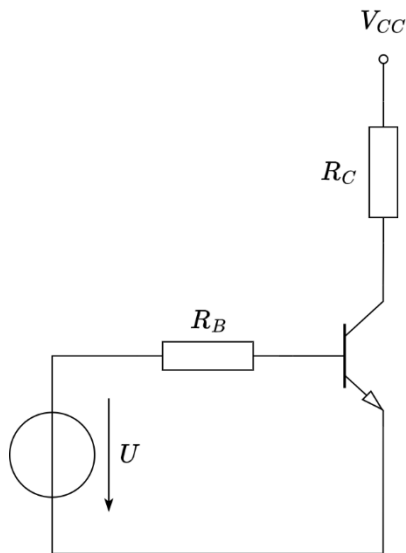


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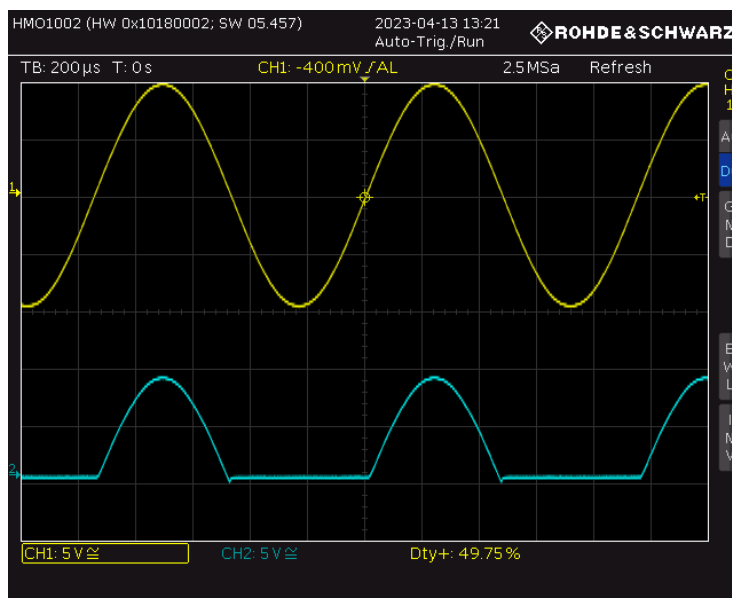
ELECTRICS AND ELECTRONICS I.

1. CALCULATE THE VOLTAGE ACROSS R_B AND R_C ! CALCULATION REQUIRED! 25.05.2025



$V_{CC} = 12V$
 $U = 2.5V$
 $R_B = 5k\Omega$
 $R_C = 100\Omega$
 $\beta = 100$
 $V_{BE} = 0.6V$

2. READ THE QUANTITIES ASKED FOR! NUMBER AND UNIT OF MEASUREMENT (IF ANY) IS REQUIRED! THE SIGNAL ON CH1 IS THE INPUT AND ON CH2 IS THE OUTPUT OF A CIRCUIT MEASURED DURING THE SEMESTER. WHAT IS THIS CIRCUIT?



CH1: Volts/Div =
CH2: Volts/Div =
Time/Div =
CH1: signal peak to peak value =

3. THE COLLECTOR CURRENT OF A BIPOLAR TRANSISTOR IS $I_C = 2A$. THE CURRENT GAIN IS 100. WHAT IS THE VALUE OF THE BASE CURRENT (I_B) ASSUMING NORMAL ACTIVE OPERATION? CALCULATION IS REQUIRED!

4. WHAT ARE THE MAIN DIFFERENCES BETWEEN THE BIPOLAR JUNCTION TRANSISTOR AND THE MOSFET? (HOW THEY ARE COMPOSED, HOW TO CONTROL THEM, WHAT ARE THEY USED FOR, ETC.)

5. WHAT IS A DIODE? WHAT ARE THEY USED FOR? DRAW A DIODE AND NAME THE PINS!

6. DESCRIBE THE BEHAVIOR OF A DIODE IN FORWARD BIAS AND IN REVERSE BIAS!

7. WHAT IS THE DIFFERENCE BETWEEN AC AND DC? WHAT IS THE EASIEST WAY TO CREATE DC FROM AC USING ONE SEMICONDUCTOR DEVICE? HOW CAN WE IMPROVE THE QUALITY OF THE DC VOLTAGE CREATED BY THIS CIRCUIT? DRAW THE SCHEMATICS OF THE CIRCUIT!

8. WHAT IS A BUCK CONVERTER USED FOR? HOW CAN THE OUTPUT VOLTAGE OF A BUCK CONVERTER BE CHANGED?