Republic of the Philippines
**SULTAN KUDARAT STATE UNIVERSITY**
College of Industrial Technology
Isulan Campus, Isulan, Sultan Kudarat

**AT 122 Midterm Exam**

**NAME:**_____ **DATE:**_____

**YEAR AND SECTION:**_____

**GENERAL DIRECTION: READ AND ANSWER CAREFULLY**

- **Test 1: Multiple choice:**
  - Choose and encircle the best answer from the options provided (A, B, C, or D) for each question.
  - There is only one correct answer for each question.

1. What is the function of a resistor in an electrical circuit?
   a. Store electrical energy
   b. Convert electrical energy to mechanical energy
   c. Oppose the flow of current
   d. Increase voltage
2. Which semiconductor device is commonly used as a switch or amplifier?
   a. Resistor
   b. Inductor
   c. Transistor
   d. Capacitor
3. Why does a capacitor block DC but allow AC to pass?
   a. Because DC voltage is constant
   b. Because AC voltage fluctuates
   c. Due to the insulating properties of the dielectric
   d. Because DC has higher energy than AC
4. What happens when the resistance in a circuit increases while the voltage remains constant?
   a. The current increases
   b. The current decreases
   c. The power output increases
   d. The frequency changes
5. If a 10V power supply is connected across a 5Ω resistor, what is the current flowing through the circuit?
   a. 0.5A
   b. 2A
   c. 5A
   d. 10A
6. A technician needs to increase the capacitance in a circuit. What should they do?
   a. Use a lower-value capacitor
   b. Use a capacitor with a higher voltage rating
   c. Connect more capacitors in parallel
   d. Connect more capacitors in series
7. A circuit contains a combination of resistors in parallel and series. If one resistor in the parallel section burns out, what will happen?
   a. The total resistance decreases
   b. The total resistance increases
   c. The circuit will stop working completely
   d. The voltage across the remaining resistors will decrease
8. Why does an inductor resist changes in current?
   a. Because of its internal resistance
   b. Due to the electromagnetic field it generates
   c. Because it absorbs excess voltage
   d. Due to its dielectric material
9. What is the main difference between a diode and a transistor?
   a. A diode amplifies signals, while a transistor does not
   b. A transistor can act as a switch and an amplifier, while a diode allows current in one direction only
   c. A diode is used for power regulation, while a transistor is used for resistance control
   d. A transistor is used for current rectification, while a diode is used for voltage stabilization
10. Which factor should be considered most important when selecting a power supply for an electronic circuit?
    a. Voltage and current ratings
    b. The physical size of the power supply
    c. The number of output terminals
    d. The manufacturer's brand
11. Design an LED circuit with a 12V power supply. What resistor value should you choose if the LED requires 20mA of current and has a voltage drop of 2V?
    a. 1000

