AST Practice

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. What does the acronym ESD stand for?
    a. Electrostatic Discharge
    b. Electrostatic Device
    c. Electromagnetic Sensitivity Diac
    d. Electrostatic Damage

2. What is the number one concern in regards to electrical safety?
    a. Proper grounding
    b. ESD
    c. Shock
    d. Faulty equipment

3. Bohr's Atomic Model consists of what three components?
    a. Neutrons, ion, neutrinos
    b. Protons, neutrons and cations
    c. Tachyons gravitons and electrons
    d. Protons, neutrons and electrons

4. Electrons are arranged in _____ around a nucleus.
    a. orthogonal lattices
    b. shells
    c. loops
    d. spheres

5. What are three types of materials used in electronics?
    a. Conductors, semi-conductors and insulators
    b. Semi-conductors, insulators and semi-insulators
    c. Insulators, conductors and interions
    d. Conductors, insulators and regulators

6. Coulomb's Law describes the forces of attraction or repulsion between electrical charges, which are _____ to the product of the charges _____ to the distance between them.
    a. directly proportional, inversely proportional
    b. inversely proportional, directly proportional
    c. indirectly proportional, directly proportional
    d. inversely proportional, indirectly proportional

7. The magnetic field that surrounds a magnet can best be described as invisible lines of force, and are commonly referred to as:
    a. lines of flux.
    b. lines of density.
    c. lines of attraction.
    d. lines of flux proportionality.

8. An analog multimeter (AMM) checks for:
    a. voltage, resistance and inductance.
    b. voltage, resistance and capacitance.
    c. current, resistance and capacitance.
    d. voltage, current and resistance.

9. An oscilloscope with two vertical inputs, is commonly referred to as a _____ oscilloscope.
    a. multi-trace
    b. dual-trace
    c. sweep trigger-trace
    d. modulation-trace

10. Voltage or potential difference is the measure of potential energy between two points in a circuit and is commonly referred to as:
    a. voltage drop.
    b. voltage flow.
    c. difference in conduction.
    d. potential resistance.

11. What is impedance?
    a. The resistance of a component at a given frequency.
    b. The conductivity of a component at a given frequency.
    c. The potential difference of a component at a given frequency.
    d. The ability of a component to store a charge at a given frequency.

12. A resistor has three color bands of red, brown and brown. What is the ohmic value of this resistor?
    a. 205 Ohms
    b. 100 Ohms
    c. 210 Ohms
    d. 330 Ohms

13. What components value is measured in millihenries?
    a. Capacitor
    b. Inductor
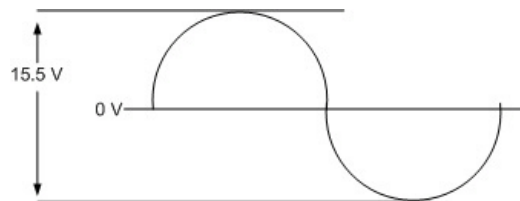   c. Resistor
    d. Diode

14. Ohm's Law characterizes the relationship between:
    a. power, coulombs, current and joules.
    b. inductance, resistance, current and joules.
    c. power, resistance, current and voltage.
    d. capacitance, inductance, voltage and current.

15. Ohm's Law states that resistance is calculated by voltage divided by current. Using Ohms law, how do you determine power?
    a. Voltage times current
    b. Current divided by resistance
    c. Current squared, divided by resistance
    d. Voltage divided by resistance

16. Using a scientific calculator, a 3300 ohm resistor can be entered with scientific notation as:
    a. 3.3×10^3
    b. 33×10^3
    c. 3.3×10^2
    d. 330×10^2

17. Total resistance in a series circuit equals:
    a. half the measured resistance multiplied by the applied voltage.
    b. the average value of the voltage drops across each resistor within the circuit.
    c. The sum of the power dissipated by each resistor.
    d. the sum of all the resistor values within the circuit.

18. If a series circuit has three resistors valued at 10k Ohms, 15k Ohms and 20k Ohms, with a voltage source of 15V, the total current will be_____.
    a. 333.33mA
    b. 33.33uA
    c. 333.33uA
    d. 3.33uA

19. Current in a parallel circuit is:
    a. equally divided among each branch.
    b. inversely proportional to the circuits resistance.
    c. equal to the sum of the branch resistances.
    d. equal to the voltage source, minus the branch resistances.

