

**First Group: Questions (1 – 9)****1) Choose to answer (a) or (b):****(a) Write down the scientific concept expressed by the following statement:**

" The law that states that the electric current intensity passing through a conductor is directly proportional to the potential difference between its terminals, at constant temperature".

.....

**(b) Write down the scientific concept expressed by the following statement:**

"The work done to transfer a charge of one Coulomb through the whole circuit, inside and outside the electric source".

.....

**2) Choose to answer (a) or (b):****(a) Write down the scientific concept expressed by the following statement:**

" The scale deflection of the galvanometer pointer away from zero position per unit current intensity passing through its coil".

.....

**(b) Write down the scientific concept expressed by the following statement:**

" The magnetic flux density that exerts a force of one Newton on a wire of length one meter, through which an electric current of one Ampere passes when it is placed perpendicular to the direction of the magnetic flux".

.....

**3) Choose to answer (a) or (b):****(a) Choose the correct answer:**

An application of mutual induction between two coils is .....

**(the transformer – the dynamo – the motor)**

**(b) Choose the correct answer:**

The scientific principle upon which the operation of the induction furnaces depends is .....

**(the unidirectional currents – the direct currents – the eddy currents)**

**4) Choose the correct answer:**

A small compass needle deflects when placed parallel to a current-carrying wire indicates the generation of .....field around the wire.

**(a magnetic – an electric – a thermal)**

**5) Choose the correct answer:**

The coil of the electric motor continues motion when its plane becomes perpendicular to the direction of the magnetic field due to .....

**(inertia – self-induction – magnetic flux)**

**6) Choose the correct answer:**

An electric cell of electromotive force (6V) and negligible ohmic resistance is connected to two resistors of values (R) and (3R) all in series. The potential difference between the terminals of the resistor (R) equals .....

**(1.5 V – 2 V – 3 V)**

**7) Two straight wires, each of length (L) have a normal distance (d) between them and carry electric currents of the same intensity (I).****Choose the correct answer:**

**First:** The magnitude of the mutual force between the two wires in terms of the normal distance between them (d) and the current intensity through each wire (I) equals .....

$$\left( \frac{\mu I L}{2 \pi d} - \frac{\mu I^2}{2 \pi d} - \frac{\mu I^2 L}{2 \pi d} \right)$$

**Second:** The factor that affects the direction of this force is .....

**(direction of current in both wires – current intensity in both wires – the distance between the two wires)**

(بقية الأسئلة في الصفحة الثالثة)

**8) Choose the proper type of energy for each blank space:**

The dynamo converts the ..... (mechanical – electrical – chemical) energy into ..... (mechanical – electrical – chemical) energy.

**9) Choose the correct answer:**

A light beam of power 2 W and speed  $3 \times 10^8$  m/s is incident on a surface. What is the magnitude of the force by which this beam affects the surface on reflection? .....

(  $1.3 \times 10^{-8}$  N -  $7.5 \times 10^{-7}$  N -  $6.7 \times 10^{-9}$  N )

**Second Group: Questions (10 – 18)**

**10) Choose to answer (a) or (b):**

**(a) Write down the scientific concept expressed by the following statement:**

"The rule that states that the current induced in a conductor is in a direction that opposes the change producing it".

**(b) Write down the scientific concept expressed by the following statement:**

"The law that states that the electromotive force induced in a conductor is directly proportional to the rate of change of magnetic flux intercepting the conductor".

**11) Choose to answer (a) or (b):**

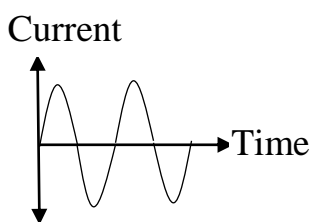
**(a) Choose to answer the correct answer:**

Transformers used before transmitting the electric energy generated by power stations are transformers that step up .....

