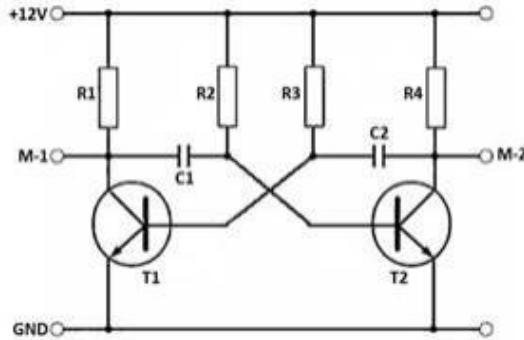


Department:	<b>Electronics and Electrical Technology</b>	
Course:	<b>Power Electronics, DC-AC Inverter Project Final Exam</b>	<b>30 Points Maximum</b>
Name, ID number class		

1. Print your name, class and ID-number at the top of this page.
2. Check that you have got one cover sheet and all 7 problem sheets.
3. Duration: 60 minutes
4. Permitted material: Calculator and personal binder
5. Not permitted: Mobile phones, other electronic devices or textbooks
6. Ensure that your handwriting is clear!
7. Check your solutions!

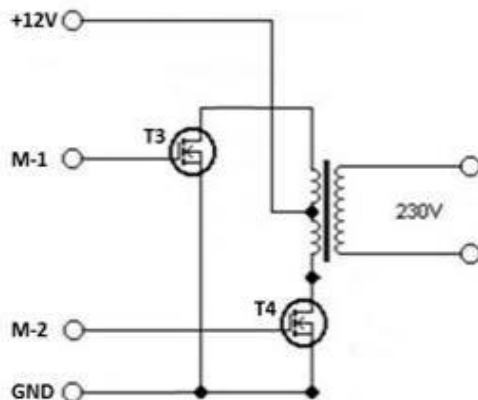
**Circuit diagram**



Picture 1: Oscillator of the DC-AC inverter

Oscillator:

R1 =	820 $\Omega$
R4 =	820 $\Omega$
R2 =	100 k $\Omega$
R3 =	100 k $\Omega$
C1 =	100 nF
C2 =	100 nF
T1 =	BC 548
T2 =	BC 548



Picture 2: Power unit of the DC AC inverter

Power unit:

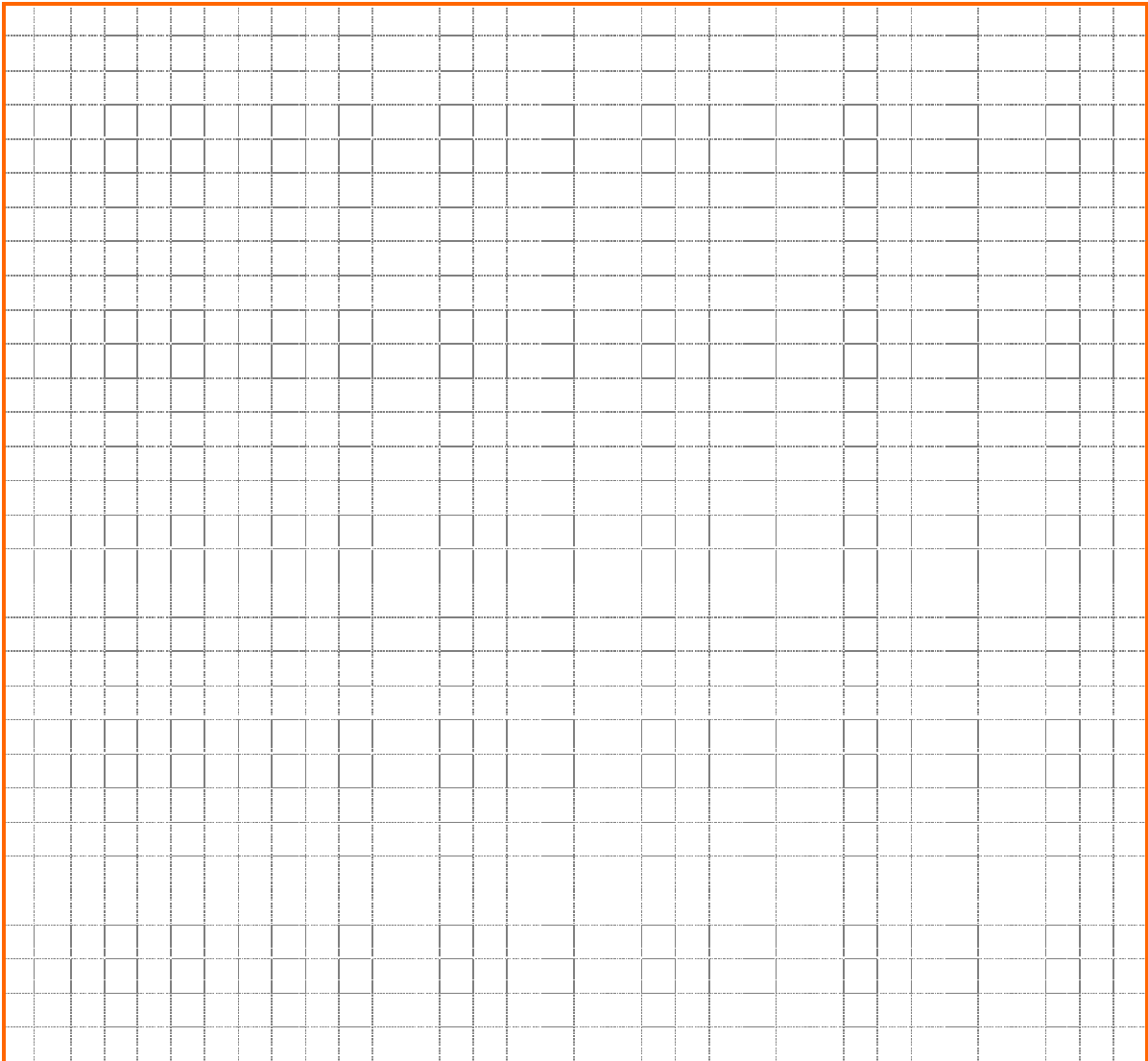
T3 =	IRF 720
T4 =	IRF 720
Max $V_{DSS}$ :	400V
Max $I_D$ :	3.3A
Transformer	
$V_P$	12V - 0 - 12V, 1A
$V_S$	110V - 0 - 110V 54mA

## Task 1

8 points

Referring to the circuit diagram on page 2, the output frequency of this device will be 60 Hz. What exactly do you have to do to change the output frequency to 50 Hz?

- Which components do you have to change?
- What will be the value of these new components?