d. 10Ω

12. What is the main function of a multimeter?
    a. To generate electrical signals
    b. To measure electrical properties such as voltage, current, and resistance
    c. To convert AC to DC
    d. To store electrical energy
13. Why is it important to set the correct range before measuring voltage with a multimeter?
    a. To prevent inaccurate readings and potential damage to the meter
    b. To make the display brighter
    c. To increase battery life of the multimeter
    d. To reduce the resistance of the circuit
14. If you want to measure the resistance of a resistor using a multimeter, what should you do first?
    a. Connect the multimeter in series with the resistor
    b. Ensure the circuit is powered on for accurate readings
    c. Set the multimeter to the resistance (Ω) setting and connect it across the resistor
    d. Use the AC voltage setting for more precise results
15. A technician is testing a fuse with a multimeter. If the reading shows infinite resistance, what does this indicate?
    a. The fuse is working properly
    b. The fuse is blown and must be replaced
    c. The multimeter is set to the wrong mode
    d. The circuit is powered on
16. Which factor is most important when choosing a multimeter for automotive electrical testing?
    a. The number of display digits
    b. The type of probes included
    c. The ability to measure both DC and AC voltage accurately
    d. The color of the casing
17. You need to test whether a battery is still functional using a multimeter. How would you set up and conduct the test?
    a. Set the multimeter to the DC voltage mode, place the probes on the battery terminals, and compare the readin the battery's rated voltage
    b. Set the multimeter to resistance mode and measure the battery's internal resistance
    c. Use the AC voltage setting to check if the battery produces any current
    d. Connect the multimeter in series with a load to test its power output
18. What is the primary function of a diode in an electrical circuit?
    a. To amplify signals
    b. To store electrical energy
    c. To allow current to flow in one direction only
    d. To generate voltage
19. Which of the following materials are commonly used to make diodes?
    a. Copper and Aluminum
    b. Silicon and Germanium
    c. Iron and Zinc
    d. Gold and Silver
20. Why does a diode conduct current in only one direction?
    a. Because it has a metallic body
    b. Due to the difference in resistance on both ends
    c. Because of the PN junction, which allows current flow in forward bias but blocks it in reverse bias
    d. Because it operates only in AC circuits
21. What happens when a diode is in reverse bias?
    a. It conducts maximum current
    b. It blocks current flow almost completely
    c. It allows both AC and DC to pass
    d. It reduces circuit resistance
22. If you want to check whether a diode is working using a multimeter, what setting should you use?
    a. Voltage mode
    b. Resistance mode
    c. Diode test mode
    d. Capacitance mode
23. A technician is designing a DC power supply using a rectifier circuit. What type of diode arrangement should be used for full-wave rectification?
    a. A single diode in series with the load
    b. A Zener diode for voltage regulation
    c. A bridge rectifier made of four diodes
    d. A photodiode for light detection
24. A bridge rectifier is built using four diodes. If one diode fails in an open condition, what effect will it have on the circuit?
    a. The rectifier will still work perfectly
    b. The rectifier will output half-wave instead of full-wave rectification

a. A Zener diode conducts in forward bias only, while a regular diode works in both directions
b. A Zener diode is used for rectification, while a regular diode is used for voltage regulation
c. A Zener diode allows reverse current flow after a certain voltage, while a regular diode does not
d. A Zener diode produces light, while a regular diode does not

26. A Schottky diode is often used in high-frequency circuits. What characteristic makes it suitable for such applications?
    a. Its ability to conduct in reverse bias
    b. Its very low forward voltage drop and fast switching speed
    c. Its ability to store electrical charge for a long time
    d. Its capacity to convert AC to DC without rectification
27. Which type of diode would be most suitable for protecting a circuit from voltage spikes?
    a. Light Emitting Diode (LED)
    b. Zener Diode
    c. Schottky Diode
    d. TVS (Transient Voltage Suppression) Diode
28. You need to design a simple LED indicator circuit powered by a 12V power supply. What resistor value should you choose to protect the LED, assuming the LED requires 20mA of current and has a voltage drop of 2V?
    a. 100Ω
    b. 200Ω
    c. 500Ω
    d. 10Ω
29. What is the primary function of a resistor in an electrical circuit?
    a. To store electrical energy
    b. To oppose the flow of electric current
    c. To amplify signals
    d. To convert AC to DC
30. Why does increasing the resistance in a circuit decrease the current flow?
    a. Because resistance reduces voltage
    b. Because resistance absorbs current
    c. Because Ohm's Law states that current is inversely proportional to resistance
    d. Because resistance converts current into energy
31. A 9V battery is connected to a 1.8kΩ resistor. Using Ohm's Law, what is the current flowing through the circuit?
    a. 0.005A (5mA)
    b. 0.05A (50mA)
    c. 0.5A (500mA)
    d. 5A
32. A circuit contains a series and parallel combination of resistors. If one resistor in the parallel section burns out (open circuit), what effect does this have on the total resistance?
    a. The total resistance decreases
    b. The total resistance increases
    c. The total resistance remains the same
    d. The circuit will stop working entirely
33. Which type of resistor would be best suited for high-power applications where heat dissipation is a concern?
    a. Carbon film resistor
    b. Metal oxide resistor
    c. Wire-wound resistor
    d. Variable resistor
34. You need to design an LED circuit using a 12V power supply. If the LED requires 20mA of current and has a voltage drop o 2V, what resistor value should you use to ensure safe operation?
    a. 100Ω
    b. 200Ω
    c. 500Ω
    d. 10Ω
35. What is the primary function of a transistor in an electrical circuit?
    a. To store electrical energy
    b. To control the flow of current as a switch or amplifier
    c. To convert AC to DC
    d. To provide resistance in a circuit
36. Why does a transistor require a small current at the base to control a larger current between the collector and emitter?
    a. Because it acts as a variable resistor
    b. Because it operates as a current-controlled device
    c. Because it stores energy like a capacitor
    d. Because it blocks current flow in both directions
37. A technician wants to use a transistor to amplify a weak signal. Which transistor configuration should they use?
    a. Common emitter
    b. Common base
    c. Common collector
    d. Parallel circuit

