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?

- o (a) Positive
- • (b) Negative
- o (c) Neutral

If choice b is selected set score to 1.

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

If choice a is selected set score to 1.

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

If choice b is selected set score to 1.

4. Which metal is the best conductor for electricity?

- (a) Copper
- (b) Aluminium

- (c) Silver

If choice c is selected set score to 1.

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.

If choice c is selected set score to 1.

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

- (a) electrons.

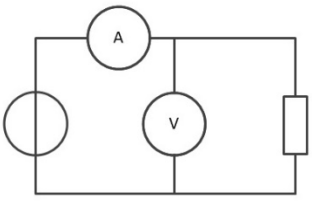
- (b) positive and negative ions.

- (c) electrons and negative ions.

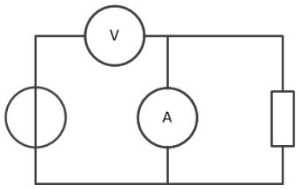
If choice b is selected set score to 1.

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

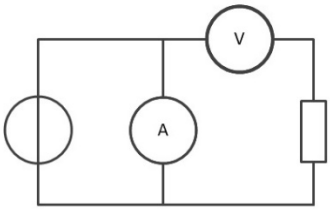
- (a)



o (b)



o (c)



If choice a is selected set score to 1.

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

- (a) 1 A

o (b) 60 A
o (c) 240 A

If choice a is selected set score to 1.

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

o (a) Piezo electricity.

- (b) Static electricity.

o (c) Thermo-electricity.

If choice b is selected set score to 1.

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

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

- (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....

- o (a) in series and parallel
- o (b) parallel

- (c) in series

If choice c is selected set score to 1.

12. Electrolyte is used in a....

- (a) battery

- o (b) thermocouple
- o (c) piezo crystal

If choice a is selected set score to 1.

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

- o (a) Secondary cell.
- o (b) Lead-Acid cell.

- (c) Primary cell.

If choice c is selected set score to 1.

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

- o (a) The overall capacity increases while the total voltage remains the same.
- o (b) The total voltage and overall capacity increases.

- (c) The total voltage increases while the overall capacity remains the same.

If choice c is selected set score to 1.

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

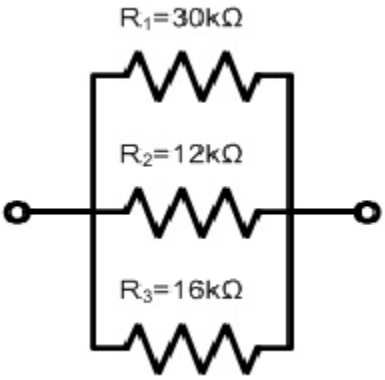
- o (a) Alternating Current (AC).

- (b) both Direct and Alternating Current (DC and AC).

- o (c) Direct Current (DC).

If choice b is selected set score to 1.

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



- o (a) R_2
- • (b) R_1
- o (c) R_3

If choice b is selected set score to 1.

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.

- o (a) 8 V
- o (b) 4 V
- • (c) 12 V

If choice c is selected set score to 1.

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

The resistance of the wire will...

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

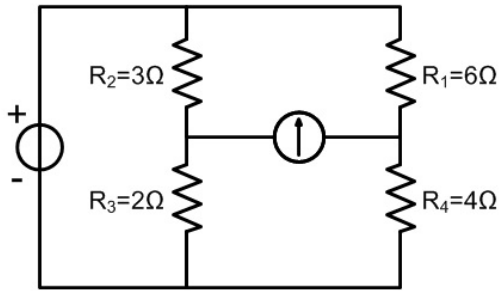
If choice a is selected set score to 1.

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

- o (a) increases
- o (b) stays constant
- • (c) decreases

If choice c is selected set score to 1.

20. Is this bridge of Wheatstone balanced?



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

If choice c is selected set score to 1.

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

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

If choice c is selected set score to 1.

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

- o (a) high frequencies.
- • (b) accurate adjustments.
- o (c) high voltages.

