JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY
Electronics and Communication Engineering
Electrical Science-1 (15B11EC111)
Tutorial Sheet: 11

Q1. [CO3] A moving-coil ammeter has springs giving a control constant of $0{\cdot}3 \times 10^{-6}$ Nm per degree. If the deflecting torque on the instrument is $28{\cdot}8 \times 10^{-6}$ Nm, find the angular deflection of the pointer.

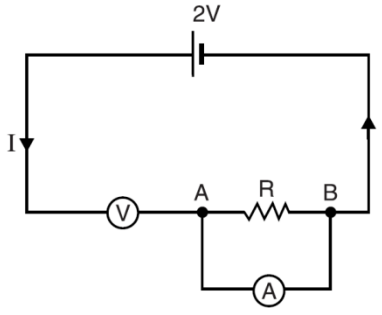
Q2. [CO3] The torque of an ammeter varies as the square of current through it. If a current of 10 A produces a deflection of 90°, what deflection will occur for a current of 5 A when the instrument is (i) spring-controlled (ii) gravity-controlled.

Q3. [CO3] A moving coil millivoltmeter has a resistance of 200 W and full-scale deflection is reached when a potential difference of 100 mV is applied across its terminals. The moving coil has effective dimensions of 30 × 25 mm and is wound with 100 turns. The flux density in the gap is 0.2 Wb/m^2. Determine the control constant of the spring if the final deflection is 100° and suitable diameter of copper wire for the coil winding if 20 % of total instrument resistance is due to coil winding. Resistivity of copper is 1.7×10^{-8} Ωm.

Q4. [CO3] A moving coil milliammeter with a resistance of 1·6 Ω is connected with a shunt of 0·228 Ω. What will be the current flowing through the instrument if it is connected in a circuit in which a current of 200 mA is flowing ?

Q5. [CO3] What should be the resistance of the moving coil of an ammeter which requires 2·5 mA for full-scale deflection so that it may be used with a shunt having a resistance of 0·0025 Ω for a range of 0 – 10 A ?

Q6. [CO3] While determining the resistance R of a conductor, a student by mistake connects ammeter in parallel with R and voltmeter in series as shown in Figure. What are the readings of ammeter and voltmeter ? The resistance of the voltmeter is 2000 Ω and the resistance of the ammeter is negligible.



Q7. [CO3] When a 250-volt moving coil voltmeter that has a resistance of 12 kΩ is used to measure an unknown voltage, the pointer just goes off scale. When a resistance of 2500 Ω is placed in series with this voltmeter, the instrument reads 242 volts. What is the unknown voltage ?