Name of the Program: B. Sc. in CEE   Date: 15 December, 2023
Semester: 3rd   Time: 1:30 pm – 4:30 pm

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

Semester Final Examination   Winter Semester: 2022 – 2023
Course Number: EEE 4385   Full Marks: 150
Course Title: Electrical and Electronic Technology   Time: 3 Hours

There are **10 (ten)** questions. Answer **all 10 (ten)** questions. The symbols have their usual meanings.
Marks of each question and corresponding CO and PO are written in the brackets.

1. For an AC circuit, show that the maximum power that can be transferred to the load will be   (15)
   (CO1)
   (PO1)

$$P_{max} = \frac{|V_{Th}|^2}{8R_{Th}}$$

2. In the circuit shown in Figure 2, find the value of R_L that will absorb the maximum average   (15)
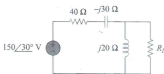   power. Calculate that power.   (CO2)
   (PO2)

Figure 2

3. Find V_0 in the circuit in Figure 3 using the superposition theorem.   (15)
   (CO2)
   (PO2)

Figure 3

4. Find the Thevenin equivalent of the circuit in Figure 4 as seen from terminals a-b.   (15)
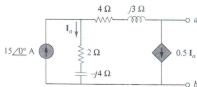   (CO2)
   (PO2)

Figure 4

5. When connected to a 120 V (rms), 60 Hz power line, a load absorbs 4 kW at a lagging power factor of 0.8. Find the value of capacitance necessary to raise the pf to 0.95. **(15) (CO2) (PO2)**

6. Explain different types of power. Define power factor and power triangle. State the maximum and the minimum value of the power factor. How can we correct the power factor? **(15) (CO1) (PO1)**

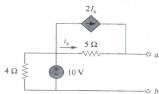7. Using Norton's theorem, find R_N and I_N of the circuit in Figure 7 at terminals a-b **(15) (CO2) (PO2)**

Figure 7

8. Find V_C, I_L and the energy stored in the capacitor and inductor in the circuit of Figure 8 under dc conditions. **(15) (CO2) (PO2)**
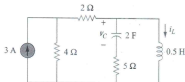

Figure 8

9. Find for Vo in the circuit in Figure 9 using mesh analysis. **(15) (CO2) (PO2)**

Figure 9

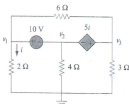10. Find V_1, V_2 and V_3 in the circuit in Figure 10 using nodal analysis. **(15) (CO2) (PO2)**

Figure 10