Question block created by wizard

This exam contains 52 questions.

$$F = \frac{k \cdot Q_1 \cdot Q_2}{d^2}$$
$$I = \frac{Q}{t}$$
$$R = \frac{U}{I}$$
$$R = \frac{1}{G}$$
$$\Sigma I_{in} = \Sigma I_{out}$$
$$\Sigma U = I \cdot \Sigma R$$
$$I_{tot} = I_1 + I_2 + I_3 + \ldots$$
$$I_{tot} = I_1 = I_2 = I_3 = \ldots$$
$$U_{tot} = U_1 + U_2 + U_3 + \ldots$$
$$U_{tot} = U_1 = U_2 = U_3 = \ldots$$
$$R_{tot} = R_1 + R_2 + R_3 + \ldots$$
$$R_{tot} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$$
$$X_{L(tot)} = X_{L1} + X_{L2} + X_{L3} + \ldots$$
$$\frac{1}{X_{L(tot)}} = \frac{1}{X_{L1}} + \frac{1}{X_{L2}} + \frac{1}{X_{L3}} + \ldots$$
$$X_{C(tot)} = X_{C1} + X_{C2} + X_{C3} + \ldots$$
$$\frac{1}{X_C} = \frac{1}{X_{C1}} + \frac{1}{X_{C2}} + \frac{1}{X_{C3}} + \ldots$$
$$U_{tot} = I \cdot R_{tot}$$
$$\rho = \frac{R \cdot A}{l}$$
$$P = U \cdot I$$
$$P = I^2 \cdot R$$
$$P = \frac{U^2}{R}$$
$$R_t = \frac{R}{n}$$
$$R_t = \frac{R_1 \cdot R_2}{R_1 + R_2}$$
$$R_1 \cdot R_4 = R_2 \cdot R_3$$
$$P = \frac{W}{t}$$
$$P_t = P_1 + P_2 + P_3 + \ldots$$
$$\eta = \frac{P_e}{P_t} C = \frac{\varepsilon \cdot A}{d}$$
$$C = \frac{Q}{U}$$
$$I = \frac{U}{R_t}$$
$$I = \frac{U - U_c}{R_t}$$
$$F_m = I \cdot n$$
$$H = \frac{I \cdot n}{l}$$
$$B = \frac{\Phi}{A}$$
$$\mu = \frac{B}{H}$$
$$E = -n \frac{d\Phi}{dt}$$
$$E = -L \frac{dI}{dt}$$
$$E = -M \frac{dI}{dt}$$
$$M = \sqrt{L_1 L_2}$$
$$M = k\alpha \sqrt{L_1 L_2}$$
$$L_{tot} = L_1 + L_2 + 2M$$
$$L_{tot} = L_1 + L_2 - 2M$$
$$f = \frac{1}{T}$$
$$U_{av} = 0{,}636 \cdot \hat{u}$$
$$U_{RMS} = \frac{\hat{u}}{\sqrt{2}}$$
$$U_L = U_r \cdot \sqrt{3}$$
$$I_L = I_r \cdot \sqrt{3}$$
$$U_L = U_r$$
$$X_L = 2\pi f L$$
$$X_C = \frac{1}{2\pi f C}$$
$$Z = \frac{U}{I}$$
$$Z = \sqrt{R^2 + X_L^2}$$
$$f_0 = \frac{1}{2\pi \sqrt{LC}}$$
$$U_2 = N_2 \frac{d\Phi}{dt}$$
$$N_p \cdot I_p = N_s \cdot I_s$$
$$\frac{U_s}{U_p} = \frac{N_s}{N_p}$$
$$f = \frac{P \cdot n}{60}$$
$$s = \frac{n_s - n_r}{n_s}$$
$$n = \frac{60 \cdot f}{P} - s$$

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

a. An atom
b. A positive ion
c. A negative ion

2. Give the names of the charged particles of an atom.

a. Protons and electrons
b. Neutrons and electrons
c. Protons and neutrons

3. What is intrinsic material

a. An insulator
b. A conductor
c. A semiconductor

4. What is mica?

a. A conductor
b. An insulator
c. A semi-conductor

5. What will happen, if two unlike charged bodies are positioned at close range of each other?

a. They will attract each other.
b. They will repel each other.
c. Nothing will happen.

