**PHY 202 – ELECTRIC CIRCUITS (Kirchhoff’s laws) – PROBLEM SET 1**

1. Determine the values of r, I1 and E.

12 V

r

E

1 Ω

1 A

3 Ω

I1

2 A

1. Determine the magnitudes and directions of the currents through R1 and R2.

V1 = 9.0 V

R1 = 22 Ω

R2 = 15 Ω

V2 = 6.0 V

1. Determine the magnitudes and directions of the currents in each resistor shown. The batteries have emfs of E1 = 9.0 V and E2 = 12.0 V and the resistors have values of R1 = 25 Ω, R2 = 18 Ω, and R3 = 35 Ω.

R1

R2

R3

E2

E1

1. Calculate the currents in each resistor.

3.0 V

2 Ω

10 Ω

8 Ω

6 Ω

12 Ω

6.0 V

Answers: **1.** I1 = 3A, r = 2Ω, E = 5V **2.** I1 = 0.68A, left; I2 = 0.40A, left

**3.** I1 = 0.13A, right; I2 = 0.31A, left; I3 = 0.18A, up

**4.** 2Ω: 0.26A, 6Ω: 0.028A, 8Ω: 0.29A, 10Ω: 0.26A, 12Ω: 0.29A (Beware of truncation error)