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(DEPARTMENT OF EDUCATION)

AN BRAINSE GAIRM-OIDEACHAIS.
(TECHNICAL INSTRUCTION BRANCH.)

CERTIFICATE EXAMINATIONS

for

DAY VOCATIONAL COURSES, 1953.

MAGNETISM AND ELECTRICITY.

Thursday, June 18th—10 to 12 noon.

Instructions.

Not more than *five* questions to be attempted.

All the questions carry equal marks.

1. Sketch the magnetic field between the poles of a horse-shoe magnet when an iron washer is placed in the space between the poles.

How can the space just outside the end of a bar magnet be magnetically "screened"?

2. Give a rule to show the relationship between

(a) the polarity of an electro-magnet and direction of current.

(b) the magnetic field around a straight conductor, and direction of current.

Describe an experiment to verify one of these rules.

3. What do you understand by a B.O.T. unit?

When an electric iron is used for 6 hours the cost is 1/6. Find the rating of the iron in watts, if a B.O.T. unit costs 6d.

If the supply voltage is 200, find the resistance of the heating element of the iron (when hot).

[P.T.O.]

4. Calculate the E.M.F. and internal resistance of a battery of 12 cells, each of E.M.F. 1.4 volts and internal resistance 0.42 ohm if the cells are

- (a) connected in series,
- (b) connected in parallel.

When the cells are connected in series, what current would the battery supply to an external resistance of 3.36 ohms?

5. Define (a) the ohm, (b) the coulomb.

If 5 amperes flow in a resistance of 10 ohms for 4 minutes, calculate

- (i) the voltage applied.
- (ii) the quantity of electricity supplied.
- (iii) the energy in joules supplied.

6. Explain the meaning of

- (a) the specific resistance of a material,
- (b) the temperature coefficient of resistance of a material at 0°C.

If the resistance of a coil made of wire 300 cms. long and 0.8 millimetre diameter, is 5 ohms, find the resistance of a coil made of wire, of the same material, 500 cms. long and 0.4 millimetre diameter.

7. Distinguish between the E.M.F. and the terminal P.D. of a cell.

A secondary cell has an E.M.F. of 2 volts, and when delivering a current of 2 amperes, its terminal P.D. is 1.92 volts. Find the internal resistance of the cell.

What would be the terminal P.D. when the cell is delivering 3 amperes?

8. State the essential difference between an ammeter and a voltmeter and show how such instruments are connected in a circuit.

A battery, with switch, is connected to three lamps arranged in parallel. Describe, giving a suitable diagram, how the total power absorbed by the lamps can be determined.