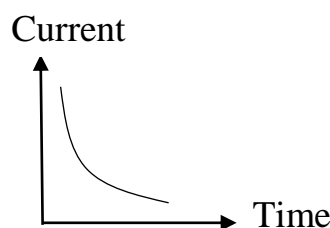
(voltage – current – power)

**(b) Choose to answer the correct answer:**

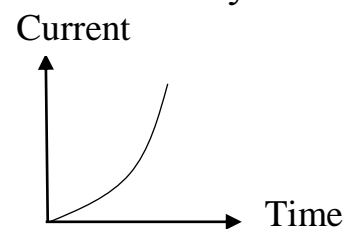
The graph that represents the electric current produced from the dynamo is .....



**Graph (1)**



**Graph (2)**



**Graph (3)**

(بقية الأسئلة في الصفحة الرابعة)

**12) Choose to answer (a) or (b):****(a) Choose the correct answer:**

An electric spark is produced between the terminals of a switch at the moment of turning off an electric circuit composed of a strong electromagnet and a battery due to an induced electromotive force which is .....

**(alternating – forward – backward)**

**(b) Choose the correct answer:**

No electromotive force is induced in a solenoid when there is a bar magnet is stationary inside it because the magnetic flux inside the coil is .....

**(increasing – decreasing – constant)**

**13) Choose the correct answer:**

When a photon of X-rays or gamma rays falls on a free electron, what is increased?

**(the photon speed – the electron speed – the electron mass)**

**14) Choose the correct answer:**

The idea of operation of the moving coil galvanometer is the same as that of .....

**(the transformer – the dynamo – the motor)**

**15) Choose the correct answer:**

The electromotive force of the electric cell used inside the ohmmeter should be .....

**(constant – variable – very high)**

**16) Answer all the following:**

**First: Write down the scientific concept expressed by the following statement:**

"The ratio between the electric energy produced in the secondary coil in the transformer and the electric energy consumed in the primary coil, at the same time.

**Second: Choose the correct answer:**

When this ratio equals one, the transformer is .....

**(stepping up – stepping down – ideal)**

**(بقية الأسئلة في الصفحة الخامسة)**

**17) Choose the correct answer:**

Two wires **Y** and **Z** are made up of the same material having the same electrical resistance. If the length of the wire **Y** is twice the length of the wire **Z**, the cross-sectional area of the wire **Y** will be ..... the cross-sectional area of the wire **Z**.

(greater than – less than – equal to)

**18) Choose the correct answer:**

A voltmeter of coil resistance **20 Ω** measures potential difference of maximum **1V**. The multiplier resistance should be connected with its coil in order to measure potential difference up to **10 V** equals ...

( 100 Ω - 180 Ω - 200 Ω )

**Third Group: Questions (19 – 27)****19) Choose to answer (a) or (b):**

(a) **Write down the scientific concept expressed by the following statement:**

"The reciprocal of the electrical resistivity of a material".

.....

(b) **Write down the scientific concept expressed by the following statement:**

"The opposition of the conductor to the flow of current".

.....

**20) Choose to answer (a) or (b):**

(a) **Choose the correct answer:**

When placing a piece of iron inside the core of a coil in which an alternating current pass, its temperature would .....

(lower – rise – not be affected)

(b) **Choose the correct answer:**

The core of the transformer is made up of thin laminated sheets of siliconic soft iron insulated from each other to reduce .....

(eddy currents – the transformer efficiency – the core resistance)

(بقية الأسئلة في الصفحة السادسة)

21) **Choose to answer (a) or (b):**

(a) **Choose the correct answer:**

The unit of measuring coefficient of self-induction is .....

(Volt. Second/Ampere – Newton/Ampere. meter – Newton. meter)

(b) **Choose the correct answer:**

The unit of measuring the frequency of the alternating current is .....

(Joule/second – Oscillation/second – Coulomb/second)

22) **Choose the correct answer:**

The force acting on a straight wire of length ( $L$ ) through which an electric current ( $I$ ) passes and placed perpendicular to a uniform magnetic field ( $B$ ) is given by the relation .....

$$\left(F = \frac{B L}{I}\right) - (F = B I L) - \left(F = \frac{B}{I L}\right)$$

23) **Choose the correct answer:**

An electron is freed from the surface of a metal having kinetic energy ( $E$ ) if the photon falls on the metal having energy ..... the work function of that metal.