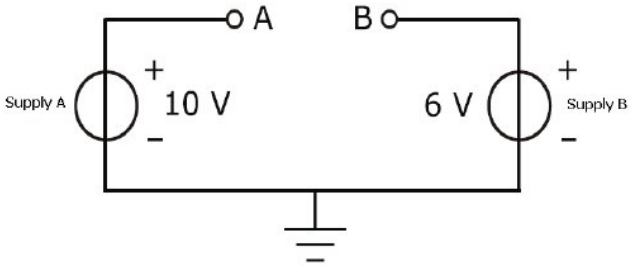
6. Two charged bodies are positioned at close range. The charge of one body is increased from 1 C to 2 C.

What will happen with the force between those two bodies?

The force will...

a. decrease by a factor 4.
b. increase by a factor 2.
c. decrease by a factor 2.

7. What is the potential difference at U_{AB} in the next figure?



a. 4 Volt
b. -4 Volt
c. 16 Volt

8. A resistor has a conductance of 10 Siemens, what is the resistance of this resistor?

a. 1 Ω
b. 0,1 Ω
c. 10 Ω

9. What is the name for electricity produced by rubbing certain materials together?

a. Thermo-electricity.
b. Piezo electricity.
c. Static electricity.

10. The potential between the two legs of a thermocouple depends on....

a. choice of metals and pressure on the joint
b. pressure on the joint and quantity of light
c. the temperature and choice of metals

11. A single solar cell produces an output voltage of 0,5 V. A higher voltage can obtained by connecting numerous cells....

a. in series
b. in series and parallel
c. parallel

12. A primary cell is....

a. Not Rechargeable
b. always a dry cell
c. Rechargeable

13. What is the effect of hydrogen bubbles forming on the surface of the cathode?

The cell....

a. discharges more quickly.
b. output voltage decreases.
c. heats up.

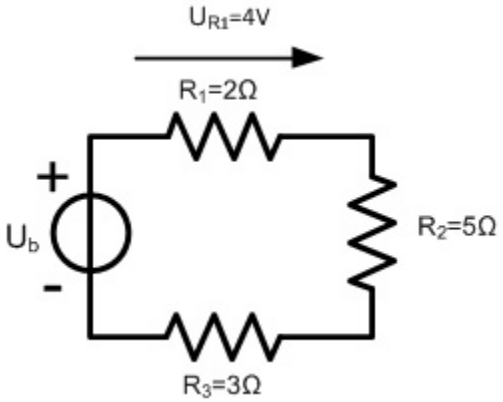
14. Which of the following photo-cells are also called solar cells?

a. Photo-emitting cells.
b. Photo-conducting cells.
c. Photo-voltaic cells.

15. Ohm's law shows a relationship between;

a. Current and resistance only.
b. Current, voltage and resistance.
c. Voltage and resistance only.

16. Calculate the total supply voltage U_b in the next picture.



a. U_b= 12 V
b. U_b= 8 V
c. U_b= 20 V

17. The EMF (Electromotive Force) of a source is 12 Volt. The internal source resistance is 2 ohm. The circuit load resistance is 4 ohm.

The circuit current is....

a. 2 A
b. 3 A
c. 6 A

18. The resistance of a wire is;

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

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

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

20. Calculate the maximum current in a 2 Ω ; 8 Watt resistor.

a. 2 A.
b. 16 A.
c. 4 A.

21. The resistance of a Voltage Dependent Resistor (VDR)....

a. Increase when the applied voltage decreases.
b. Increases when the applied voltage increases.
c. Varies only with a temperature change.

22. An electrolytic rheostat is a rheostat with....

a. carbon layer as resistor.
b. metal wire as an resistor.
c. conductive fluid as resistor.

23. High current conductors are not bundled together with other wires because....

a. of danger to overheating.
b. power and signal wires can be routed together.
c. of too much weight.

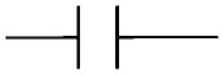
24. Energy is....

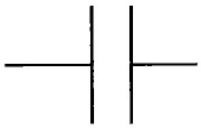
a. the same as power.
b. the power consumption during an amount of time.
c. when power is transformed into movement.

