



Full Name : \_\_\_\_\_ Student ID: \_\_\_\_\_

Grade Table (for Lecturer use only)

Question	Points	Score
1	8	
2	5	
3	6	
4	12	
5	8	
6	14	
7	6	
8	6	
9	15	
10	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 15:00 and 16:30. Exam duration is 90 minutes. Students must finalise the exam by delivering it before 16:30. 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. (8 points) Which of the following divisions are included in the scope of the Department of Electrical and Electronic Engineering at Çukurova University? Select 8 out of 16.

- |  |  |
|--|--|
| <input type="checkbox"/> Artificial Intelligence     | <input type="checkbox"/> Electrical Plants                               |
| <input type="checkbox"/> Automation Systems          | <input type="checkbox"/> Electromagnetic Fields and Microwave Techniques |
| <input type="checkbox"/> Biomedical Systems          | <input type="checkbox"/> Electronics                                     |
| <input type="checkbox"/> Circuits and Systems        | <input type="checkbox"/> Mechatronics                                    |
| <input type="checkbox"/> Computer Sciences           | <input type="checkbox"/> Renewable Energy Systems                        |
| <input type="checkbox"/> Control and Command Systems | <input type="checkbox"/> Robotics  |
| <input type="checkbox"/> Data Analytics              | <input type="checkbox"/> Software Development                            |
| <input type="checkbox"/> Electrical Machines         | <input type="checkbox"/> Telecommunication Systems                       |

2. (5 points) Match the term belonging to Electrical and Electronic Engineering with the appropriate units.

- |                    |            |
|--------------------|------------|
| 1. Capacitance ( ) | a. Coulomb |
| 2. Charge ( )      | b. Farad   |
| 3. Conductance ( ) | c. Henry   |
| 4. Inductance ( )  | d. Ohm     |
| 5. Resistance ( )  | e. Siemens |

3. (6 points) Write down three programming languages which are actively employed in Electrical and Electronic Engineering.

- 1.
- 2.
- 3.

4. (12 points) What is the electrical efficiency of a coal-fired power plant that instantly generates 750 MW of electric power and typically consumes 9,000 tonnes coal per day? The coal has a calorific value of 20 GJ/t.

Answer: \_\_\_\_\_

5. (8 points) What do TSO and DSO stand for? Describe these terms from the perspective of Turkish Electricity Market.

6. (14 points) Suppose that you have a small house in the countryside which is not connected to the grid. Therefore, you have decided to install a stand-alone PV system to supply the demand of your house.

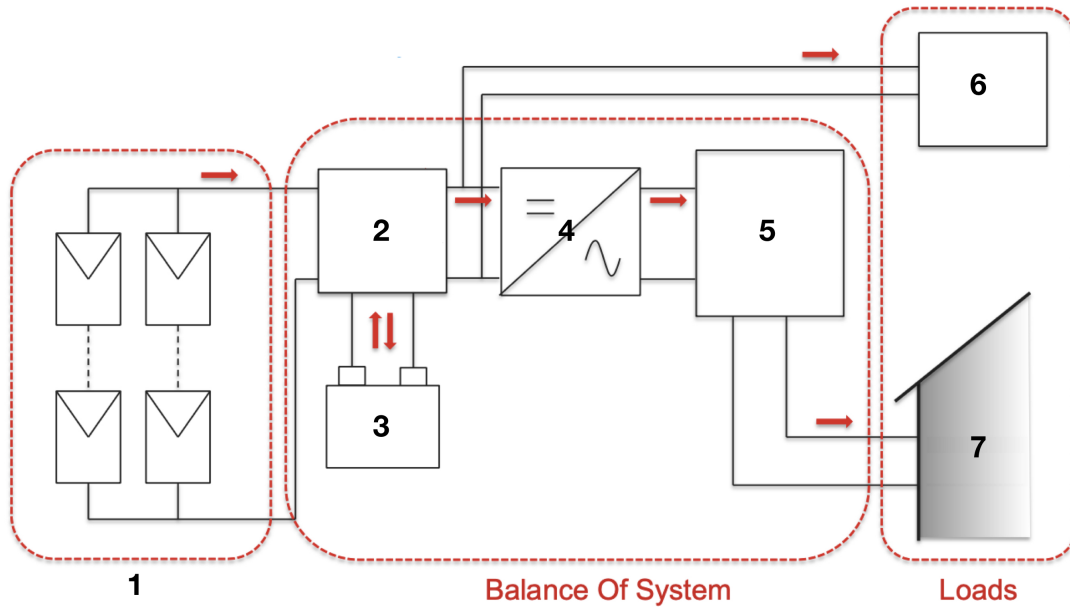


Figure 1: An illustration of a stand-alone PV system

According to Figure 1, write down the appropriate components of a stand-alone PV system.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

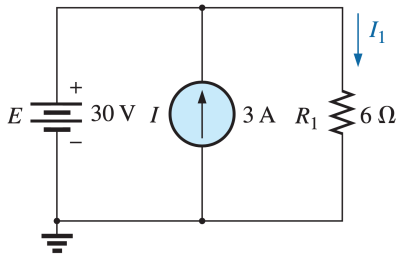
7. (6 points) Clarify the main difference between alternating current (AC) and direct current (DC) by drawing current versus time graphs for both AC and DC.

8. (6 points) Explain the Kirchhoff's current and voltage laws.



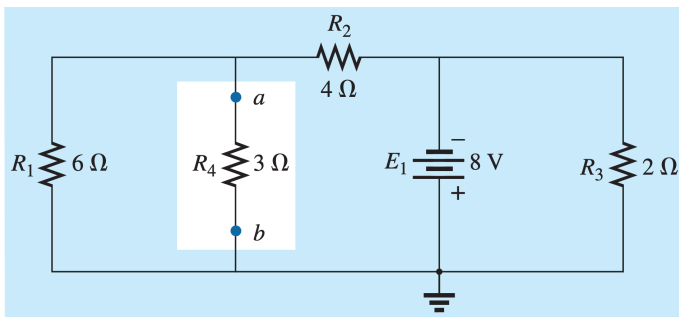
21st Nov 2023, 15:00–16:30

9. (15 points) Using the superposition theorem, determine current  $I_1$  for the network in the below figure.



Answer: \_\_\_\_\_

10. (20 points) Find the Thévenin equivalent circuit for the network in the shaded area of the network in the below figure.



Answer: \_\_\_\_\_