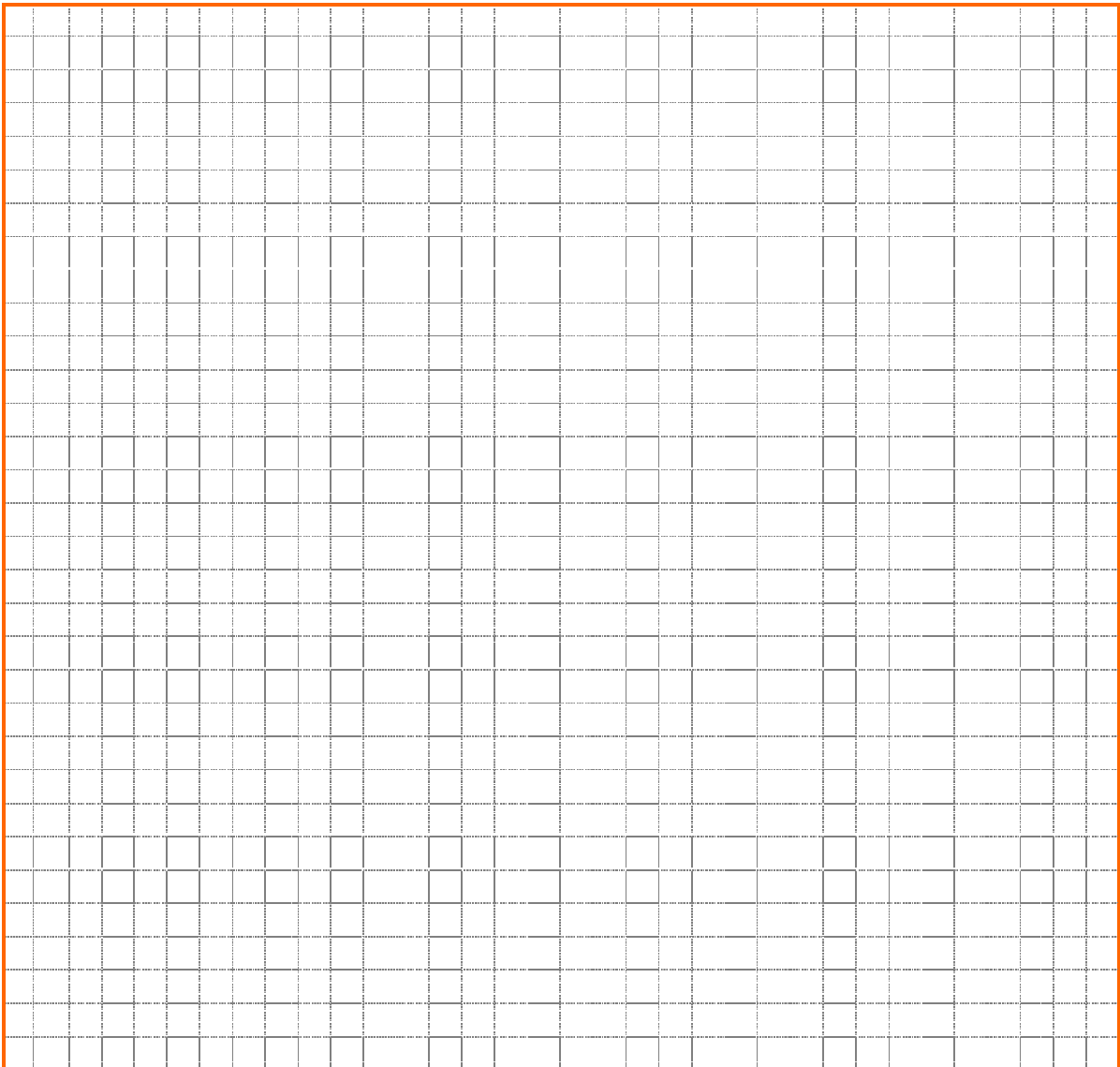


## Task 2

4 points

Referring to the circuit diagram on page 2, how can you increase the output power?

- What components have an influence on the power output?
- What is the overall maximum output power for the device?