If choice b is selected set score to 1.

23. Electric power is....

- o (a) the same as electric energy.
- • (b) proportional to electric energy and inverse proportional to time.
- o (c) proportional to electric energy and time.

If choice b is selected set score to 1.

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

- o (a) the applied voltage and the time the applied voltage is switched on.
- • (b) the applied voltage and the total current.
- o (c) the total current and the duration of that current.

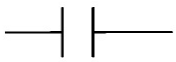
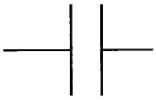
If choice b is selected set score to 1.

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?

- o (a) 
- • (b) 
- o (c) 

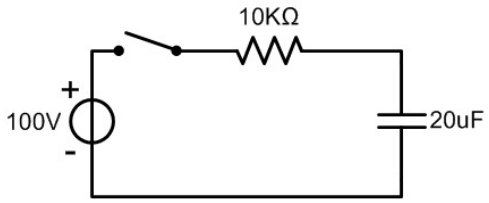
If choice b is selected set score to 1.

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

- o (a) Ct = C1 - C2 - C3
- o (b) $^1/_{Ct} = {}^1/_{C1} + {}^1/_{C2} + {}^1/_{C3}$
- • (c) Ct = C1 + C2 + C3

If choice c is selected set score to 1.

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



- (a) 200 ms

o (b) 1000 ms
o (c) 2 ms

If choice a is selected set score to 1.

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

o (a) north pole.

- (b) north and south pole.

o (c) south pole.

If choice b is selected set score to 1.

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

- (a) Aluminium - Nickel - Cobalt.

o (b) Aluminium - Nickel - Copper.
o (c) Aluminium - Nickel - Silver.

If choice a 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?

o (a) To avoid saturation.

- (b) To increase the magnetic flux.

o (c) To support the turns of the coil.

If choice b is selected set score to 1.

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

The flux density...

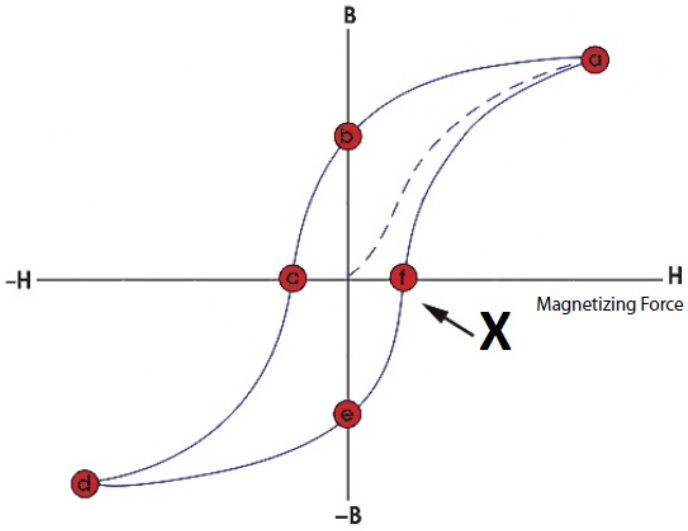
o (a) will increase.

- (b) will decrease.

o (c) will not change.

If choice b is selected set score to 1.

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



o (a) Retentivity point.
o (b) Saturation point

- (c) Coercivity point.

If choice c is selected set score to 1.

34. Shock, Stress and Vibration has...

o (a) no influence on magnet materials.
o (b) almost none influence on magnet materials.

- (c) influence on permanent magnets.

If choice c is selected set score to 1.

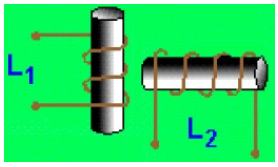
35. When a coil is moved towards a magnetic field, the resulting induced EMF will....

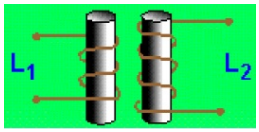
o (a) remain the same as the coil gets closer to the magnetic field.
o (b) decrease as the coil gets closer to the magnetic field.

