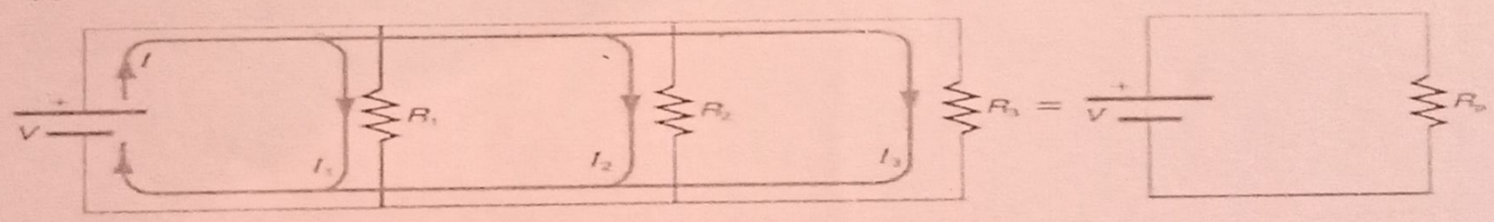
BCS 116/BIT 114-ELECTRICAL PRINCIPLES- CAT 24/10/2022

1. A series RLC resonant circuit has a resonant frequency admittance of $2x10^{-2}$ S(mohs). The Q of the circuit is 50, and the resonant frequency is 10,000 rad/sec. Calculate the values of R, L, and C. **(7 Marks)**
2. Given a 10 Vrms and 50 Hz power source hooked up in series to a 0.04 H inductor, a 5 Ω resistor, and 0.01 F capacitor. Calculate the impedance of this circuit and the resonance frequency **(8 Marks)**
3. From first principle prove that the effective resistance R_{eff} for three resistors (R_1, R_2, and R_3) connected in parallel and supplied with an emf is given by $R_{eff} = R_1R_2R_3/(R_1+R_2+R_3)$ **6 Marks**



4. The voltage applied to a series RLC circuit is 0.85V. The Q of the inductor coil is 50 and the value of the capacitor is 320 pF. The resonant frequency of the circuit is 175 KHz. Find:
   (i) the value of inductance
   (ii) the value of resistance
   (iii) the voltage across capacitor **9 Marks**