit affect the other globes in any way? Explain.

_____

_____

Now add another globe to one of the parallel arms of the circuit and re-measure the voltage across this arm and the current in this arm. Describe any differences from the previous measurements.

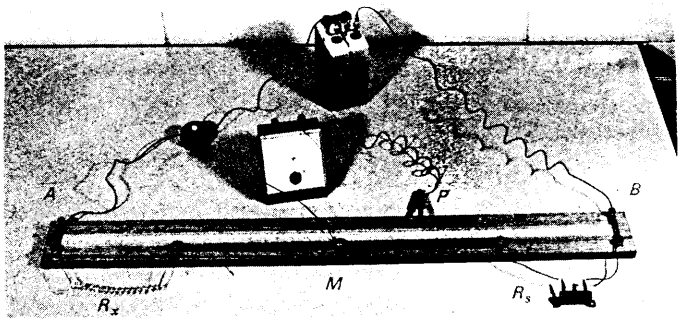
_____

Do any of the globes glow more or less brightly after the addition of the 4th globe? If so, explain this.

DETERMINING THE VALUE OF UNKNOWN RESISTANCES:

Equipment Supplied: Wheatstone Bridge board, 8 electrical leads, 1 switch, 1 galvanometer, a 5Ω resistor, a 10Ω resistor, power pack.

The diagram below shows the arrangement of a Wheatstone Bridge. This is a special circuit that can be used to determine the size of unknown resistors, by comparing them to a standard, known resistor.



In the diagram, R_x is a resistor of unknown value and R_s is a standard, known resistor. In this experiment assume that your 5Ω resistor is the unknown one and that your 10Ω resistor is the standard.

TASK: Set up a Wheatstone Bridge circuit. Draw a circuit diagram to represent this circuit.

Position the probe, P, in the middle of the nichrome wire (on the ruler), close the switch briefly and observe which way the galvanometer needle moves. Progressively move the probe along the wire (right or left) until you find the position at which the galvanometer needle does not move. Close the switch BRIEFLY each time you wish to observe the needle movement. Otherwise you will destroy the wire. Record the lengths of the two sections of wire divided by the probe, l_x on the unknown resistor side of the probe and l_s on the standard resistor side of the probe.

l_x = **l_s =**

Explain why the needle does not move at this particular position of the probe.

The formula below is used to determine the unknown resistor, R_x.

$$R_x = R_s . \frac{l_x}{l_s}$$

where R_s = Standard resistor, l_x & l_s are the two lengths of wire divided by the probe, l_x on the unknown resistor side of the probe and l_s on the standard resistor side of the probe.

Determine the value of the unknown resistor using your data and discuss any discrepancy between this value and the 5Ω theoretical value of this "unknown" resistor.
