



ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

SCHOOL OF ELECTRICAL ENGINEERING&COMPUTING

DEPARTMENT OF ELECTRICAL POWER & CONTROL ENGINEERING

Course name: Fundamentals of Electrical Engineering

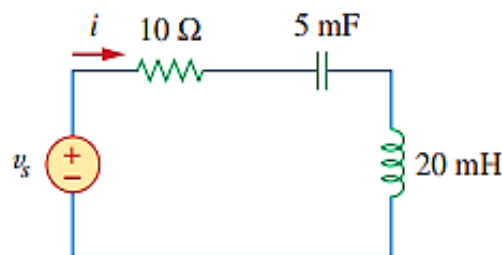
Individual Assignment II: (5%)

Course no: EPCE 2101

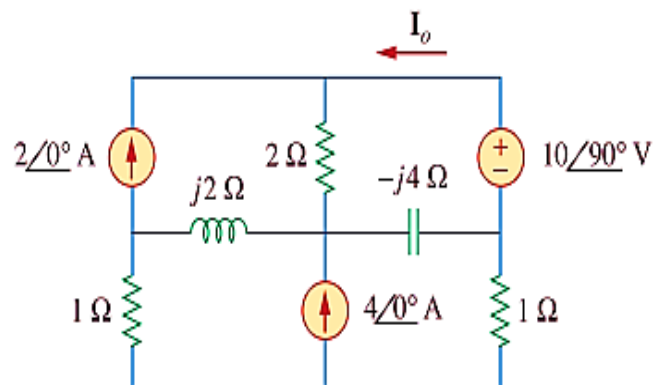
Submission date:24/04/23

Instructions:

- *Answer all of the following questions.*
 - *Make your answers Clear and Readable.*
1. For the following pairs of sinusoids, determine which one leads and by how much.
 - a) $v(t) = 10 \cos(4t - 60^\circ)$ and $i(t) = 4 \sin(4t + 50^\circ)$
 - b) $v_1(t) = 4 \cos(377t + 10^\circ)$ and $v_2(t) = -20 \cos 377t$
 - c) $x(t) = 13 \cos 2t + 5 \sin 2t$ and $y(t) = 15 \cos(2t - 11.8^\circ)$
 2. Find current I and draw the impedance and phasor diagrams in the circuit of Fig below, when $v_s(t) = 50 \cos 200t$ V.



3. Using mesh analysis obtains I_0 in circuit shown below.



4. A balanced delta-connected load is supplied by a 60-Hz three-phase source with a line voltage of 240 V. Each load phase draws 6 kW at a lagging power factor of 0.8. Find:
- the load impedance per phase
 - the line current
 - the value of capacitance needed to be connected in parallel with each load phase to minimize the current from the source
5. Two coils connected in series-aiding fashion have a total inductance of 250 mH. When connected in a series-opposing configuration, the coils have a total inductance of 150 mH. If the inductance of one coil (L_1) is three times the other, find L_1 , L_2 , and M . What is the coupling coefficient?
6. For the circuit in shown below, calculate the transfer function of the input current to the current through capacitor.

