

Question block created by wizard

This exam contains 52 questions.

$$F = \frac{k \cdot Q_1 \cdot Q_2}{d^2}$$

$$I = \frac{Q}{t}$$

$$R = \frac{U}{I}$$

$$R = \frac{1}{G}$$

$$\Sigma I_{in} = \Sigma I_{out}$$

$$\Sigma U = I \cdot \Sigma R$$

$$I_{tot} = I_1 + I_2 + I_3 + \dots$$

$$I_{tot} = I_1 = I_2 = I_3 = \dots$$

$$U_{tot} = U_1 + U_2 + U_3 + \dots$$

$$U_{tot} = U_1 = U_2 = U_3 = \dots$$

$$R_{tot} = R_1 + R_2 + R_3 + \dots$$

$$R_{tot} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots}$$

$$X_{L(tot)} = X_{L1} + X_{L2} + X_{L3} + \dots$$

$$\frac{1}{X_{L(tot)}} = \frac{1}{X_{L1}} + \frac{1}{X_{L2}} + \frac{1}{X_{L3}} + \dots$$

$$X_{C(tot)} = X_{C1} + X_{C2} + X_{C3} + \dots$$

$$\frac{1}{X_C} = \frac{1}{X_{C1}} + \frac{1}{X_{C2}} + \frac{1}{X_{C3}} + \dots$$

$$U_{tot} = I \cdot R_{tot}$$

$$\rho = \frac{R \cdot A}{l}$$

$$P = U \cdot I$$

$$P = I^2 \cdot R$$

$$P = \frac{U^2}{R}$$

$$R_t = \frac{R}{n}$$

$$R_t = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

$$R_1 \cdot R_4 = R_2 \cdot R_3$$

$$P = \frac{W}{t}$$

$$P_t = P_1 + P_2 + P_3 + \dots$$

$$\eta = \frac{P_z}{P_1} C = \frac{\epsilon \cdot A}{d}$$

$$C = \frac{Q}{U}$$

$$I = \frac{U}{R_t}$$

$$I = \frac{U - U_c}{R_t}$$

$$F_m = I \cdot n$$

$$H = \frac{I \cdot n}{l}$$

$$B = \frac{\Phi}{A}$$

$$\mu = \frac{B}{H}$$

$$E = -n \frac{d\Phi}{dt}$$

$$E = -L \frac{dI}{dt}$$

$$E = -M \frac{dI}{dt}$$

$$M = \sqrt{L_1 L_2}$$

$$M = k\alpha \sqrt{L_1 L_2}$$

$$L_{tot} = L_1 + L_2 + 2M$$

$$L_{tot} = L_1 + L_2 - 2M$$

$$f = \frac{1}{T}$$

$$U_{av} = 0,636 \cdot \hat{u}$$

$$U_{RMS} = \frac{\hat{u}}{\sqrt{2}}$$

$$U_L = U_r \cdot \sqrt{3}$$

$$I_L = I_r \cdot \sqrt{3}$$

$$U_L = U_r$$

$$X_L = 2\pi fL$$

$$X_C = \frac{1}{2\pi fC}$$

$$Z = \frac{U}{I}$$

$$Z = \sqrt{R^2 + X_L^2}$$

$$f_0 = \frac{1}{2\pi \sqrt{LC}}$$

$$U_2 = N_2 \frac{d\Phi}{dt}$$

$$N_p \cdot I_p = N_s \cdot I_s$$

$$\frac{U_s}{U_p} = \frac{N_s}{N_p}$$

$$f = \frac{P \cdot n}{60}$$

$$s = \frac{n_s - n_r}{n_s}$$

$$n = \frac{60 \cdot f}{P} - s$$

1. What is the electrical charge of an electron?

- Positive
- Neutral
- Negative

2. What is the name of an atom which has less than its normal amount of electrons?

- A negative ion
- A positive ion
- An atom

3. What determines the valence of an atom?
 - a. The number of electrons
 - b. The number of shells of an atom
 - c. The number of electrons in the outer most shell

4. What is mica?
 - a. An insulator
 - b. A conductor
 - c. A semi-conductor

5. What does it mean when two points are "bonded"?
 - a. They are electrically isolated.
 - b. They have a good electrical connection.
 - c. They are glued together.

