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(DEPARTMENT OF EDUCATION)

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(TECHNICAL INSTRUCTION BRANCH.)

CERTIFICATE EXAMINATIONS
for

DAY VOCATIONAL COURSES, 1958

MAGNETISM AND ELECTRICITY.

Tuesday, 17th June—10 to 12 noon.

Instructions.

Not more than *five* questions to be attempted.

All the questions carry equal marks.

1. Draw a diagram of an iron bar wound with insulated wire; indicate the direction of current in the winding, and the position of the north-seeking pole in the bar.

How could a bar of magnetised steel be demagnetised?

2. Draw a map of the lines of force between the unlike poles of two bar magnets, placed a short distance apart with their axes parallel and with an iron ring placed mid-way between them. Mark the polarity of the ends of the magnets, and the direction of the magnetic field.

3. Define (a) the Coulomb, (b) the Joule.

If a resistor of 10 ohms is connected to a 50volt supply for 4 minutes, calculate

- (i) the current supplied,
- (ii) the energy supplied,
- (iii) the quantity of electricity supplied.

4. Calculate

(a) the resistance of a 75 watt, 200 volt lamp when the rated voltage is applied to the lamp.

(b) the time the lamp could be kept lighting for 3 shillings, if energy is charged at the rate of 1.8 pence per kilowatt-hour.

5. Describe an experiment, giving a diagram of the apparatus, of how to determine the electro-chemical equivalent of copper.

Calculate the current required to copper-plate an article with 1.968 grams of copper in 25 minutes; the electro-chemical equivalent of copper is 0.000328 gram per coulomb.

6. Draw a diagram of the circuit which is used to find out if a substance is a conductor or an insulator, using a cell and an electric bell. Give a short description of the method used.

State which of the following substances are (a) conductors, (b) insulators.

Silver, mica, sulphuric acid, marble, carbon, porcelain.

7. (a) If a current of 2 amperes generates 300 calories of heat in a coil in a certain time, what amount of heat would be generated in the coil by a current of 3 amperes, assuming the resistance of the coil to remain constant?

(b) Calculate the time to raise the temperature of 450 grams of water 40° C. by a 150 watt heater (1 calorie = 4.2 Joules.)

8. What do you understand by the "specific resistance" or "resistivity" of a material.

Calculate the specific resistance of the material in a wire 100 cms. long and 0.04 cm. diameter, if the resistance of the wire is 2.5 ohms.