Question block created by wizard

This exam contains 52 questions.

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

1. What is the electrical charge of an electron?

a. Positive
b. Negative
c. Neutral

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

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

3. What determines the valence of an atom?

a. The number of shells of an atom
b. The number of electrons in the outer most shell
c. The number of electrons

4. Which metal is the best conductor for electricity?

a. Copper
b. Aluminium
c. Silver

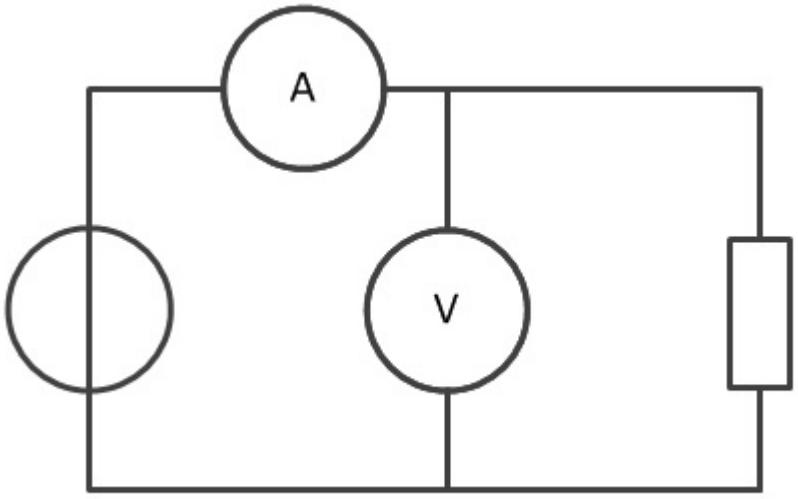
5. What will happen, if two unlike charged bodies are positioned at close range of each other?

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

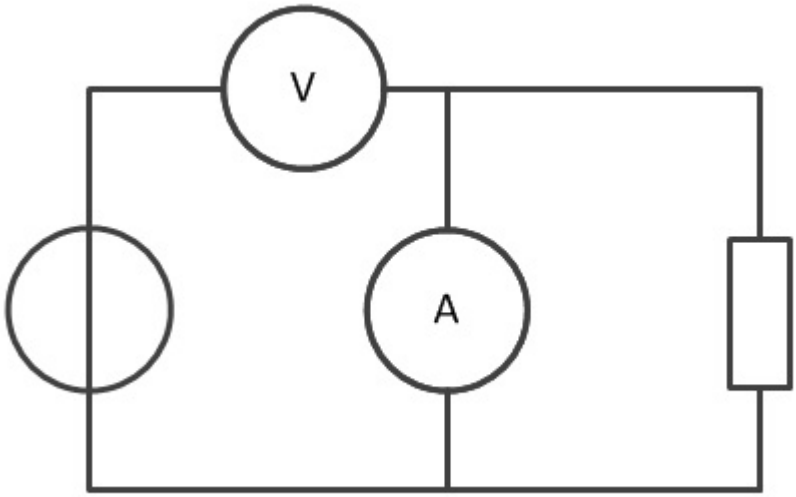
6. A liquid conducts by means of freely moving...

a. electrons.
b. positive and negative ions.
c. electrons and negative ions.

7. Which circuit diagram is correct for measuring the current in the load resistor?



a.



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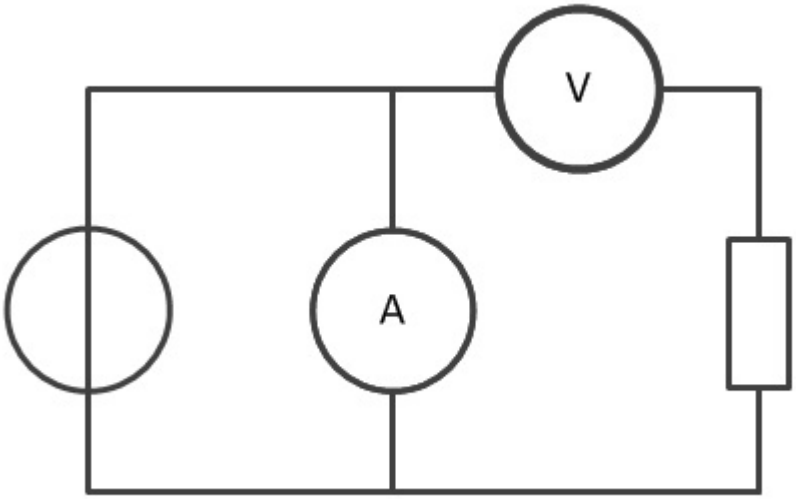


c.