6. A liquid conducts by means of freely moving...
 - a. electrons and negative ions.
 - b. positive and negative ions.
 - c. electrons.

7. How is a voltmeter connected to measure a voltage?
 - a. In series with the load through which the current flows.
 - b. In series with the device of which the voltage has to be measured.
 - c. Connected between the two points of which the voltage has to be measured.

8. During 2 minutes a charge of 120 Coulomb is passed through the conductor. What is the current in the conductor ?
 - a. 240 A
 - b. 1 A
 - c. 60 A

9. Static electricity is produced by
 - a. Heat.
 - b. Friction.
 - c. Pressure.

10. The piezoelectric effect is used for....

- a. light measurement
- b. temperature measurement
- c. generating high voltage

11. Solar cells are made of....

- a. electrolyte
- b. rochelle salts
- c. semiconductor material

12. Electrolyte is used in a....

- a. piezo crystal
- b. battery
- c. thermocouple

13. In which type of cell does chemical action eat away the electrode?

- a. Secondary cell.
- b. Lead-Acid cell.
- c. Primary cell.

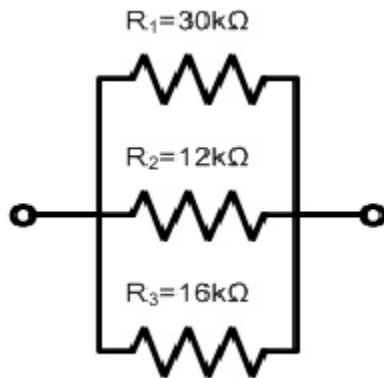
14. When connecting cells in series, what happens to the total output?

- a. The total voltage and overall capacity increases.
- b. The total voltage increases while the overall capacity remains the same.
- c. The overall capacity increases while the total voltage remains the same.

15. When the resistance in a circuit is decreased under a constant supply voltage, the current will....

- a. increase.
- b. be constant.
- c. decrease.

16. In which resistor is the current flow the lowest?



- a. R_3
- b. R_2
- c. R_1

17. The EMF of a voltage source is 12 V. The internal resistance is 2 Ω . The load resistance is 4 Ω .

Calculate the terminal voltage.

- a. 12 V
- b. 4 V
- c. 8 V

18. The resistance of a wire is;

- a. Inverse proportional to the wire cross sectional area.
- b. Inverse proportional to the wire length.
- c. Proportional to the wire cross sectional area.

19. When resistors are connected in series, the current in that circuit depends on?

- a. The sum of the resistor values and the supply voltage.
- b. The difference between the highest and lowest resistor value.
- c. The flow direction of the current in that circuit.

20. Calculate the maximum voltage across a 3 Ω ; 3 Watt resistor.

- a. 1 V.
- b. 3 V.
- c. 9 V.

- 21.** What means a negative temperature coefficient (α) for a material?
- The resistance decreases with an increase of temperature.
 - The change of resistance is only effective at temperatures below zero.
 - The resistance increases with an increase of temperature.
- 22.** A multi-turn potentiometer is normally used for....
- high frequencies.
 - high voltages.
 - accurate adjustments.
- 23.** Electric power is....
- the same as electric energy.
 - proportional to electric energy and time.
 - proportional to electric energy and inverse proportional to time.
- 24.** The power in an electric circuit depends on....
- the applied voltage and the time the applied voltage is switched on.
 - the total current and the duration of that current.
 - the applied voltage and the total current.
- 25.** A flap motor is supplied with 28 V DC. The current is 10 amp. Calculate the power consumption.
- 2.8 W
 - 280 W
 - 18 W
- 26.** What is the Unit of capacitance?
- Farad (F)
 - Henry (H)
 - Ohm (Ω)
- 27.** A capacitor of n47 can be labelled as....
- 0.47 nF
 - 0.47 mF
 - 4.7 nF

28. The charging and discharging DC current by a Capacitor is....

- a. in the same direction.
- b. not in the same direction.
- c. not possible to calculate.

