National University of Computer and Emerging Sciences 0057

Lahore Campus

Electrical Network Analysis (EE2004)

Sessional-II Exam

Total Time (Hrs): 1
Total Marks: 40
Total Questions: 2

Date: November 2nd, 2024

Course Instructors

Mr. Abdul Majid Ms. Beenish Fatima

Mr. Haris Mujtaba

Roll No _____ Section _____ Student Signature _____

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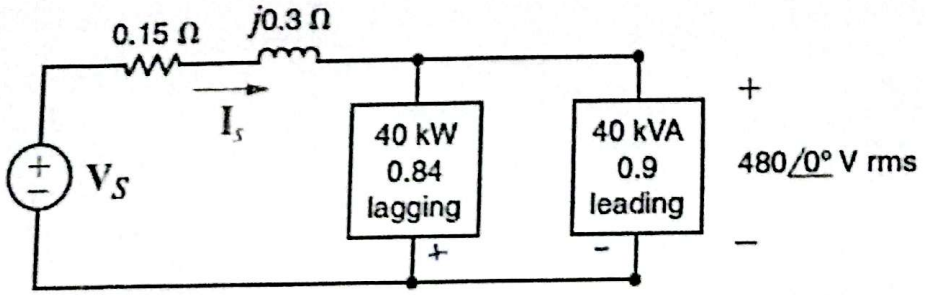
1. **Attempt all the questions.**
2. ***Attempt all parts of the same question together.***
3. ***Show all the steps with proper labelled circuit diagrams, and answers with proper units.***

CLO #2: Construct power triangle to compute power in AC circuits.

Q1: **[9 + 3 + 4 + 4 + 5 = 25 marks]**

The two loads in the circuit shown below can be described as follows:
Load 1 absorbs an average power of 40kW at a lagging power factor of 0.84 and Load 2 absorbs 40kVA at a leading power factor of 0.9.



a) **Construct** the power triangle of each load and **compute** the total complex power absorbed by the two loads. Determine the power factor of the combined load.
b) Compute the impedance of the combined load
c) Compute the current I_s and the average power loss in the transmission line.
d) Determine value of source voltage V_s and the power factor of the source.
e) Given the frequency of the source is 60Hz, compute the value of the capacitor that will correct the power factor to 1 if placed parallel with the two loads.

CLO #3: Analyze balanced three-phase circuits.

Q2: **[3 + 5 + 3 + 4 = 15 marks]**

Analyze a balanced three-phase circuit that has the following characteristics:

- Y-Y connected;
- The **line voltage** at the source, V_{ab}, is $110\sqrt{3} \angle -60°\ V_{rms}$;
- The phase sequence is positive (abc);
- The line impedance is $3 + j2\ \Omega/\varphi$;
- The load impedance is $37 + j\ 28\ \Omega/\varphi$;

a) Draw the single phase equivalent circuit diagram for the a-phase.
b) Calculate all the line currents.
c) Calculate all the phase voltages at the load end.
d) Calculate the line voltages at the load end.