

※ 考生請注意：本試題 可 不可 使用計算機

1. A 5 V (Volts) Li-battery stores 1.8×10^5 J (Joule) in full charge and the cell phone needs 0.8 A (Ampere) for normal operation. Calculate the continuous operation time of the cell phone when the battery is 80% fully charged. (20%)
2. Use node analysis to find the value of V_1 , V_2 , and V_3 in Figure 1. (20%)
3. In Figure 2, $V_1(t) = 4\sin(2 \times 10^7 t)$ V and $V_2(t) = 6\sin(2 \times 10^7 t)$ V, (a) write down the differential equation by using $V_1(t)$, $V_2(t)$, $V_3(t)$, and $V_o(t)$ (10%) and (b) solve the equation by Laplace transform and find $V_o(t)$ (15%). Assume zero initial conditions at capacitor. (20%)
4. Calculate V_o/I_s in Figure 3. (20%)
5. See the unbalanced circuit in Figure 4, find (1) three line currents, (2) the total complex power absorbed by the load, and (3) the total complex power absorbed by the source. (15%)

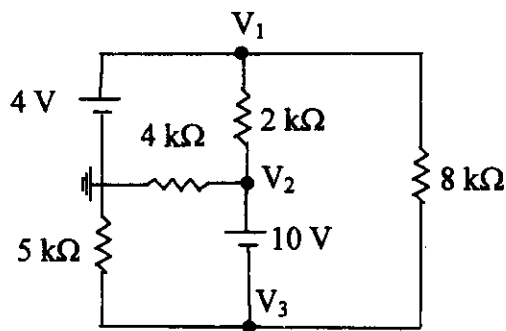


Figure 1

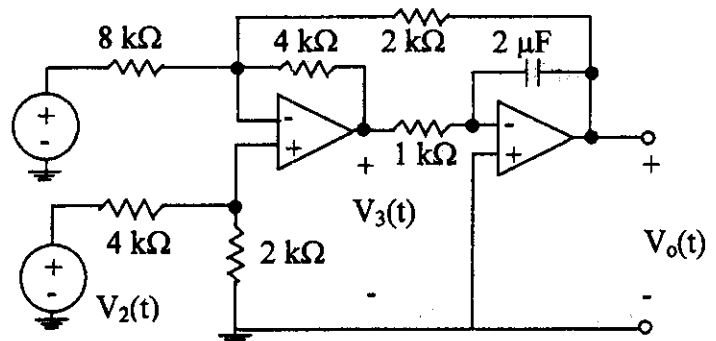


Figure 2

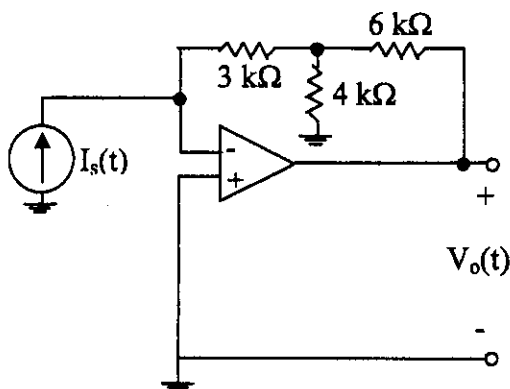


Figure 3

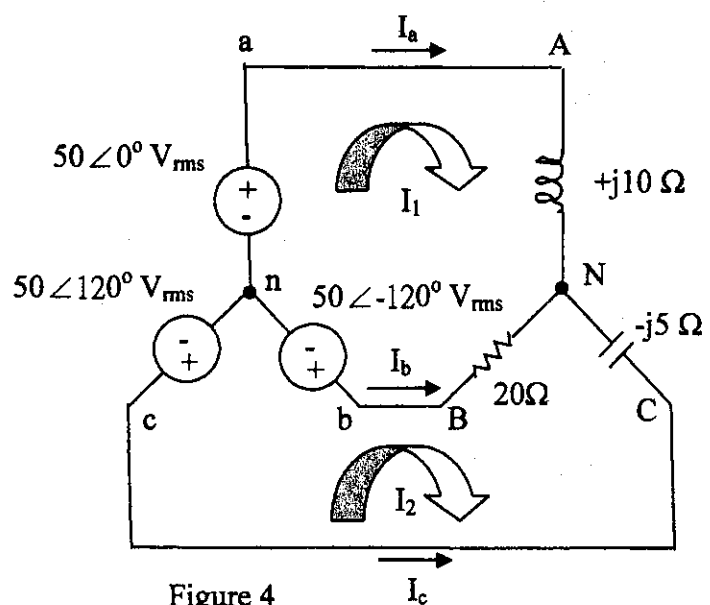


Figure 4