(greater than – less than – equal to)

24) **Choose the correct answer:**

The direction of the magnetic dipole moment of a coil is ...

(parallel to the coil plane – normal to the coil plane – in the same plane of coil)

25) You have got a secondary coil near to a primary coil connected to a battery, a rheostat and a closed switch.

Choose **two different methods** of the following by which a **reversible** electromotive force can be induced in the secondary coil:

(opening the primary coil circuit – increasing the current intensity in the primary coil – bringing the primary coil closer to the secondary coil – taking the primary coil away from the secondary coil – decreasing the current intensity in the primary coil)

(بقية الأسئلة في الصفحة السابعة)

**26) Choose the correct answer:**

An ammeter is composed of a sensitive galvanometer of resistance  $R_g$  and a shunt resistance connected to its coil of resistance  $0.1 R_g$ . If the maximum current that can pass through the galvanometer is  $I_g$ , the maximum current can be measured by the ammeter is

(greater than  $I_g$  – less than  $I_g$  – equal to  $I_g$ )

**27) Choose the correct answer:**

A straight wire of 20 cm long is moving at velocity 5 m/s in a direction perpendicular to uniform magnetic flux of density 0.1 T. The electromotive force induced across its terminals equals ...

(0.1 Volt – 0.36 Volt – 36 Volt)

**Fourth Group: Questions (28 – 36)****28) Choose to answer (a) or (b):****(a) Write down the scientific concept expressed by the following statement:**

"The law that states that the wavelength having maximum intensity ( $\lambda_m$ ) is directly proportional to the absolute temperature of the radiation source".

.....

**(b) Write down the scientific concept expressed by the following statement:**

"A quantum of energy concentrated in a very small space having mass and momentum".

.....

**29) Choose to answer (a) or (b):****(a) Choose the correct answer:**

The mathematical expression for Ampere's circuital law is .....

$$\left( \beta = \frac{\mu I}{2 \pi d} \right) - \left( \beta = \frac{\mu I}{2 d} \right) - \left( \beta = \frac{\mu I}{d} \right)$$

**(b) Choose the correct answer:**

The mathematical expression for the torque acting on a coil of a number of turns, carrying an electric current and placed a magnetic field is

.....

$$(\tau = \beta I A \sin \theta) - (\tau = I A N \sin \theta) - (\tau = \beta I A N \sin \theta)$$

(بقية الأسئلة في الصفحة الثامنة)

**30) Choose to answer (a) or (b):****(a) Choose the correct answer:**

To determine the direction of magnetic flux around a straight wire, through which an electric current pass, we use ..... rule.

(Fleming's left-hand – Fleming's right-hand – Ampere's right-hand)

**(b) Choose the correct answer:**

To determine the direction of the force that acts on a straight wire, through which an electric current pass, and placed perpendicular to a magnetic field we use ..... rule.

(Fleming's left-hand – Fleming's right-hand – Ampere's right-hand)

**31) Choose the correct answer:**

People moving in the dark can be seen by using night vision systems due to ..... radiation emitted by these objects.

(visible – heat – light)

**32) Choose the correct answer:**

The effective value of the alternating current = ..... x its maximum value.

(  $\frac{1}{2}$  –  $\frac{1}{0.707}$  – 0.707 )

**33) Choose the correct answer:**

Some metals are prepared by the electrolysis of their compounds using ...

(a direct current – an alternating current – a magnetic field)

**34) Choose the correct answer for each of the following:**

**First:** The electric current passes to the galvanometer coil through ...

(the soft iron cylinder – the coil bearings – the spiral springs)

**Second:** The device that has a non-uniform scale is ...

(The ohmmeter – The ammeter – The voltmeter)

**35) Choose the correct answer:**

**First:** A coil of cross sectional area  $0.2 \text{ m}^2$  is placed perpendicular to a uniform magnetic field of flux density  $0.4 \text{ T}$ . The magnetic flux passing through the coil .....