20. With three 2.5k resistors and one 3.4k resistor in parallel, the total resistance is:
    a. 668.81k Ohms.
    b. 66.29 Ohms.
    c. 669.29 Ohms
    d. 670.50k Ohms.

21. With one series 8 Ohm resistor connected to two in-parallel resistors, 20 and 30 ohms respectively, what is the total resistance (R_T)?

    a. 38 Ohms

    b. b30 Ohms

    c. 20 Ohms

    d. 8 Ohms

22. Given a battery rated at 350 ampere-hours how many hours will the battery be able to provide 7 amperes?
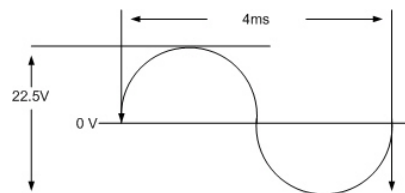
    a. 25

    b. 35

    c. 50

    d. 17.5

23. The basic properties associated with alternating voltage and current are:

    a. frequency, period, wavelength and amplitude.

    b. frequency, deviation, wavelength and amplitude.

    c. magnitude, period, wavelength and amplitude.

    d. frequency, period, designation and amplitude.

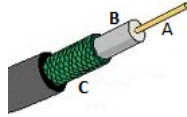24. What is the calculated effective voltage for the wave form below?

    a. 7.75V

    b. 5.48V

    c. 10.96V

    d. 4.933V

25. What is the frequency of the sine wave below?

    a. 150Hz

    b. 250Hz

    c. 22.5KHz

    d. 150KHz

26. In the illustration below, what component of the coaxial cable is letter "B"?
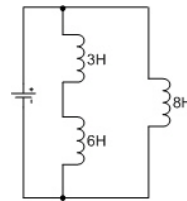

    a. Ground mesh
    b. Outer insulation
    c. Dielectric
    d. Center conductor

27. In an inductor/coil inductance varies as the _____ of the number of turns.
    a. Cube
    b. Square
    c. Inverse
    d. Log

28. What is the total inductance of the circuit below?

    a. 0.90H
    b. 4.24H
    c. 4.63H
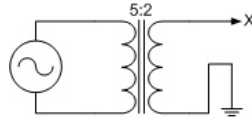   d. 9H

29. Two basic uses for transformers are:
    a. power supplies and bias control.
    b. signal matching and power supplies.
    c. signal matching and voltage regulation.
    d. voltage regulation and rectification.
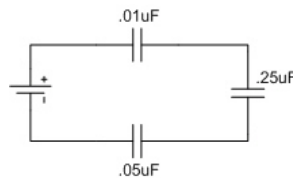
30. What is meant by "transformer action"?
    a. The action in which an expanding and contracting magnetic field around the primary winding cuts the secondary winding and induces a direct voltage into the winding.
    b. The transfer of energy from one circuit to another circuit by magnetic rectification.
    c. The transfer of load voltage to the center-tapped secondary through capacitance.
    d. The transfer of energy from one circuit to another circuit by electromagnetic induction.

31. What are the three basic parts of a transformer?
   a. Primary winding, dielectric and core
   b. Primary winding, secondary winding and core
   c. Primary winding, power diode and secondary winding
   d. Primary winding, secondary winding and tertiary winding

32. In the circuit below, what is the voltage output at letter "X", when input voltage is 25V?
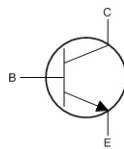

   a. 25V
   b. 5V
   c. 15V
   d. 10V

33. The time required to charge a capacitor to 63 percent is known as:
   a. Thevenin's constant.
   b. a time constant.
   c. a linear superposition.
   d. Tau.