8. During 2 minutes a charge of 120 Coulomb is passed through the conductor. What is the current in the conductor ?

a. 1 A
b. 60 A
c. 240 A

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

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

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

a. pressure on the joint and quantity of light
b. choice of metals and pressure on the joint
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 and parallel
b. parallel
c. in series

12. Electrolyte is used in a....

a. battery
b. thermocouple
c. piezo crystal

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

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

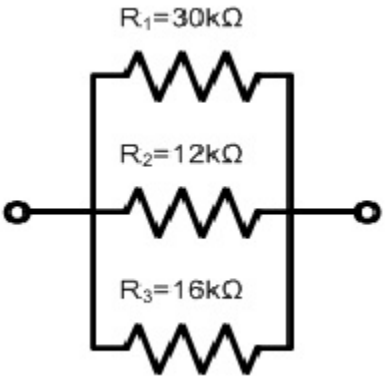
14. When connecting cells in series, what happens to the total output?

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

15. Ohm's law holds for circuits with resistive element when the supply voltage is....

a. Alternating Current (AC).
b. both Direct and Alternating Current (DC and AC).
c. Direct Current (DC).

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



a. R_2
b. R_1
c. R_3

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

Determine the unloaded terminal voltage.

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

18. What happens with the resistance of a wire if the length of the wire increases?

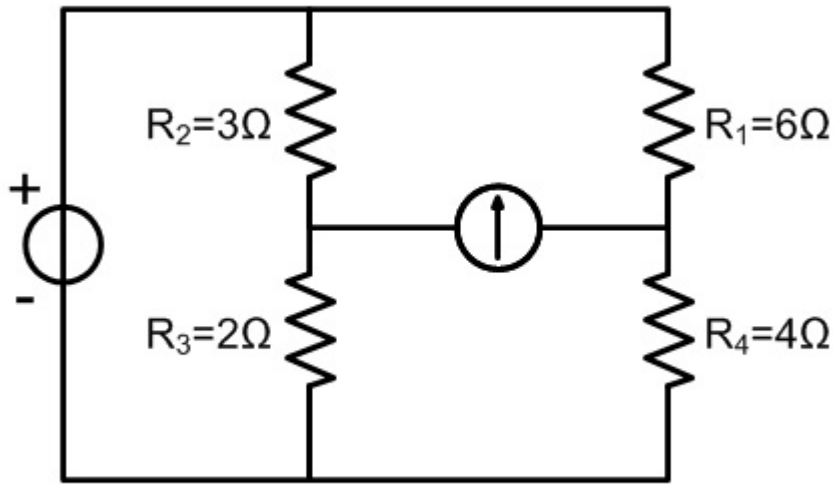
The resistance of the wire will...

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

19. When resistors are connected parallel, the circuit resistance...

a. increases
b. stays constant
c. decreases

20. Is this bridge of Wheatstone balanced?



a. There is not enough information available to estimate whether the bridge is in balance or not.
b. No, the bridge is not in balance.
c. Yes, the bridge is in balance.

21. What means a negative temperature coefficient (α) for a material?

a. The change of resistance is only effective at temperatures below zero.
b. The resistance increases with an increase of temperature.
c. The resistance decreases with an increase of temperature.

22. A multi-turn potentiometer is normally used for....

a. high frequencies.
b. accurate adjustments.
c. high voltages.

23. Electric power is....

a. the same as electric energy.
b. proportional to electric energy and inverse proportional to time.
c. proportional to electric energy and time.

24. The power in an electric circuit depends on....

a. the applied voltage and the time the applied voltage is switched on.