b. The collector-emitter voltage is too high
c. There is no current flowing into the base
d. The transistor is in saturation mode

39. Which type of transistor would be best suited for high-frequency switching applications?
    a. Bipolar Junction Transistor (BJT)
    b. Field-Effect Transistor (FET)
    c. Metal-Oxide-Semiconductor Field-Effect Transistor (MOSFET)
    d. Light Emitting Transistor (LET)
40. You need to design a simple LED control circuit using a transistor. How should you connect the transistor to allow the LED turn on and off using a small control signal?
    a. Connect the LED directly to the power source
    b. Place the transistor in series with the LED and control the base current with a resistor
    c. Use a capacitor to store charge and release it to the LED
    d. Place a diode in parallel with the LED to regulate voltage
41. What is the primary function of a capacitor in an electrical circuit?
    a. To resist the flow of current
    b. To store and release electrical energy
    c. To amplify signals
    d. To convert AC to DC
42. Why does a capacitor block DC but allow AC to pass?
    a. Because DC cannot charge a capacitor
    b. Because capacitors act as open circuits for DC and as frequency-dependent components for AC
    c. Because capacitors generate their own voltage
    d. Because capacitors have zero resistance
43. What happens when a capacitor is connected to a DC power source?
    a. It continuously allows current to flow
    b. It charges up to the supply voltage and then stops current flow
    c. It converts DC into AC
    d. It acts as a resistor
44. You are working with a power supply circuit that experiences sudden voltage drops. What type of capacitor should you u to stabilize the voltage?
    a. Ceramic capacitor
    b. Electrolytic capacitor
    c. Variable capacitor
    d. Photocapacitor
45. A technician needs to select a capacitor for a high-frequency signal filtering application. Which type of capacitor is most suitable?
    a. Electrolytic capacitor
    b. Ceramic capacitor
    c. Supercapacitor
    d. Paper capacitor
46. Two capacitors are connected in series. How does this affect the total capacitance?
    a. The total capacitance increases
    b. The total capacitance decreases
    c. The total capacitance remains the same
    d. The total capacitance is equal to the sum of both capacitors
47. A capacitor in a circuit is failing to hold charge. What could be a possible reason?
    a. The capacitor has too high of a capacitance
    b. The capacitor is connected in parallel
    c. The capacitor is damaged or has developed an internal short circuit
    d. The capacitor is exposed to low voltage
48. In an AC circuit, a capacitor is used for power factor correction. What is the effect of adding a capacitor to the circuit?
    a. It decreases circuit resistance
    b. It improves power factor by reducing reactive power
    c. It increases power consumption
    d. It generates additional current
49. Which factor is most important when selecting a capacitor for an AC circuit?
    a. The capacitor's color
    b. The type of material used for its terminals
    c. The capacitance value and voltage rating
    d. The capacitor's size
50. You need to design a simple circuit that stores energy for a short duration to power an LED after turning off the main switch. What type of capacitor should you use, and where should it be placed?
    a. A supercapacitor connected in parallel with the LED
    b. A ceramic capacitor connected in series with the LED
    c. A paper capacitor placed across the power supply

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