



Full Name : _____ Student ID: _____

Grade Table (for Lecturer use only)

Question	Points	Score
1	30	
2	5	
3	5	
4	20	
5	20	
6	20	
Total:	100	

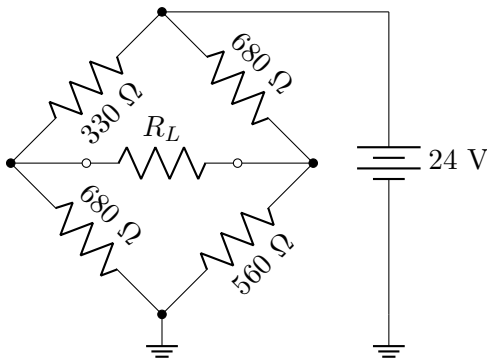
Instructions for Midterm Exam

Welcome to the midterm exam of EEE113 - Introduction to Electrical Engineering and good luck! Please read the following rules and confirm by signing that you have read and understood the rules before you receive your exam:

1. The midterm exam shall be conducted between 15:15 and 16:45. Exam duration is 90 minutes. Students must finalise the exam by delivering it before 16:45. Students are not allowed to leave the exam in the first 30 minutes.
2. Student ID cards shall visibly be on the edge of desks till the end of the exam. Students without the student ID cards or Turkish identity cards shall not be participated into the exam.
3. This is a closed-book exam which means that students are not allowed to take notes, books, or any other reference material into the exam. Throughout the exam, students shall not possess mobile phones and electronic devices that are capable of storing, receiving, or transmitting information or electronic signals, such as computerised watches.
4. Students are not allowed to take a glance at the exam questions until told to do so. Students shall not communicate with any other student under any circumstances during the exam period. A student, who cheats, tries to cheat during the exam, or is identified to be cheating after investigating exam documents, is given 0 (zero) for that exam and a disciplinary investigation is opened against the student.
5. All numerical values in the exam shall be calculated according to two decimal digits. Otherwise, there will be a penalty.
6. An incorrect answer to a question is awarded no marks with no consideration of any partial credit. Therefore, no partial credit will be given.

In recognition of and in the spirit of the above rules, I certify that I will neither give nor receive unpermitted aid on this examination.

Signature: _____



1. (30 points)

Using Thévenin equivalent circuit, find the voltage and current for R_L if $R_L = 1 \text{ k}\Omega$.

4. (20 points) What is the electrical efficiency of a natural gas-fired combined heat and power plant that generates 2,145 kW of electric power and consumes 513.9 m³ natural gas per hour? The natural gas has a calorific value of 8,500 Cal/m³.

(Hints: 1 cal = 4.184 J, $\eta_E = \frac{P_{output}}{P_{input}} \times 100$)

5. (20 points) Design a difference amplifier with a gain of 10 using an ideal op-amp with $\pm 10 \text{ V}$.

2. (5 points) Fill in the blanks with the appropriate words.

In 1745, Pieter van Musschenbroek introduced the first capacitor named as _____ jar for the storage of electric charge.

Benjamin Franklin used the same jar to establish that lightning is simply an electric _____.

In 1784, Charles Coulomb demonstrated that the force between charges is inversely related to the _____ of the distance between the charges.

In 1831, Michael Faraday demonstrated his theory of _____ induction, whereby a changing current in one coil can induce a changing current in another coil, even though the two coils are not directly connected.

_____ equations were developed to support the efforts of Faraday linking electric and magnetic effects.

3. (5 points) List the division names of the Department of Electrical and Electronic Engineering at Cukurova University.

6. (20 points) If $F = xy + x'z + yz$, simplify F to a minimum number of literals and then draw the logic diagram.