29. To make permanent magnets....

- a. magnetically hard material is used.
- b. magnetically soft material is used.
- c. any magnetically material is used.

30. An aircraft magnetic compass has....

- a. one compensation screw marked N-S compensation.
- b. two compensation screws marked N-E and S-W compensation.
- c. two compensation screws, marked N-S and E-W compensation.

31. The strength of the magnetic field of an electromagnet can be increased by....

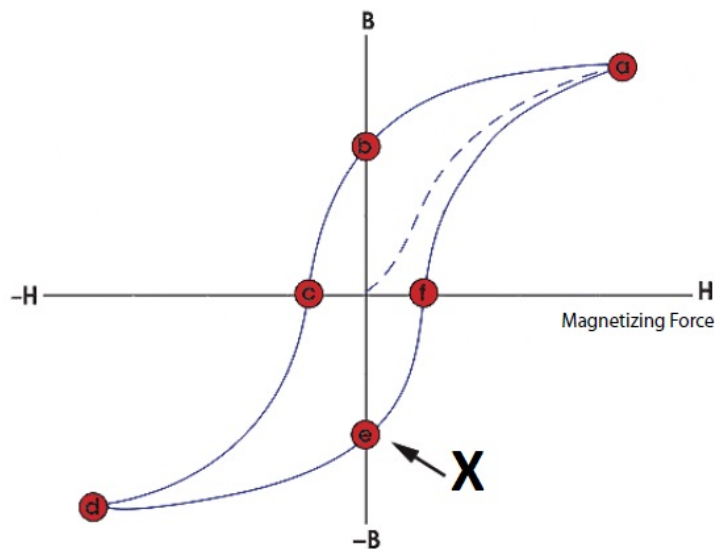
- a. decreasing the current flow and increasing the number of windings.
- b. increasing the current flow, or increasing the number of windings.
- c. increasing the current flow and decreasing the number of windings.

32. What happens with the flux density if the surface area of a magnet increases?

The flux density...

- a. will decrease.
- b. will not change.
- c. will increase.

33. What is the name of the point marked with an X in this graph?



- a. Coercivity point.
- b. Saturation point.
- c. Retentivity point.

34. Shock, Stress and Vibration has...

- a. influence on permanent magnets.
- b. no influence on magnet materials.
- c. almost none influence on magnet materials.

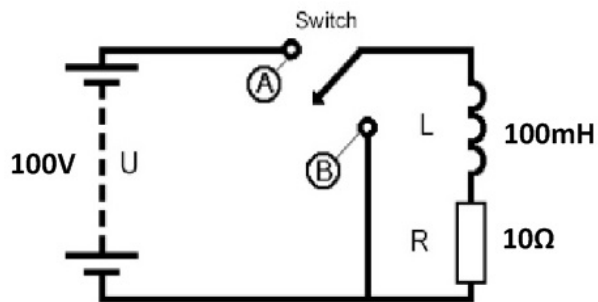
35. How is an EMF induced in a coil?

- a. By relative motion between coil and magnet.
- b. Place the coil and magnet close to each other.
- c. Moving two magnets to each other.

36. How can the self-induced voltage in a coil be increased? By....

- a. using a DC voltage instead of an AC voltage.
- b. increasing the number of turns of the coil.
- c. removing the iron core out of the coil.

37. Calculate the time constant of this circuit.



- a. 0,1 ms.
- b. 10 ms.
- c. 1000 ms.

38. What affects the magnitude of force in a DC motor?

- a. The direction of the magnetic field.
- b. The magnitude of the current flow in the armature.
- c. The total length of the conductor.