25. A current of 2 Amp flows through a pitot tube heating element during 10 minutes. The supply voltage is 10 Volt. Calculate the consumed energy.

a. 12 kJ
b. 200 J
c. 20 J

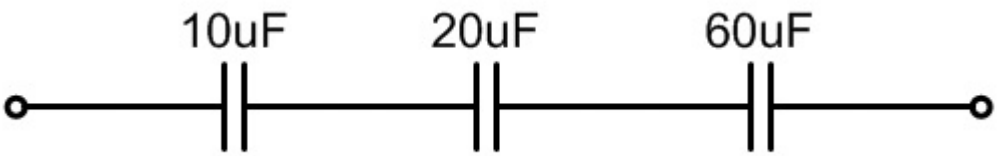
26. Which capacitor has the largest capacitance?

a. 

b. 

c. 

27. Calculate the total capacitance of this circuit?



a. 90uF
b. 45uF
c. 6uF

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

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

29. To make permanent magnets....

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

30. The most common categories of magnet materials are made of....

a. Aluminium - Nickel - Copper.
b. Aluminium - Nickel - Silver.
c. Aluminium - Nickel - Cobalt.

31. What is the purpose of the soft iron core for the current carrying coil of an electro magnet?

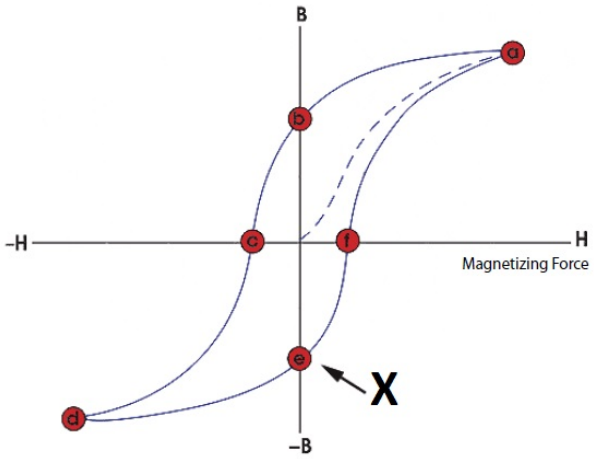
a. To avoid saturation.
b. To support the turns of the coil.
c. To increase the magnetic flux.

32. What happens with the magneto motive force if the number of turns of a coil decreases?

The magneto motive force...

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

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



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

34. What are precautions for care and storage of magnets?

a. Not existing.
b. Magnets should be kept away from non-sensitive electronic equipment
c. Magnets should be kept away from sensitive electronic equipment.

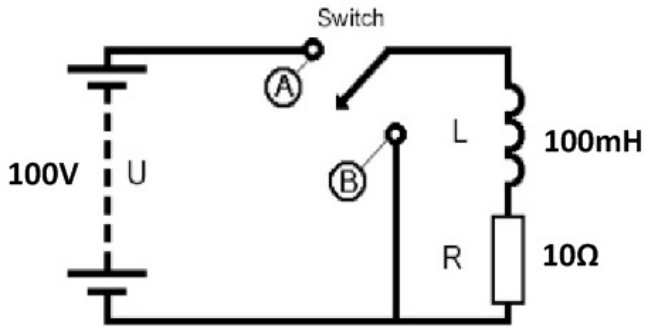
35. How is an EMF induced in a coil?

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

36. Two coils are coupled in series with each other. What is the influence of this coupling on the induced voltage?

a. The induced voltage will be large.
b. There will be no voltage induced.
c. The induced voltage will be small.

37. Estimate the voltage across the coil immediately after moving the switch into position A.



a. 0 V.
b. 100 V.
c. 37 V.