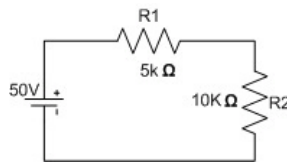34. Given the series capacitive circuit below, what is the total capacitance?

   a. 0.008uF
   b. 0.08uF
   c. 0.076mF
   d. 0.8uF

35. Calculate the capacitive reactance for 440 Hz and 9 uF.
   a. 44 Ohms
   b. 0.02 Ohms
   c. 37.37 Ohms
   d. 40.21 Ohms

36. In a resistive-capacitive circuit the vector line relationship shows two lines perpendicular to each other. What is the phase relationship?
   a. In phase
   b. Out of phase
   c. 180 degree difference
   d. 90 degree

37. In a capacitive circuit, what is the voltage and current relationship?
    a. Current lags
    b. Voltage lags
    c. Resistance leads
    d. Voltage leads

38. When the frequency of an applied voltage is increased the capacitive reactance of a circuit will:
    a. decrease.
    b. increase.
    c. stay unchanged.
    d. short all capacitors to ground.

39. What is the difference between calculating impedance for a series AC circuit and a parallel AC circuit?
    a. A series impedance calculation is derived from current and reactance, while parallel impedance is calculated with resistive and reactive current divided into the source current.
    b. A series impedance calculation is derived from resistance and reactance, while parallel impedance is calculated with resistive and reactive current divided into the source voltage.
    c. A series impedance calculation is derived from current and reactance, while parallel impedance is calculated with resistive and reactive current divided into the source voltage.
    d. A series impedance calculation is derived from current and reactance, while parallel impedance is calculated with resistive and reactive voltage divided into the source current.

40. In a series resistive and reactive circuit what formula is used to find total impedance?
    a. $Z = X^2 \left(\frac{R^2}{2} \right)$
    b. $Z = \sqrt{R^2 + X^2}$
    c. $Z = R^2 \left(\frac{X^2}{2} \right)$
    d. $Z = \sqrt{\frac{R^2 + X^2}{2}}$

41. Silicon diodes have an approximate voltage drop of:
    a. 0.3V
    b. 0.7V
    c. 1.414V
    d. 0.9V

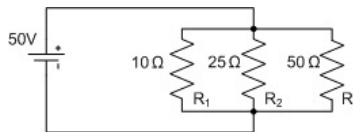42. To properly bias the NPN transistor below, which voltages are correct?

    a. E = +3; B = +1; C = -7
    b. E = -1; B = +1; C = +10
    c. E = -1.7; B = -2.7; C = -5
    d. E = 0; B = 0; C = +12

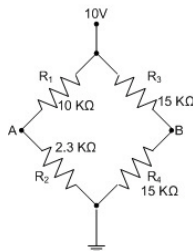43. Using ohm's law for the circuit below, calculate the total power.

   a. 166.6 mW
   b. 160.65 mW
   c. 16.6 mW
   d. 16 uW

44. In the circuit below, what is the current across R2?

   a. 5A
   b. 3.3A
   c. 2.5A
   d. 2A

45. What is the voltage at terminal 'A' for the Wheatstone bridge below?

   a. 10.3V
   b. 2.2V
   c. 1.3V
   d. 1.86V
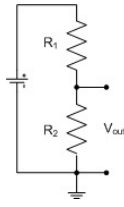
46. What is a primary advantage of a FET when compared to the bipolar transistor?
   a. High input impedance
   b. Low input impedance
   c. Gate biasing is resistive controlled
   d. No advantage

47. Zener diodes are designed to operate in the _____ bias region.
   a. forward
   b. depletion
   c. reverse
   d. reactive

48. What formula is used to properly calculate 'Vout' for the voltage divider below?

   a. $V_{out} = \left(\frac{R_2}{R_1+R_2}\right)V_{in}$

   b. $V_{out} = \left(\frac{R_1}{R_1+R_2}\right)V_{in}$

   c. $V_{out} = \left(\frac{R_1}{R_2+V_{in}}\right)V_{in}$

   d. $V_{out} = \left(\frac{R_2}{R_1 R_2}\right)V_{in}$

49. When compared to a JFET, the base of a bipolar transistor is similar to what element of the JFET?
   a. Gate
   b. Drain
   c. Source
   d. Emitter

50. A MOSFET is comprised of what four elements?
   a. Gate, source, collector and substrate
   b. Gate, source, drain and substrate
   c. Base, source, drain and dielectric
   d. Dielectric, source, drain and base