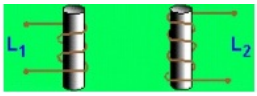
- (c) increase as the coil gets closer to the magnetic field.

If choice c is selected set score to 1.

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

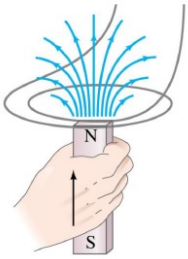
- (a) 

- o (b) 

- o (c) 

If choice a is selected set score to 1.

37. What will happen at the approaching coil side?



- o (a) A magnetic north pole arises.
- (b) A magnetic south pole arises.
- o (c) Nothing will happen.

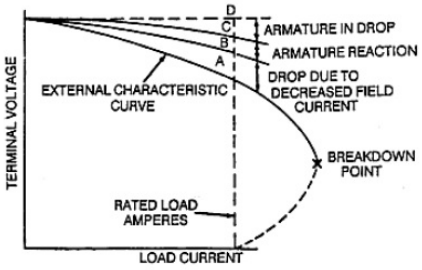
If choice b is selected set score to 1.

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

- (a) The direction of current flow in the armature.
- 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. Of which kind of generator is this the terminal current graph?



- o (a) Compound DC generator.
- • (b) Shunt DC generator.
- o (c) Series DC generator.

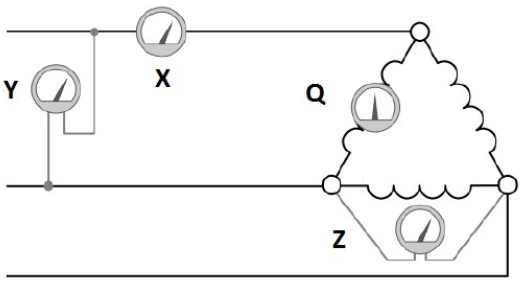
If choice b is selected set score to 1.

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

- • (a) 0,5 Hz.
- o (b) 2 Hz.
- o (c) 4 Hz.

If choice a is selected set score to 1.

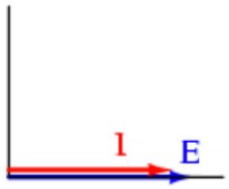
41. Which meter indicates the phase current?



- o (a) Meter Z.
- o (b) Meter X.
- • (c) Meter Q.

If choice c is selected set score to 1.

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



- o (a) Inductor
- o (b) Capacitor
- • (c) Resistor

If choice c is selected set score to 1.

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

- o (a) An inductive circuit.
- • (b) A resistive circuit.
- o (c) A capacitive circuit.

If choice b is selected set score to 1.

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

- o (a) 1 to 100
- • (b) 1 to 1000
- o (c) 1000 to 1

If choice b is selected set score 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.

- o (a) 300 W
- • (b) $^{300}/_{\sqrt{3}}$ W
- o (c) 100 W

If choice b is selected set score to 1.

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

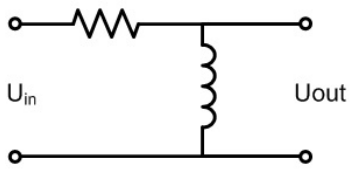
- o (a) 8 turns primary and 2 turns secondary.

o (b) 2 turns primary and 4 turns secondary.

• (c) 2 turns primary and 8 turns secondary.

If choice c 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....

• (a) a low pass and high pass filter.

o (b) 2 high pass filters.
o (c) 2 low pass filters.

If choice a is selected set score to 1.

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

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

o (a) will not change.
o (b) will decrease.

• (c) will increase.

If choice c is selected set score to 1.

50. Give an advantage of a three phase system.

• (a) In the Y connection 2 different voltages are available.

o (b) In the delta connection 2 different voltages are available.
o (c) A phase shift of 90^{o} is available.

If choice a is selected set score to 1.

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

- o (a) 90 percent of its rated speed.
- o (b) 75 percent of its rated speed.
- • (c) 25 percent of its rated speed.

If choice c is selected set score to 1.

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

By reversing...

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

If choice c is selected set score to 1.

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