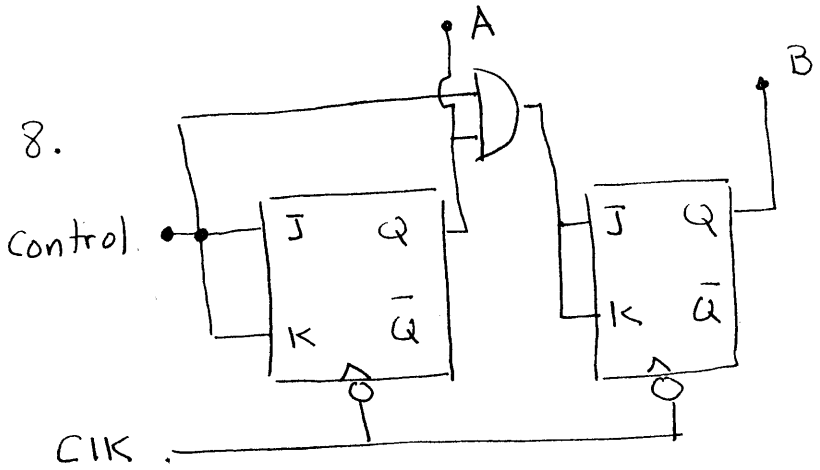
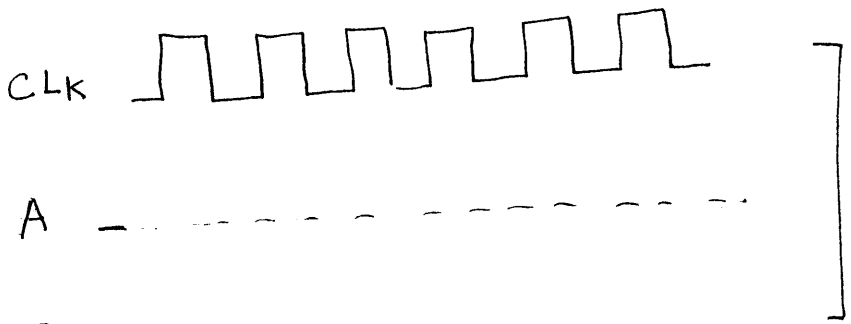
Phys 228

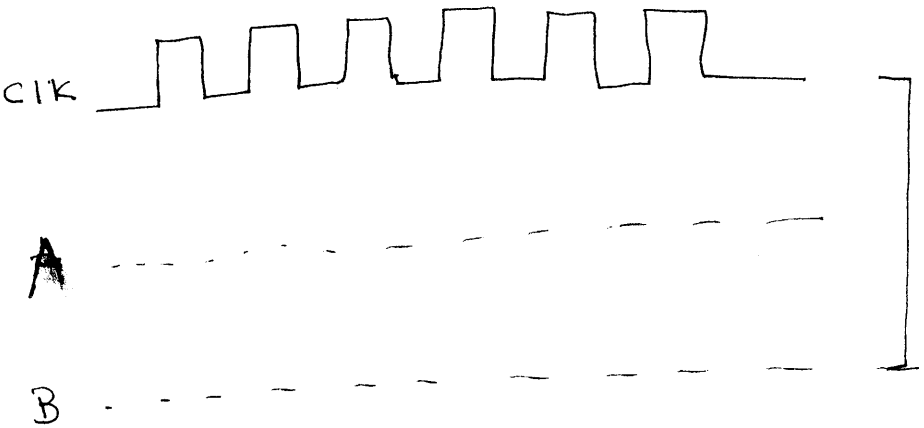
F.E. Jan 08

Name: _____ ID: _____

8.







1.
2.
3.
4.
5.
6.
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8.
9.
10.
11.

Physics 228 – Final Exam
January 2008

1. The circuit is used as an ohmmeter in a DMM. The DVM is 199.9 mV full-scale meter. What should the value of R_c be so that the reading of the meter is in kΩ directly? How large can the input bias current be so that the reading error in R_x is no more than 1%? ***(20)***

2. Find V_o / V_i as a function of frequency ***(20).***

3. The comparator in the circuit controls the switch such that the switch is open when the comparator output is low and closed when the out put is high. V_o is periodic. Sketch V_o as a function of time. What is the frequency of the output? ***(20)***

4. Find the power delivered by the source. ***(20)***

5. What is the peak voltage across the resistor? ***(10)***

6. The input to the circuit is two 4-bit numbers. What is the function of this circuit? ***(10)***

7. Construct the truth table for the circuit. Also, use Boolean algebra to write a simplified expression for the output in terms of A and B. ***(20)***

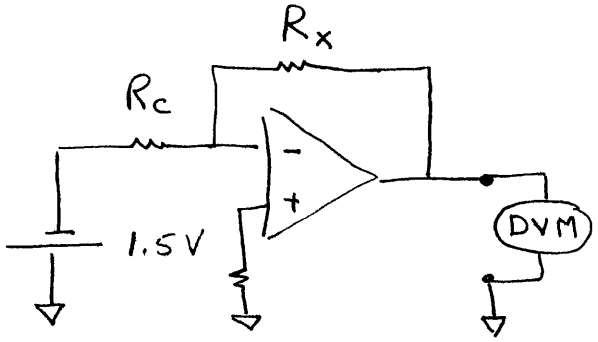
8. Draw the time sequence of A and B, synchronized with the clock for Control = HI and Control = LO . Assume that A and B are LO initially. ***(20)***

