Circuit Lab Multiple Choice

Do not open this test until told to do so. You will have 40 minutes to complete this section and the free response section. Note that the free response is weighted more than multiple choice. Additionally, you will not lose points for guessing. You may not know the answer to every question and that is to be expected. Complete as much of the exam as you can in the time given. *We tried to make as many questions as we could to best prepare you for a real circuit lab exam.* **You may write on this test but you must transfer your answers to the M/C answer sheet.**

EXAM Number (write this on the **free response** and Test Info Sheet):

ANSWER KEY

PART A

Multiple Choice: Each statement or question is followed with 4 or 5 suggested answers. Choose ONE correct answer for each question. Each question is worth one point. There is no penalty for guessing.

1. The voltage of a circuit is...
    a. The inverse of the sum of resistances.
    b. The multiplication of the current and power.
    c. **The division of the current and resistance.**
    d. The electric force of the circuit.
    e. None of the above answers are correct.
2. In a series circuit...
    a. The total resistance is equal to the resistance of the highest resistor.
    b. The total current is equal to the voltage
    c. **The total voltage is the sum of the voltage drops around the circuit**
    d. The power is equal to the force multiplied by the time
3. Kirchhoff's law concerning series circuits is that
    a. **The addition of the voltage drops across a circuit equals the total voltage**
    b. The addition of all of the currents across a circuit equals to total current
    c. The addition of all of the resistances across a circuit equals the total resistance
    d. The multiplication of the currents and resistances equals the voltage.
4. The image to the right is the schematic symbol for a
    a. Resistor
    b. **Diode**
    c. Capacitor
    d. AND gate
    e. OR gate

5. The IC chip which only has a logic value HIGH (bin. 1) one time in its truth table is
    a. XOR Gate
    b. XNOR Gate
    c. **AND Gate**
    d. OR Gate
6. Ohms law...
    a. says the sum of the voltages on a closed loop is zero.
    b. Says the reduction of a circuit is the voltage source and a resistor
    c. **Relates voltage, current, and resistance**
    d. Uses (b) for multiple loops simultaneously.
7. Energy per unit charge is an expanded way of saying which electrical unit?
    a. Ohms
    b. **Volts**
    c. Amperes
    d. Farad
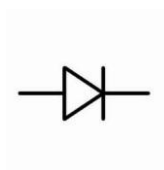
8. Two pieces of tape (A and B) are held together at point *p*. At the bottom, they are distance *d* apart. If tape A is known to be positively charged and the two pieces of tape attract, what is the charge on tape B?

P

a. Positive
b. Negative
c. Neutral
d. There is more than one correct answer.

d
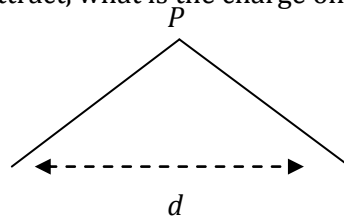
9. If tape A exerts an electric force of $3F$ on tape B, then the force exerted by tape B on A is equal to:
    a. *F*
    b. *6F*
    c. *3F*
    d. *1/2F*
    e. *1/3F*
    f. *1/6F*

10. What is the more common name of a Coulomb per second?
    a. Resistance
    b. Voltage
    c. Current
    d. Capacitance

11. One light bulb (A) has a filament that's long and thin while another bulb (bulb B) has a filament that thick and short. The resistance of A is…
    a. Greater than that of B.
    b. Equal to that of B.
    c. Less than that of B.
    d. Cannot be determined.

12. The schematic symbol to the right is also known as a
    a. Resistor
    b. Battery
    c. Capacitor
    d. Diode
    e. Diamond Loop

13. What are the color bands for a 390 ohm resistor?
    a. Red-Blue-Black
    b. Green-Blue-Red
    c. Red-Green-Black
    d. Orange-White-Brown

14. Which gate, if it exists, produces the exact opposite output as the input (for example, if we put in a logic one, the output would be a logic zero)?
    a. OR gate
    b. AND gate
    c. INVERTER gate
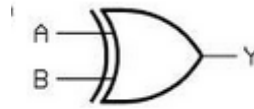   d. XOR Gate
    e. The gate does not exist.

15. The wave to the right is most likely a (voltage vs. time)
    a. **Analog signal**
    b. Digital signal
    c. Analog-Digital signal
    d. High signal
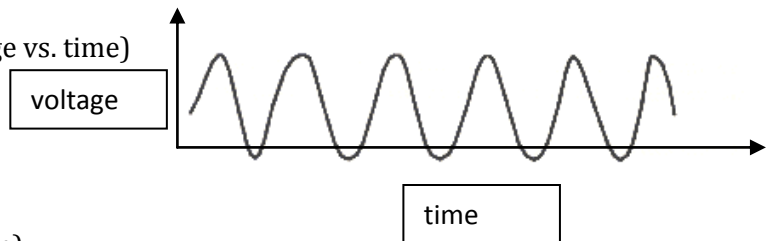
16. The gate shown to the right is most likely a(n)
    a. AND gate
    b. OR Gate
    c. **XOR gate**
    d. XNOR gate

17. When comparing a PLD (programmable logic device) circuit to a logic circuit implemented with individual logic gates, the PLD circuit will
   a. **Be easier to breadboard with less chips and wires**
    b. Require you to simplify the equation using a K-map
    c. Require more chips and wiring
    d. Require a higher operating voltage

18. How many flip flops are required to implement a divide by 4 circuit (4 points EXTRA CREDIT)?
    a. 0
    b. 1
    c. **2**
    d. 3
    e. 4

19. The items to the right are connected in a circuit and the light illuminates. The electrons in the circuit originate from the _____ and flow _____.
    a. Battery and flow from the positive terminal to the negative terminal
    b. **Battery and flow from the negative terminal to the positive terminal**
    c. Battery and flow from the light bulb to the positive terminal
    d. Light bulb and flow from the negative terminal to the positive terminal.
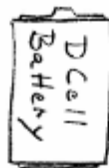
Matching: Pair each unit below with its equivalent (1/2 pt each). Each choice *may* be used once, more than once, or not at all.

20. Volt **H**	a. Ampere*second
21. Ohm **F**	b. Volt*ampere
22. Ampere **C**	c. Watt/volt
23. Farad **D**	d. Coulomb/volt
24. Watt **B**	e. Volt/coulomb
25. Coulomb **A**	f. (Volt*second)/coulomb
26. Joule **E**	g. (Volt*coulomb)/meter
27. Newton **G**	h. Joule/coulomb

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