

Question block created by wizard

This exam contains 52 questions.

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

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

If choice c is selected set score to 1.

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

- (a) Protons and electrons
- (b) Neutrons and electrons

- (c) Protons and neutrons

*If choice a is selected set score to 1.*

**3.** What is intrinsic material

- (a) An insulator
- (b) A conductor
- (c) A semiconductor

*If choice c is selected set score to 1.*

**4.** What is mica?

- (a) A conductor
- (b) An insulator
- (c) A semi-conductor

*If choice b is selected set score to 1.*

**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.

*If choice a is selected set score to 1.*

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

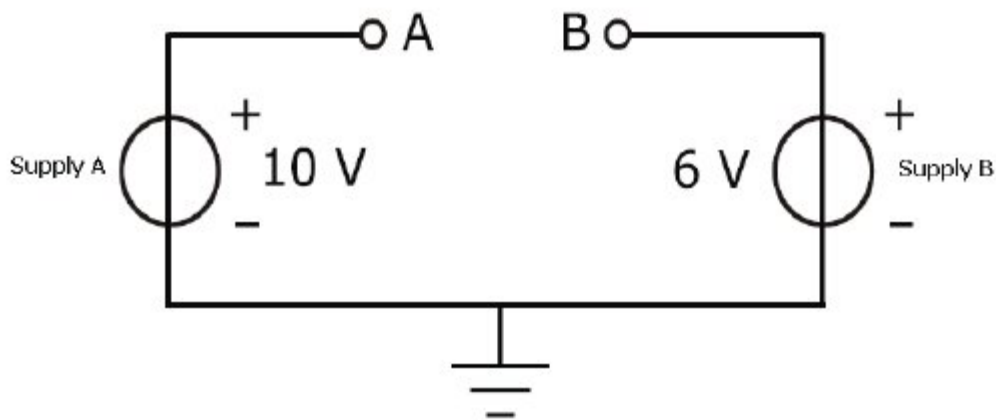
What will happen with the force between those two bodies?

The force will...

- (a) decrease by a factor 4.
- (b) increase by a factor 2.
- (c) decrease by a factor 2.

*If choice b is selected set score to 1.*

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



- (a) 4 Volt
- o (b) -4 Volt
- o (c) 16 Volt

*If choice a is selected set score to 1.*

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

- o (a)  $1 \Omega$
- (b)  $0,1 \Omega$
- o (c)  $10 \Omega$

*If choice b is selected set score to 1.*

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

- o (a) Thermo-electricity.
- o (b) Piezo electricity.
- (c) Static electricity.

*If choice c is selected set score to 1.*

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

- o (a) choice of metals and pressure on the joint
- o (b) pressure on the joint and quantity of light
- (c) the temperature and choice of metals

*If choice c is selected set score to 1.*

**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
- o (b) in series and parallel
- o (c) parallel

*If choice a is selected set score to 1.*

**12.** A primary cell is....

- (a) Not Rechargeable
- o (b) always a dry cell
- o (c) Rechargeable

*If choice a is selected set score to 1.*

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

The cell....

- o (a) discharges more quickly.
- (b) output voltage decreases.
- o (c) heats up.

*If choice b is selected set score to 1.*

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

- o (a) Photo-emitting cells.
- o (b) Photo-conducting cells.
- (c) Photo-voltaic cells.

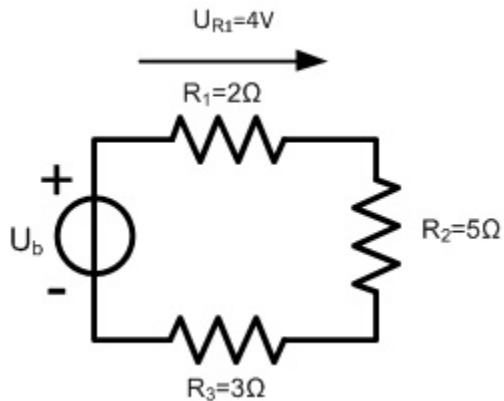
*If choice c is selected set score to 1.*

**15.** Ohm's law shows a relationship between;

- o (a) Current and resistance only.
- (b) Current, voltage and resistance.
- o (c) Voltage and resistance only.

