



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering
Final Examination, Fall – 2024

Course Code: 0713-121
Section: A, B, C
Full Marks: 40

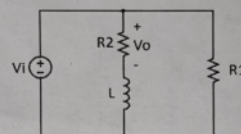
Course Title: Electrical Circuits II
Level-Term: L1-T2
Exam Date: December 18, 2024

Teacher's Initial: MSA, SZE
Time: 2 Hours

Taking at least TWO from each section, answer FIVE of the following questions.

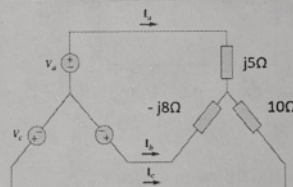
Section A

- Q1. (a) Determine** the type of filter the following circuit works as. Find the corner frequency if $R_1 = 200\Omega$, $R_2 = 100\Omega$ and $L = 2\text{mH}$. CO-3 [04]
(C5)



- (b)** A band Stop Filter circuit's rejection frequency is 1000 Hz, and the rejection bandwidth is 500 Hz. if $L = 0.1\text{H}$, **design** the circuit with suitable values of R and C . (C6) [04]

- Q2. (a) Compute** the phase currents of the following 3-phase unbalanced circuit operating in abc sequence if $V_{an} = 120\text{ V}$. CO-2 [06]
(C3)



- (b) Calculate** the total complex power of the load. [02]

- Q3. (a) Show** that for a three-phase balanced load, $Z_\Delta = 3Z_Y$. CO-2 [02]
(C3)

- (b)** For a 3-phase Y-connected source, **prove** that $V_L = \sqrt{3}V_P \angle 30^\circ$. [02]

- (c)** In a 3-phase negative sequence balanced Y- Δ circuit, $V_{an} = 100 \angle 0^\circ$ and the per phase impedance, $Z_\Delta = (12 - j6)\Omega$. **Compute** the line voltages, line currents, total power, and power factor of the system. [04]

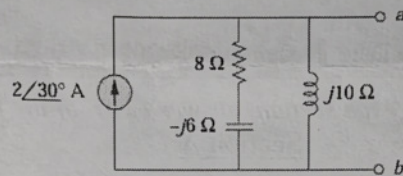
- Q4. (a) Demonstrate** the expression of resonant frequency (ω_0) in an R-L-C series resonant circuit. **Sketch** the frequency response of the circuit with proper labelling. CO-3 [03]
(C3)

- (b)** A three-phase Δ -connected motor takes 20KVA power with 0.6 power factor (lagging). The motor is connected to a Y load of 15Ω resistance and 12Ω inductive reactance connected in series in each phase. **Calculate** the total Volt-Amperes, power factor, and line current of the circuit. CO-2 [05]
(C3)

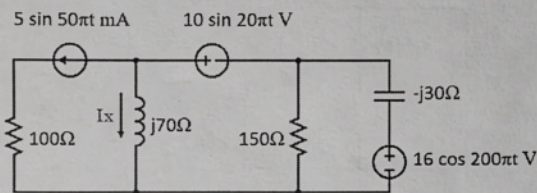
Section B

Q5. (a) Show that in a Thevenin's equivalent circuit, maximum power is attained if the load impedance, $Z_L = Z_{th}^*$ where, Z_{th} = Thevenin's equivalent impedance. CO-2 [04]
(C3)

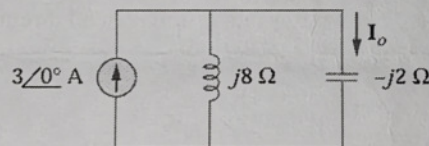
(b) Compute the Thevenin's equivalent of the circuit. What is the maximum power of the load? [04]



Q6. (a) Write the expression of I_x of the following circuit. CO-2 [05]
(C3)

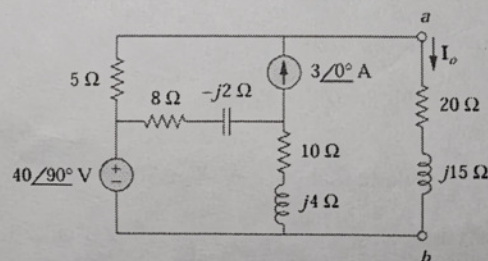


(b) Determine I_o of the following circuit using Mesh analysis. (C5) [03]



Q7. (a) What do you understand by a sinusoidal signal? Prove that a signal's RMS value is always greater than the AVERAGE value. CO-2 [03]
(C1)

(b) Calculate the Norton's equivalent of the following circuit. (C3) [05]



Q8. (a) Use nodal analysis to find I_x of the following circuit. CO-2 [08]
(C3)