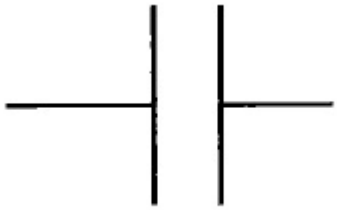
b. the applied voltage and the total current.
c. the total current and the duration of that current.

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. 

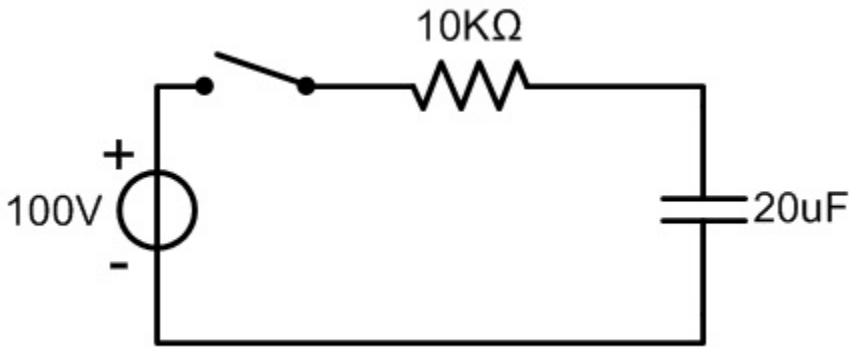
b. 

c. 

27. Which equation do we use to calculate the total capacitance of parallel capacitors?

a. Ct = C1 - C2 - C3
b. $^1/_{Ct} = {}^1/_{C1} + {}^1/_{C2} + {}^1/_{C3}$
c. Ct = C1 + C2 + C3

28. How long will it take to charge the capacitor in this circuit completely?



a. 200 ms
b. 1000 ms
c. 2 ms

29. If the bar magnet is cut or broken into pieces, each piece immediately becomes a....

a. north pole.
b. north and south pole.
c. south pole.

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

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

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

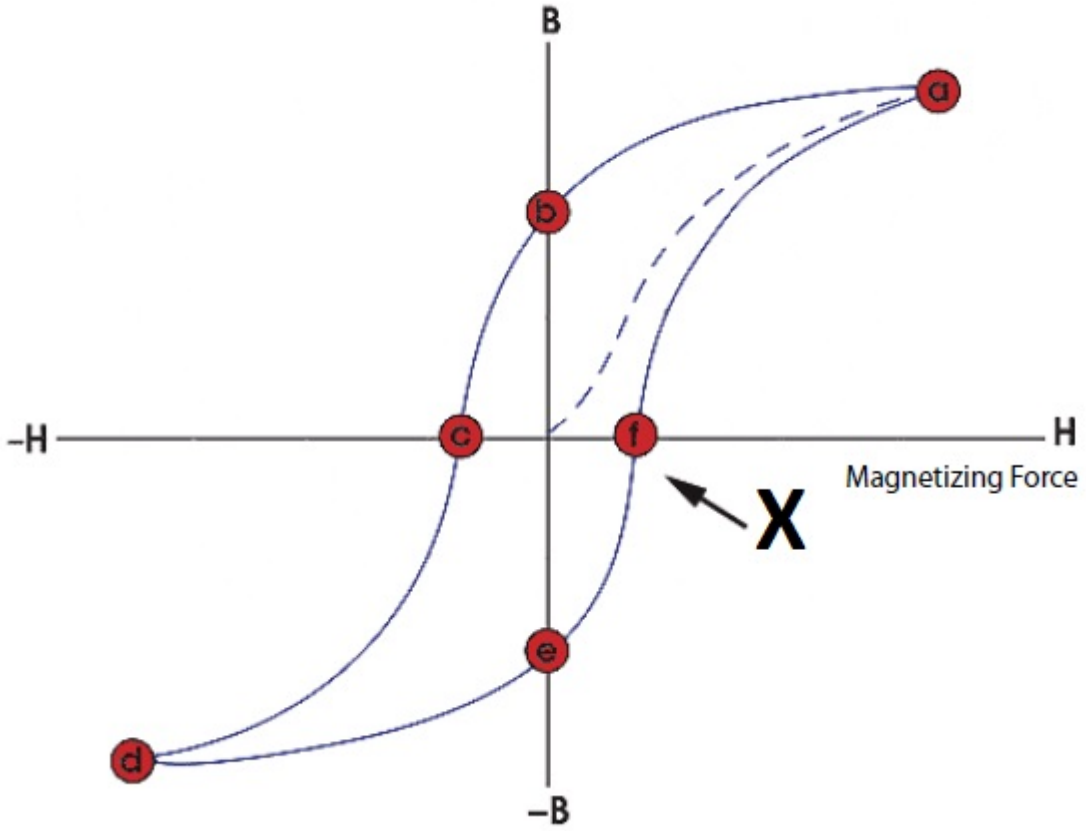
a. To avoid saturation.
b. To increase the magnetic flux.
c. To support the turns of the coil.