*If choice b is selected set score to 1.*

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



- (a)  $U_b = 12\text{ V}$
- (b)  $U_b = 8\text{ V}$
- (c)  $U_b = 20\text{ V}$

*If choice c is selected set score to 1.*

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

*If choice a is selected set score to 1.*

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.

*If choice b is selected set score to 1.*

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.

*If choice c is selected set score to 1.*

**20.** Calculate the maximum current in a  $2\ \Omega$  ; 8 Watt resistor.

- (a) 2 A.
- o (b) 16 A.
- o (c) 4 A.

*If choice a is selected set score to 1.*

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

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

*If choice b is selected set score to 1.*

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

- o (a) carbon layer as resistor.
- o (b) metal wire as an resistor.
- (c) conductive fluid as resistor.

*If choice c is selected set score to 1.*

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

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

*If choice a is selected set score to 1.*

**24.** Energy is....

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

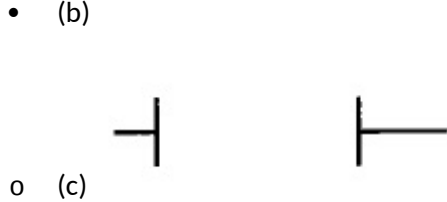
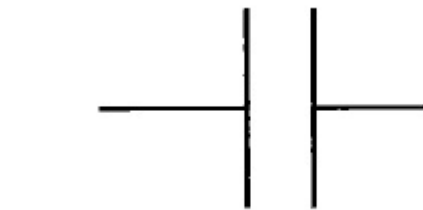
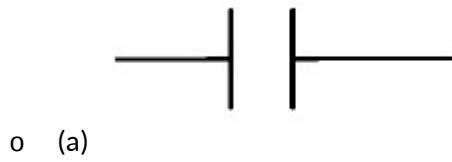
*If choice b is selected set score to 1.*

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
- o (b) 200 J
- o (c) 20 J

*If choice a is selected set score to 1.*

26. Which capacitor has the largest capacitance?



*If choice b is selected set score to 1.*

27. Calculate the total capacitance of this circuit?



- o (a) 90uF
- o (b) 45uF
- (c) 6uF

*If choice c is selected set score to 1.*

**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.

*If choice b is selected set score to 1.*

**29.** To make permanent magnets....

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

*If choice c is selected set score to 1.*

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

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

*If choice c is selected set score to 1.*

**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.

*If choice c is selected set score to 1.*

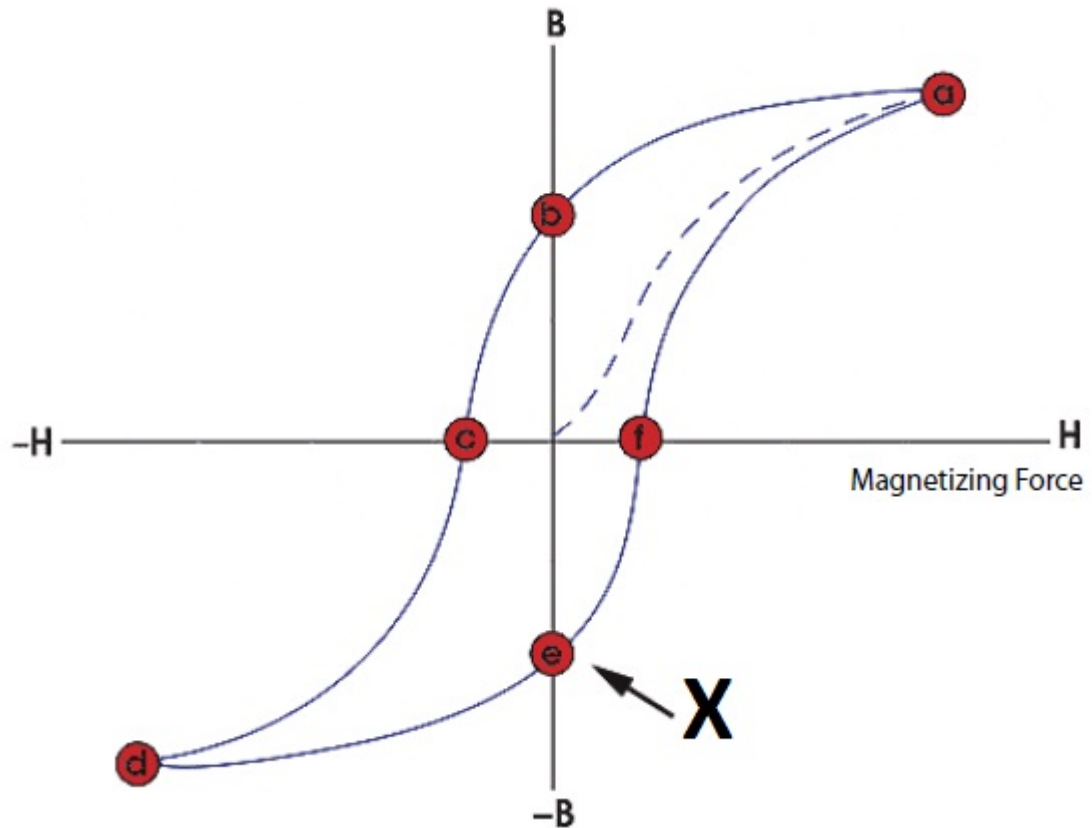
**32.** What happens with the magneto motive force if the number of turns of a coil decreases?

