

CERTIFICATE EXAMINATIONS  
for  
DAY VOCATIONAL COURSES, 1962.

MAGNETISM AND ELECTRICITY.

TUESDAY, 18th June—10 a.m. to 12 noon.

INSTRUCTIONS.

Not more than five questions to be attempted.

All the questions carry equal marks.

Illustrate your answers with sketches and diagrams where possible.

1. The following items are all connected in series: a 6 volt battery, a switch, two bulbs (of resistance 1 ohm and 2 ohms respectively) and an ammeter. A voltmeter is connected across each bulb. State the reading on each of the three instruments when the switch is closed.

If the 2 ohm bulb is removed from its holder, what will now be the reading of each instrument ?

2. Explain how it is possible to magnetise a strip of steel, such as a hacksaw blade, so that it has a South pole at each end and a North pole at the centre. Draw a diagram of the magnetic field around the strip.

If it is now broken into four equal parts, mark on a diagram the poles which will appear on each part.

3. Name and define each of the following electrical units:-

- (i) the unit of power,
- (ii) the unit of energy,
- (iii) the unit of potential (pressure).

Which of the following would have the lowest power consumption when connected to a 200 volt supply: (a) a 1200-watt heater, (b) a heating coil whose resistance is 40 ohms, (c) an electric fire which takes a current of 5.5 amps ?

4. (a) "Polarisation" and "local action" often occur in primary cells. Explain what is meant by any one of these terms, stating why it is undesirable and how it is reduced in any type of cell with which you are familiar.

(b) A 6 volt battery having an internal resistance of 0.8 ohm is used to supply current to two coils of resistance 2 ohms and 3 ohms, respectively, connected in parallel. Find:-

- (i) the terminal P.D. of the battery,
- (ii) the power used in the 3 ohm coil.

5. State how the resistance of a conductor varies with (a) length, (b) cross-sectional area, (c) temperature.

A copper cable is found to have a resistance of 3 ohms. What would be the resistance of another cable of the same material and of equal volume, but twice as long as the first ?

6. Describe with the aid of a diagram the construction of any one type of ammeter with which you are familiar. Explain how it works and state how it could be converted into a voltmeter.

7. A bar magnet is mounted horizontally at the centre of a closed vertical coil of insulated wire. Describe fully what happens in the coil when the magnet is rotated horizontally about its centre. What would be the effect of increasing the speed of rotation ?