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

The flux density...

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

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



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

34. Shock, Stress and Vibration has...

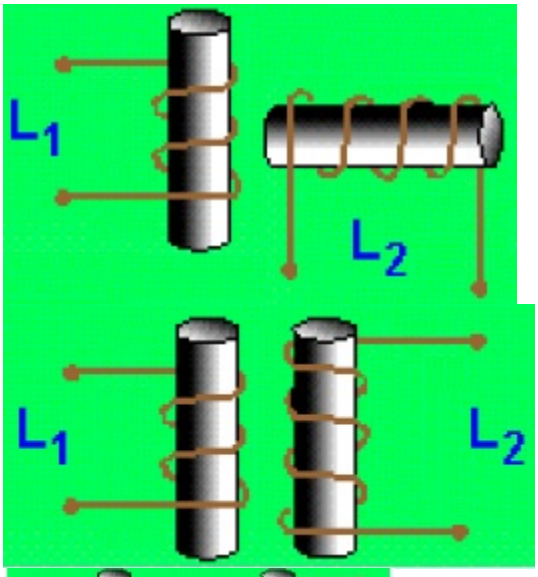
a. no influence on magnet materials.
b. almost none influence on magnet materials.
c. influence on permanent magnets.

35. When a coil is moved towards a magnetic field, the resulting induced EMF will....

a. remain the same as the coil gets closer to the magnetic field.
b. decrease as the coil gets closer to the magnetic field.
c. increase as the coil gets closer to the magnetic field.

36. In which picture is the mutual inductance between the two coils the lowest?

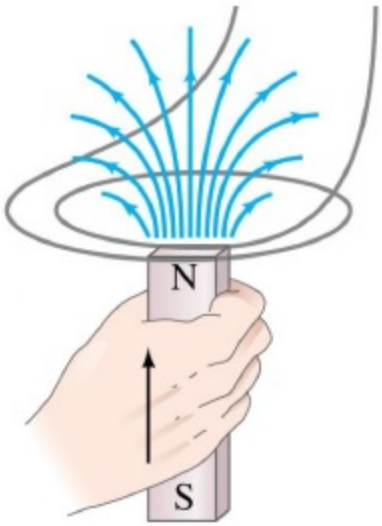
a.



b.

c.

37. What will happen at the approaching coil side?

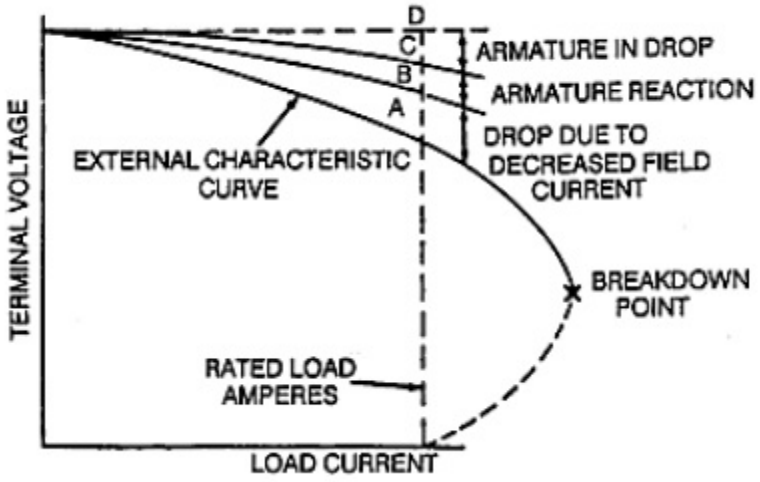


a. A magnetic north pole arises.
b. A magnetic south pole arises.
c. Nothing will happen.