The magneto motive force...

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

*If choice c is selected set score to 1.*

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



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

*If choice c is selected set score to 1.*

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.

*If choice c is selected set score to 1.*

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.

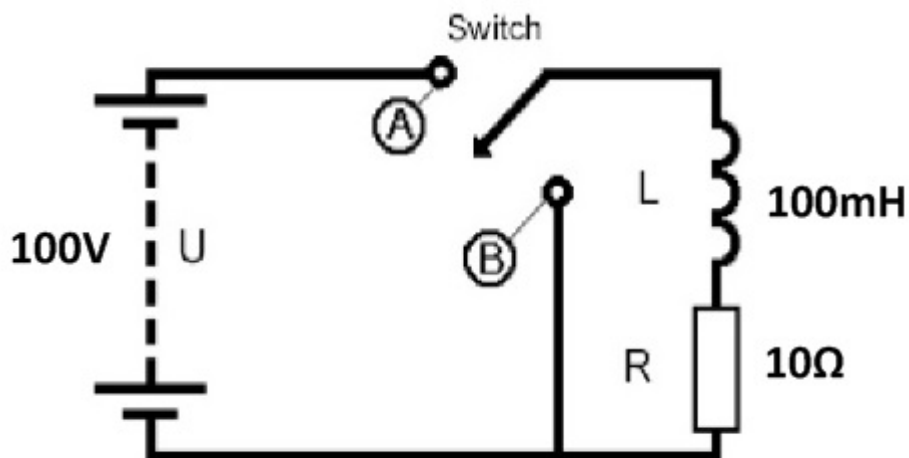
If choice b is selected set score to 1.

**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.
- o (b) There will be no voltage induced.
- o (c) The induced voltage will be small.

If choice a is selected set score to 1.

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



- o (a) 0 V.
- (b) 100 V.
- o (c) 37 V.

If choice b is selected set score to 1.

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

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

If choice a is selected set score to 1.

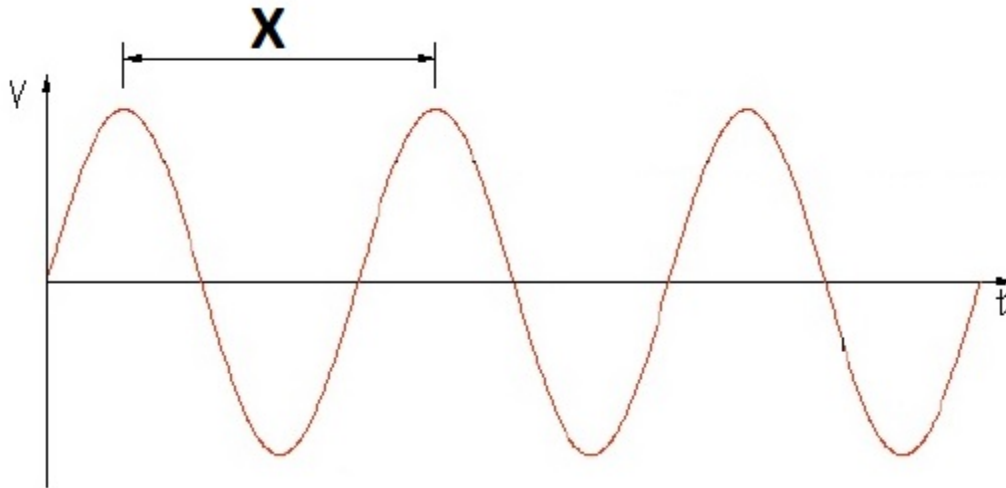
**39.** What is a solution to overcome reactive sparking in a DC generator?

