Closed book/notes, calculators allowed up to level of TI89, TI Inspire, HP50.

Part I: 7 questions
Part II: 7 questions
Part II is worth twice as much as Part I.

On the SCANTRON write and bubble-in your:

1. **Name** (Last, first)

2. Write the **color of your exam paper** (IVORY or GREEN) on the top left margin of the SCANTRON.

Show your UA picture ID card when you turn in your exam.

All work should be done on the examination paper. Allow for reasonable amounts of roundoff error, and **carefully** mark one choice for each problem on the SCANTRON answer sheet.

All answer sheets and examinations will be collected at 10:30. You will be asked to stop writing and hand in your papers/answer sheets. **Failure to comply promptly may result in disqualification from the exam.**

NAME: ________________________________

SIGNATURE: __________________________
Part I.

1. Find $i$.

   a) $-1 \text{ mA}$
   b) $1 \text{ mA}$
   c) $-1.1 \text{ mA}$
   d) $1.1 \text{ mA}$
   e) none of these

2. Find $v_o$.

   a) $-4 \text{ V}$
   b) $4 \text{ V}$
   c) $6 \text{ V}$
   d) $-6 \text{ V}$
   e) none of these

3. Find $v_o$.

   a) $6 \text{ V}$
   b) $-6 \text{ V}$
   c) $5 \text{ V}$
   d) $-5 \text{ V}$
   e) none of these
4. Find \( v_o \).

a) \(-10\) V  
b) 10 V  
c) 4 V  
d) \(-4\) V  
e) none of these

5. Find \( i(t) \) for \( t = \ln(2) \).

a) \(-0.75\) \( \mu \)A  
b) 1.5 \( \mu \)A  
c) \(-3\) \( \mu \)A  
d) 6 \( \mu \)A  
e) none of these

6. Which terminal should be labeled with a dot?

a) \( ii \)  
b) \( iii \)  
c) \( iv \)  
d) not enough information given  
e) none of these

7. Find \( C_{eq} \).

a) 3 \( \mu \)F  
b) 6 \( \mu \)F  
c) 9 \( \mu \)F  
d) 12 \( \mu \)F  
e) none of these
Part II.

8. Which of the following is a valid mesh equation for the given circuit?

a) \(-v(t) + 10i_1(t) + 4 \frac{di_1(t)}{dt} + 8 \frac{di_2(t)}{dt} = 0\)
b) \(-v(t) + 10i_1(t) + 4 \frac{di_1(t)}{dt} - 8 \frac{di_2(t)}{dt} = 0\)
c) \(-v(t) + 10i_1(t) + 4 \frac{di_1(t)}{dt} + 16 \frac{di_2(t)}{dt} = 0\)
d) \(-v(t) + 10i_1(t) + 4 \frac{di_1(t)}{dt} - 16 \frac{di_2(t)}{dt} = 0\)
e) none of these
9. Let $v(4) = 4$, $i(t) = 5t \ mA$, and find $v(8)$.

a) 28 V  
b) 32 V  
c) 60 V  
d) 64 V  
e) none of these
10. Let the power rails be $\pm 25$ V and find $i$.

a) $8 \text{ mA}$  
b) $-8 \text{ mA}$  
c) $4 \text{ mA}$  
d) $-4 \text{ mA}$  
e) none of these
11. Find the smallest value of $R$ for which saturation does not occur.

a) $0 \, \Omega$

b) $2 \, k\Omega$

c) $4 \, k\Omega$

d) $6 \, k\Omega$

e) none of these
12. Find $v_n$.

a) 0 V  
b) 1.43 V  
c) 2 V  
d) 2.86 V  
e) none of these
13. Which LED is on?

a) LED A  
b) LED B  
c) LED A & LED B  
d) neither  
e) none of these
14. Find $v_1$.

a) 1 V
b) 3 V
c) 5 V
d) 7 V
e) none of these
Extra Credit Problems.

15. What is the ECE 220 class’s favorite pet?
   a) parrot  
   b) Gila monster  
   c) hamster  
   d) turtle  
   e) none of the above

16. What is Dr. Marcellin’s favorite color?
   a) orange  
   b) burgundy  
   c) yellow  
   d) lavender  
   e) none of the above
Answers

1) a
2) c
3) d
4) c
5) c
6) c
7) a
8) b
9) d
10) c
11) d
12) b
13) a
14) a
15) d
16) b