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

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

39. Of which kind of generator is this the terminal current graph?

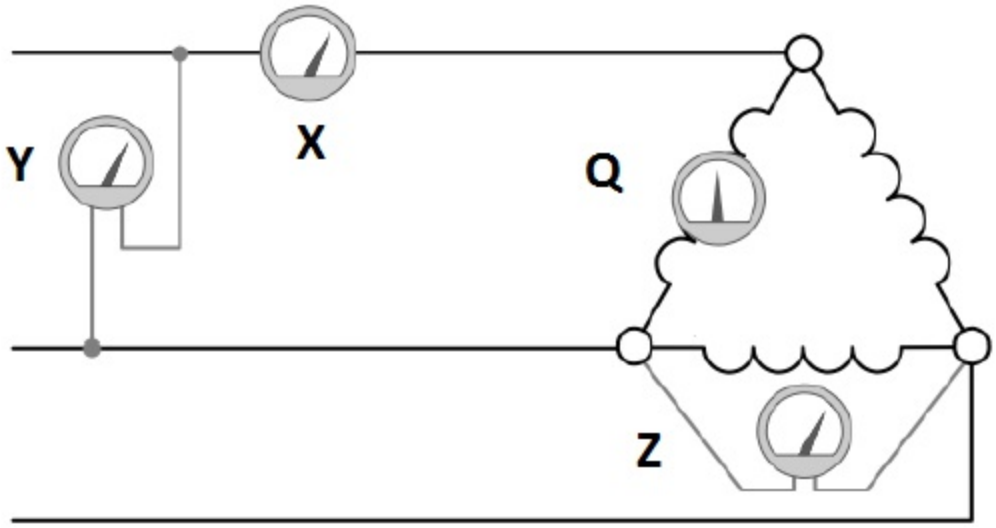


a. Compound DC generator.
b. Shunt DC generator.
c. Series DC generator.

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

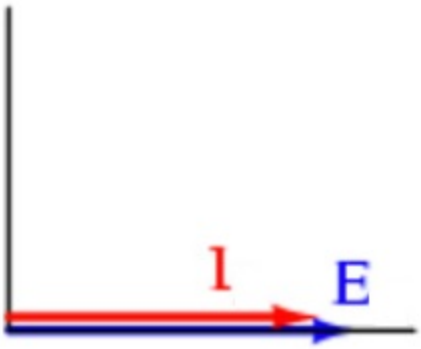
a. 0,5 Hz.
b. 2 Hz.
c. 4 Hz.

41. Which meter indicates the phase current?



a. Meter Z.
b. Meter X.
c. Meter Q.

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



a. Inductor
b. Capacitor
c. Resistor

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

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

44. Typical ratio for current transformer is....

a. 1 to 100
b. 1 to 1000
c. 1000 to 1

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

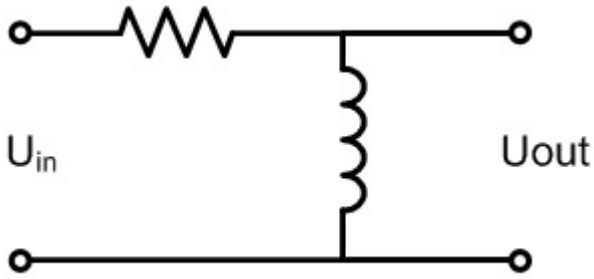
Calculate the secondary power if the primary phase voltage equals to 10V.

a. 300 W
b. $^{300}/_{\sqrt{3}}$ 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 4 turns secondary.
c. 2 turns primary and 8 turns secondary.

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

49. The number of pole pairs of an AC generator increases.

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

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

50. Give an advantage of a three phase system.

a. In the Y connection 2 different voltages are available.
b. In the delta connection 2 different voltages are available.
c. A phase shift of 90° is available.

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

a. 90 percent of its rated speed.
b. 75 percent of its rated speed.
c. 25 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. two of the leads to supply the motor.
c. the connection of one phase.