- o (a) Change the rotation direction of the armature.
- o (b) Shortening of the commutator by the brushes.

- (c) To fit inter-poles between the main poles.

If choice c is selected set score to 1.

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



- (a) Period.
- o (b) Peak to Peak voltage.
- o (c) Frequency.

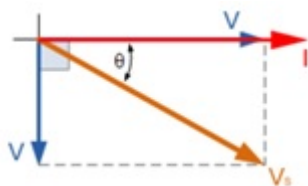
If choice a is selected set score to 1.

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

- o (a)  $I_L = I_f$
- o (b)  $I_L = \frac{I_f}{\sqrt{2}}$
- (c)  $I_L = I_f \cdot \sqrt{3}$

If choice c is selected set score to 1.

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.

*If choice a is selected set score to 1.*

**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.

*If choice b is selected set score to 1.*

**44.** The current transformer is a....

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

*If choice b is selected set score to 1.*

**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

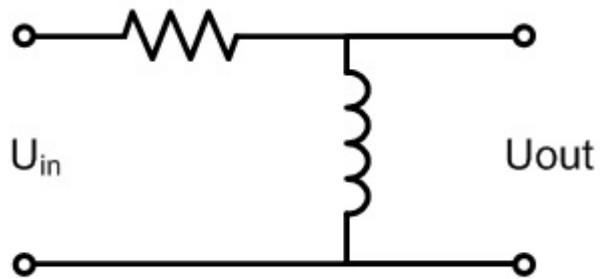
*If choice c is selected set score to 1.*

**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

*If choice a is selected set score to 1.*

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



- (a) High Pass Filter
- o (b) Band Pass Filter
- o (c) Low Pass Filter

*If choice a is selected set score to 1.*

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

- o (a) 2 low pass filters.
- o (b) 2 high pass filters.
- (c) a low pass and high pass filter.

*If choice c is selected set score to 1.*

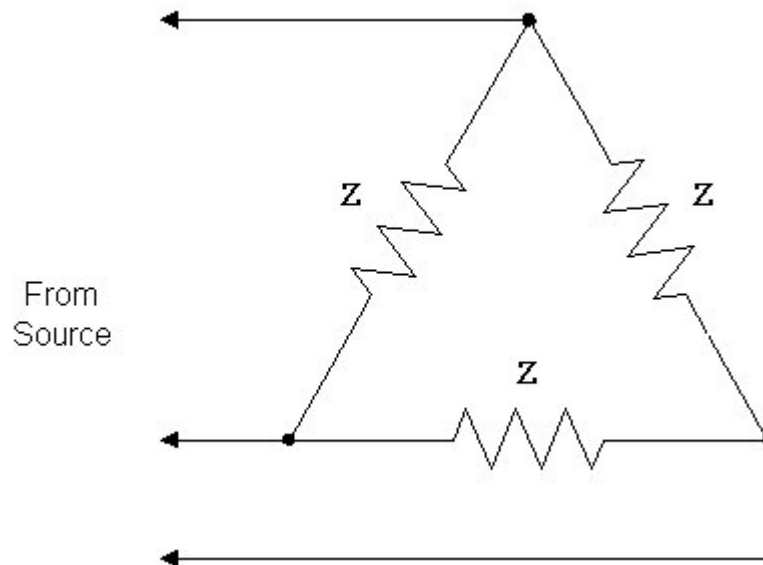
49. The rotation speed of the armature of an AC generator increase.

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

- (a) will increase.
- o (b) will not change.
- o (c) will decrease.

*If choice a is selected set score to 1.*

50. What kind of three phase connection is indicated?



- (a) Delta Connection
- o (b) Wye Connection
- o (c) Star Connection

*If choice a is selected set score to 1.*

51. In a split phase motor....

- o (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.
- o (c) the starting winding is 180 electrical degrees displaced from the main or running winding.

*If choice b is selected set score to 1.*

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

By changing the...

- (a) supply frequency.
- o (b) phase voltage.
- o (c) phase current.

*If choice a is selected set score to 1.*

***If assessment score is 75% to 100% Pass  
If assessment score is 0% to 74% Fail***