39. What happens with the magnetic neutral axis of a DC motor due to the armature reaction?

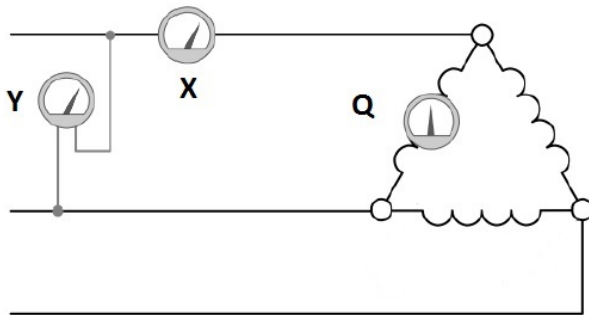
The magnetic neutral axis...

- a. will move in the rotation direction.
- b. will not move.
- c. will move against the rotation direction.

40. An AC signal has a period of 2 seconds. Calculate the frequency of this signal.

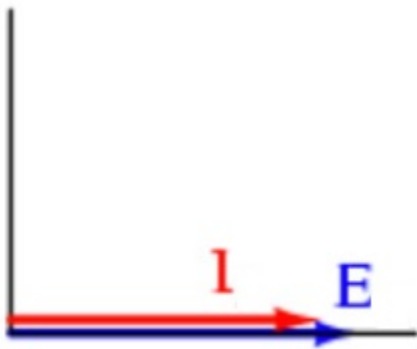
- a. 0,5 Hz.
- b. 2 Hz.
- c. 4 Hz.

41. Which meter indicates the line voltage?



- a. Meter Q.
- b. Meter Y.
- c. Meter X.

42. To which circuit, connected on a sine wave AC source belongs this phasor diagram?



- a. Capacitor
- b. Resistor
- c. Inductor

43. In which type of circuit is the power always positive?

- a. A resistive circuit.
- b. A capacitive circuit.
- c. An inductive circuit.

44. The current transformer is a....

- a. dual wire magnetic transformer.
- b. ring dual-type transformer.
- c. ring-type transformer.

45. The primary line current of a three phase transformer, without losses, connected in a Y is $10/\sqrt{3}$ A.

Calculate the secondary power if the primary phase voltage equals to 10V.

- a. $300/\sqrt{3}$ W
- b. 300 W
- c. 100 W

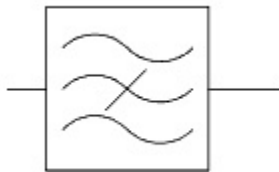
46. A step-up transformer has a 1 to 4 turns ratio....

- a. 8 turns primary and 2 turns secondary.
- b. 2 turns primary and 8 turns secondary.
- c. 2 turns primary and 4 turns secondary.

47. What type of filter is commonly used in microphone circuits?

- a. High pass filter.
- b. Band pass filter.
- c. Band stop filter.

48. This is the symbol of a....



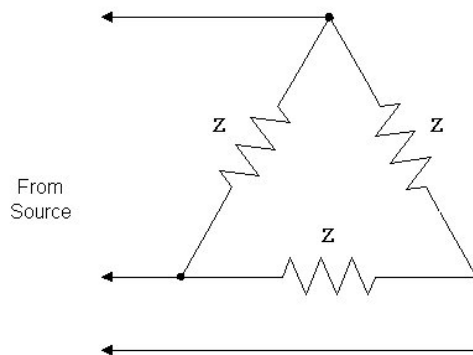
- a. Band Pass Filter
- b. High Pass Filter
- c. Band Stop Filter

49. The rotation speed of the armature of an AC generator increase.

What happens with the output frequency of this generator? The frequency...

- a. will increase.
- b. will not change.
- c. will decrease.

50. What kind of three phase connection is indicated?



- a. Wye Connection
- b. Star Connection
- c. Delta Connection

51. On a split phase motor, a centrifugal switch disconnects the starting winding automatically, after the rotor has attained approximately....

- a. 25 percent of its rated speed.
- b. 90 percent of its rated speed.
- c. 75 percent of its rated speed.

52. How can we change the direction of rotation of a two phase motor?

By reversing...

- a. the connections to the starting winding.
- b. the connection of one phase.
- c. two of the leads to supply the motor.