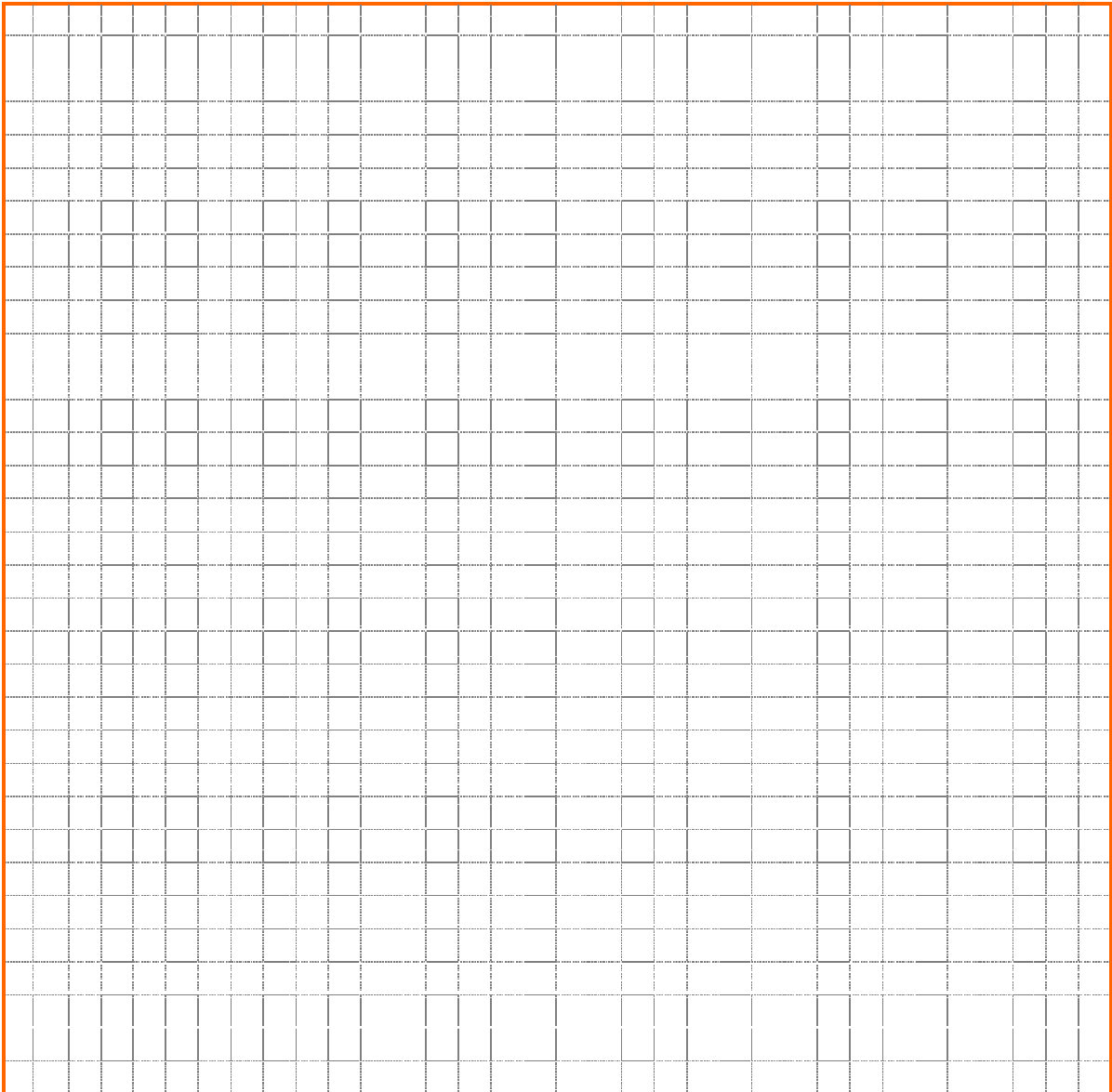


## Task 3

4 points

Referring to the circuit diagram on page 2, how can you increase the output voltage?

- What components have an influence on the output voltage?
- How can you set the output voltage to 400V?



## Task 4

4 points

During a final check, you do a measuring test with an AC-DC inverter.  
You will get the following values:

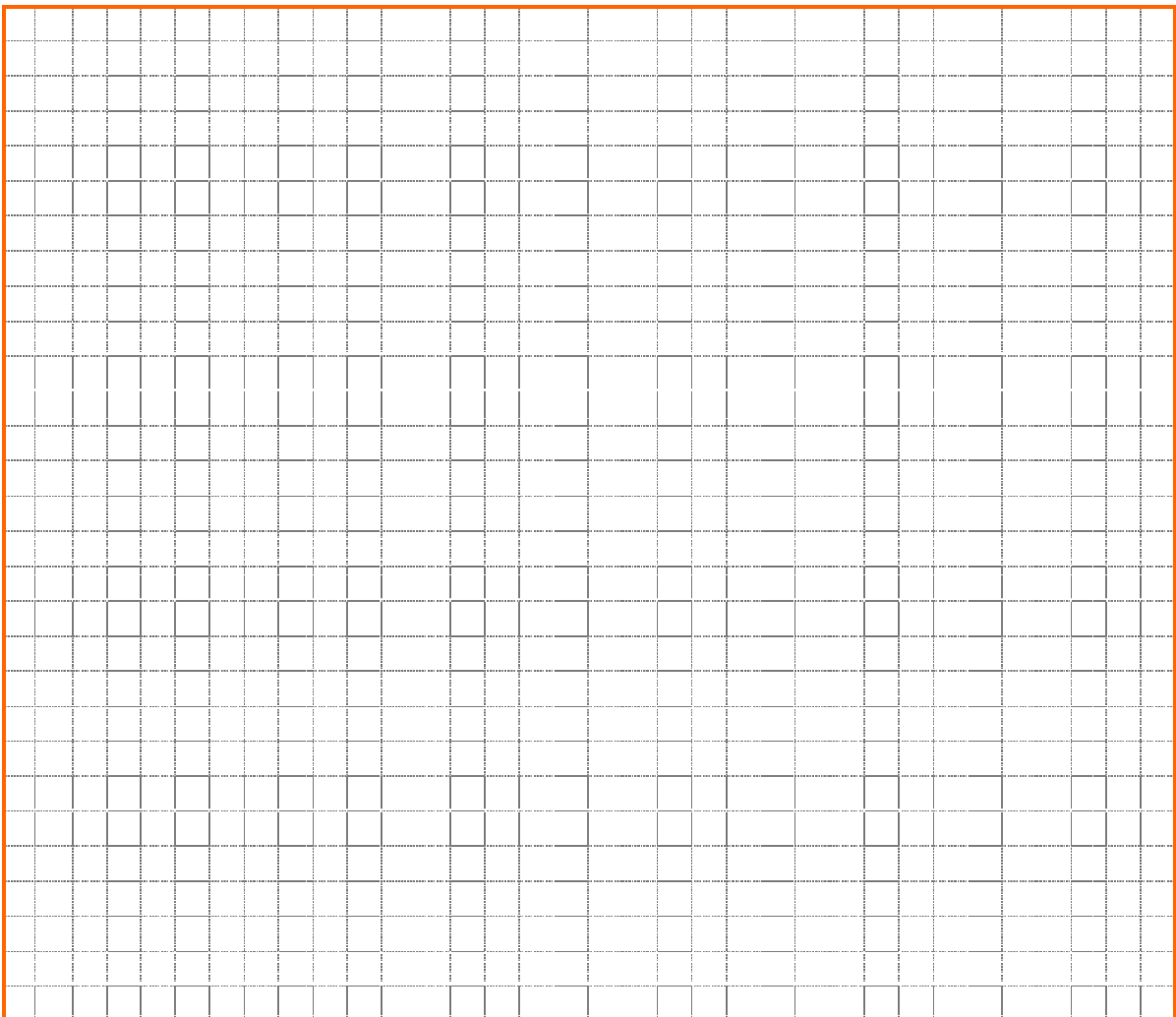
Input Voltage      13.8 V

Input Current      7.24 A

Load at output      500  $\Omega$

Output Voltage      219 V

**Task: Determine the efficiency of this inverter.**



Task 5:	3 points
<p><b>How do you plan a project? Select the best answer below</b></p> <p><input type="radio"/> A      Step 1: Search for a circuit diagram Step 2: Buy the components Step 3: Solder the board</p> <p><input type="radio"/> B      Step 1: Search for a circuit design Step 2: Order the components and solder the board Step 3: Do a running test</p> <p><input type="radio"/> C      Step 1: Collecting tasks Step 2: Scheduling tasks Step 3: Assign tasks to resources</p> <p><input type="radio"/> D      Step 1: Project initiating Step 2: Project planning Step 3: Project executing and closing</p>	

<b>Task 6:</b>	5 points
<b>What does the acronym SMART mean?</b>	
<b>S</b>	_____
<b>M</b>	_____
<b>A</b>	_____
<b>R</b>	_____
<b>T</b>	_____

<b>Task 7:</b>	2 points
<b>What is the definition of project risk? Select the best answer below.</b>	
<input type="radio"/> A	There are no risk-free projects because there are an infinite number of events that can have a negative effect on the project.
<input type="radio"/> B	The risk management approach influenced project schedules and cost goals but exerted less influence on project product quality.
<input type="radio"/> C	Project risk is an uncertain event or condition that, if it occurs, has an effect on at least one project objective.
<input type="radio"/> D	Project risk management focuses on identifying and assessing the risks to the project and managing those risks to minimize the impact on the project.