9. What is the power delivered by each source? ***(20)***

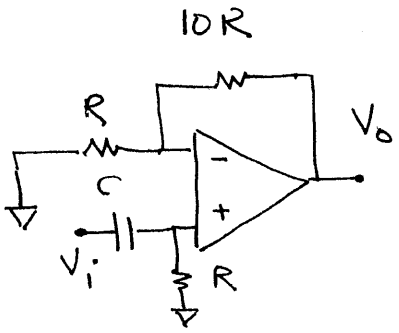
10. What are the two functions (we considered in this course) that can be implemented with a 555 timer? What external elements do you need to implement each? ***(10)***

11. a) What is a Schmitt trigger?
    b) What is the characteristic impedance of a transmission line?
    c) What is the superposition principle? ***(15)***

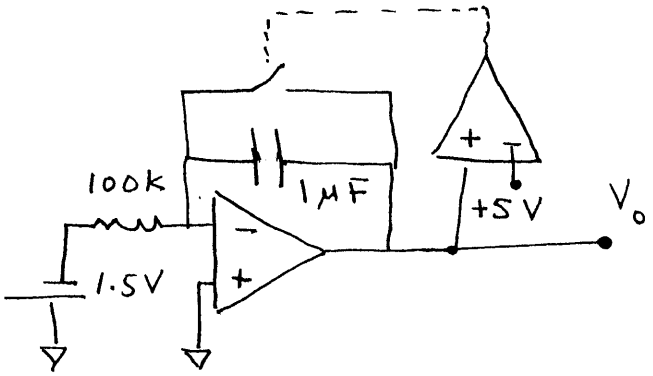
1.


R_x
R_c
1.5V
DVM

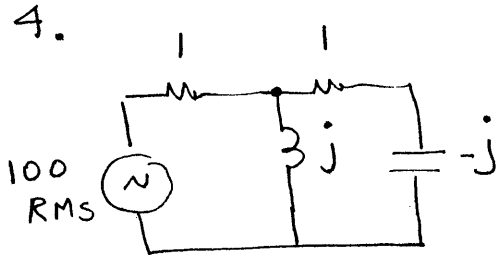
2.


10R
R
C
V_i
R
V_o

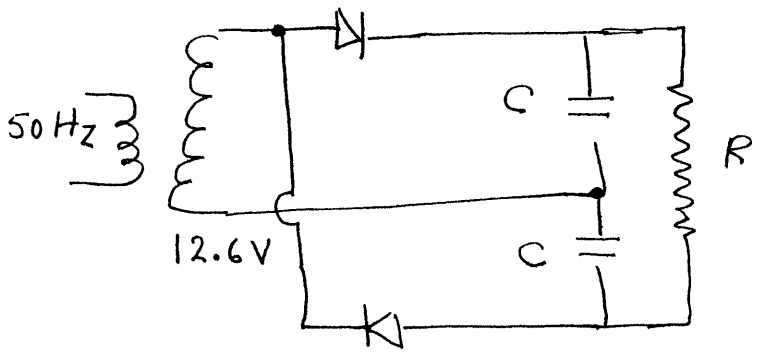
3.


100k
1MF
+5V
V_o
1.5V

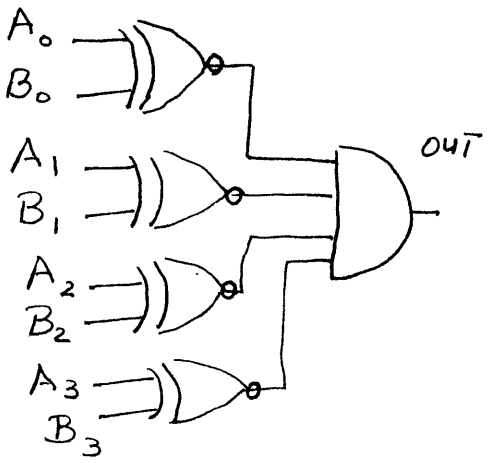
4.


1
1
100
RMS
j
-j

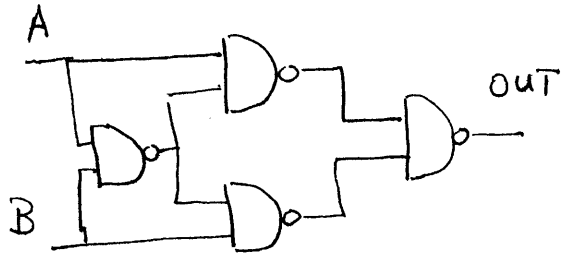
5.


50Hz
12.6V
C
C
R

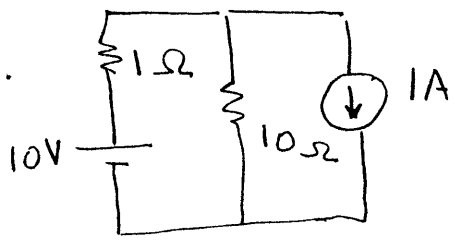
6.


A_0
B_0
A_1
B_1
A_2
B_2
A_3
B_3
OUT

7.


A
B
OUT

9.


1Ω
10V
10Ω
1A