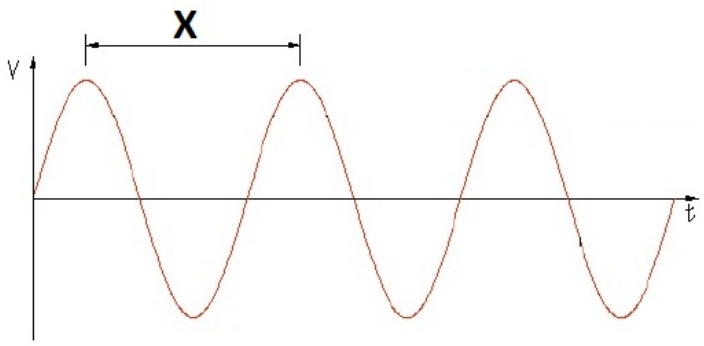
38. What affects the direction of force and movement of a DC motor?

a. The direction of the magnetic field.
b. The strength of the magnetic field.
c. The angle at which the conductor cuts the magnetic field.

39. What is a solution to overcome reactive sparking in a DC generator?

a. Change the rotation direction of the armature.
b. Shortening of the commutator by the brushes.
c. To fit inter-poles between the main poles.

40. Which AC measurement is marked with an X in this graph?

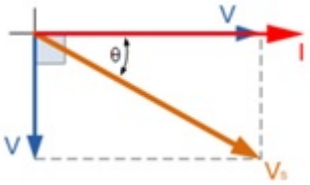


a. Period.
b. Peak to Peak voltage.
c. Frequency.

41. What is the relation between line current and phase current of a delta configuration?

a. $I_L = I_f$
b. $I_L = \frac{I_f}{\sqrt{2}}$
c. $I_L = I_f \cdot \sqrt{3}$

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



a. Capacitor and resistor in series.
b. Inductor and resistor in series.
c. Capacitor.

43. What is impedance?

a. The opposition to current flow in a DC circuit.
b. The opposition to current flow in a AC circuit.
c. The opposition to voltage in an AC circuit.

44. The current transformer is a....

a. dual wire magnetic transformer.

b. ring-type transformer.
c. ring dual-type transformer.

45. The secondary power of a three phase transformer, without losses, connected in a Y is 300 W.

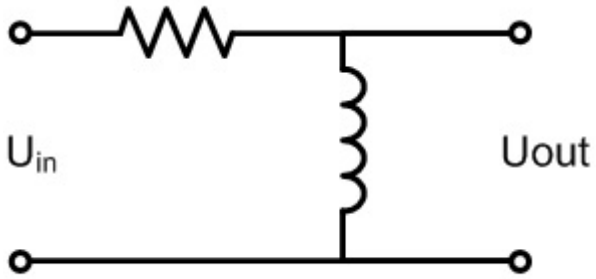
Calculate the primary current if the primary phase voltage equals to 10 V.

a. $^{10}/_{\sqrt{3}}$ A
b. 30 A
c. 10 A

46. A transformer has a ratio from 1 to 100. A current flow 10A in the primary lead. The secondary current will be?

a. 0,1 A
b. 1000 A
c. 100 A

47. This is the circuit diagram of a....



a. High Pass Filter
b. Band Pass Filter
c. Low Pass Filter

48. A band pass filter can be constructed with....

a. 2 low pass filters.
b. 2 high pass filters.
c. a low pass and high pass filter.

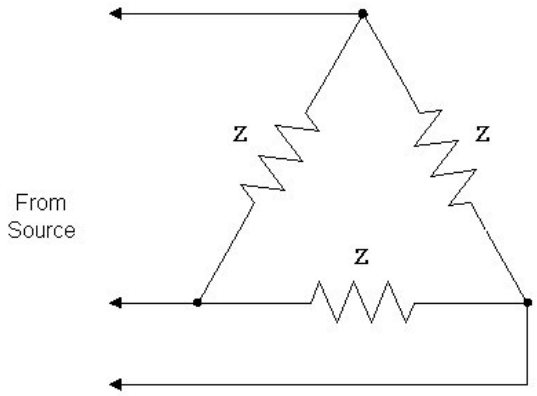
49. The rotation speed of the armature of an AC generator increase.

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. Delta Connection
b. Wye Connection
c. Star Connection

51. In a split phase motor....

a. the starting winding is placed on the main or running winding.
b. the starting winding is 90 electrical degrees displaced from the main or running winding.
c. the starting winding is 180 electrical degrees displaced from the main or running winding.

52. Which principle is commonly used to control the rotation speed of an AC motor?

By changing the...

a. supply frequency.
b. phase voltage.
c. phase current.