(0.08 Wb – 0.04 Wb – zero)

**Second:** When the previous coil is replaced by another coil of area (A) and placed perpendicular to the same magnetic field, the magnetic flux passing through the coil is  $0.16 \text{ Wb}$ . The area of the coil (A) equals .....

( $0.08 \text{ m}^2$  –  $0.04 \text{ m}^2$  –  $0.02 \text{ m}^2$ )

(بقية الأسئلة في الصفحة التاسعة)



**36) Choose the correct answer:**

Four lamps, each of resistance  $6\Omega$ , are connected together in parallel. Then the group is connected to a battery of electromotive force  $12\text{ V}$  and internal resistance  $0.5\Omega$ .

**First:** The equivalent resistance of the lamps equals .....

( $1.5\Omega - 2\Omega - 24.5\Omega$ )

**Second:** The current intensity through the battery equals .....

( $24\text{ A} - 6\text{ A} - 2\text{ A}$ )

**Fifth Group: Questions (37 – 45)****37) Choose to answer (a) or (b):****(a) Choose the correct answer:**

The electrical measuring instruments that depend on the reading of a pointer deflecting on a scale are called ..... instruments.

(analog – digital – standard)

**(b) Choose the correct answer:**

The magnetic field produced when an electric current flow through a solenoid looks like the magnetic field produced by .....

(a disc magnet – a bar magnet – a horse shoe magnet)

**38) Choose to answer (a) or (b):****(a) Choose the correct answer:**

The part in the electric motor that causes its rotation in one direction is the .....

(carbon brushes – two insulated cylindrical halves – direct current source)

**(b) Choose the correct answer:**

Existence of a cylinder split into two insulated halves in the electric generator leads to generate an electric current that is .....

(alternating – of constant intensity only – unidirectional only)

**39) Choose to answer (a) or (b):****(a) Choose the correct answer:**

It is advisable to live away from the towers of high power in order to ...

(reduce the loss in power during transmission – protect the environment and general health – decrease the intensity of current that reaches them)

(بقية الأسئلة في الصفحة العاشرة)

**(b) Choose the correct answer:**

One use of the galvanometer is to .....

(define the current direction in the circuit – measure the intensity of weak alternating currents – measure the effective value of alternating currents)

**40) Choose the correct answer:**

The role of the cathode in the cathode ray tube is to .....

(direct the electrons – control the intensity of the electron beam – emit electrons)

**41) Choose the correct answer:**

One of the factors that affect the coefficient of self-induction of a coil is .....

(its number of turns – its material type – the current through it)

**42) Choose the correct answer:**

If we can lower the value of the electric current through the wires to  $\frac{1}{100}$  of its original value, the dissipated energy decreases to ..... of its original value.

$$\left(\frac{1}{100} - \frac{1}{1000} - \frac{1}{10000}\right)$$

**43) Choose the correct answer:**

The ohmmeter is used to measure ...

(the resistance of a conductor – self-induction of a coil – force acting on a wire)

And its idea of operation depends on applying .....

(Ohm's law – Faraday's law – Wien's law)

**44) Choose the correct answer:**

**First:** The fridge, the electric heater and TV set at home are connected in ....

(series only – parallel only – both series and parallel)

**Second:** This method allows these devices to .....

(operate at the same voltage – pass the same current – have the same resistance)

**45) Choose the correct answer:**

A metal ring of radius **15.7 cm** carries an electric current of intensity **10 A**. if the permeability of air is  $4\pi \times 10^{-7}$  Wb/A.m and  $\pi = 3.14$ , the magnetic flux density at the ring center equals ...

$$(4 \times 10^{-5} \text{ T} - 4 \times 10^{-6} \text{ T} - 4 \times 10^{-7} \text{ T})$$

( انتهت الأسئلة )