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ARAB REPUBLIC OF EGYPT

Ministry of Education and Technical Education

General Secondary Education Certificate Examination – First Session 2022

Third Year Secondary

Physics **Time: 3 hours**

الفيزياء بالإنجليزية (الدور الأول ٢٠٢٢) (الإجابة فى نفس كراسة الأسئلة)

(الأسئلة فى ١٣ صفحة)

Answer the following questions:

Group one: Questions from (1 - 9)

1) Answer (A) or (B):

(A) Define : The potential difference between two points .

.....

.....

(B) Define: The electric resistance.

.....

.....

2) Answer (A) or (B):

(A) Mention one of the uses of the Pn junction.

.....

(B) Mention one of the uses of the transistor.

.....

3) Answer (A) or (B):

(A) Choose the correct answer:

The induced electromotive force in a straight wire is maximum when the direction of the motion of the wire makes an angle with the direction of magnetic field equals ..... degree

1) 45 2) 90 3) Zero

(بقية الأسئلة فى الصفحة الثانية)

(B) Choose the correct answer:

The induced electromotive force in a coil due to the self-induction increasing on .....

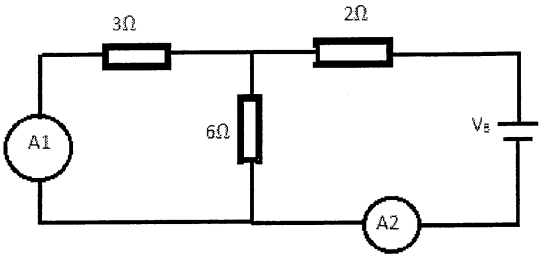
1) increasing the passing time of the current in the coil

2) decreasing the rate of change in the current intensity through the coil

3) increasing the rate of change in the current intensity

4) Choose the correct answer:

In the electric circuit shown in the figure: If the reading of the ammeter (A_1) = (2A) and the electromotive force of the source (V_B) = (12 V) then the reading of the ammeter (A_2) = ...



1) 1.5 A 2) 3A 3) 4A

5) Choose the correct answer:

Electromagnetic radiation the energy of one of its photons equals 3 X 10^{-19} J , so that the wave length of the photon of radiation equals .....

(Knowing that h = 6.625 X 10^{-34} J.s , C = 3 X 10^{8} m/s)

1) 3 X10^{-7} m 2) 21 X 10^{-7} m 3) 6.625 X 10^{-7} m

6) Choose the correct answer:

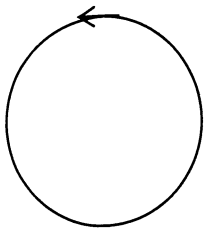
On transferring an electron from the third energy level in hydrogen atom to emit a photon of Visible light photons, so that the energy of this photon equals .....

1) 3.02 X10^{-19} J 2) 1.88 X10^{-19} J 3) 2.26 X 10^{-19} J

(بقية الأسئلة فى الصفحة الثالثة)

7) Choose the correct answer:

A metallic ring carrying a current as in the figure, the direction of the magnetic flux that produced at the center of the ring is .....



1) perpendicular to the plan of the paper and inside it.

2) parallel to the plan of the paper from up to down.

3) perpendicular to the plan of the paper and outside it.

8) Firstly : Choose the correct answer:

From the properties of laser beam, that it is highly monochromatic and that means .....

1) the number of photons in the laser beam is very small

2) the spectral line broadening of laser beam is small

3) the spectral line broadening of laser beam is large

Secondly: Choose the correct answer :

If one of the two mirrors in laser device is broken , which of the following processes will not done to produce laser beam .....

1) population inversion 2) stimulated emission 3) amplification

9) Choose the correct answer:

Alternating current dynamo coil has a face area of 0.2 m^2, the number of its turns 50 turns, its resistance 5 Ω and revolves with a uniform speed 2100 cycle per minute between the two poles of a magnet, a maximum electromotive force of 220 Volts is induced in the coil. **Find** :

Firstly: The magnetic flux intensity in which the coil revolves .....

1) 0.5 T 2) 0.1 T 3) 0.3 T

Secondly: The maximum induced electric current intensity .....

1) 44 A 2) 30 A 3) 50 A

(بقية الأسئلة فى الصفحة الرابعة)

Group two: Questions from (10 – 18)

10) Answer (A) or (B):

(A) Choose the correct answer :

The Henry is equivalent to .....

1) Volt.A/s 2) Ω.s/A 3) Volt.s/A

(B) Choose the correct answer :

The Webber is equivalent to .....

1) Volt.A/s 2) Ω.s/A 3) Volt.s

11) Answer (A) or (B):

(A) Which part of the sensitive galvanometer is responsible for restoring the pointer to zero position when the current is switched off ?

.....

(B) which part in the direct current ammeter is responsible for protecting the coil from damage due to high current intensity ?

.....

12) Answer (A) or (B):

(A) Write down the scientific term for the following:

It the electromotive force induced in the coil when the current passing through it changes at a rate equals one ampere per second.

.....

(B) Write down the scientific term for the following:

The ratio between the electric power produced from the secondary coil of the electrictransformer to the electric power consumed in its primary coil at the same interval of time.

.....

(بقية الأسئلة فى الصفحة الخامسة)

13) Choose the correct answer:

X- Rays are used in studying the crystalline structure of materials because .....

1) they can ionize gases
2) they diffract in crystals
3) they can penetrate media easily

14) Choose the correct answer:

If we succeed to increase the electric voltage in the transmission cables to 1000 times of its original value, then the consumed electric energy through the transmission process of the electric energy will .....

1) increase 1000 times of its original value
2) decrease to $\frac{1}{1000}$ of its original value.
3) decrease to $\frac{1}{1000000}$ its original value.

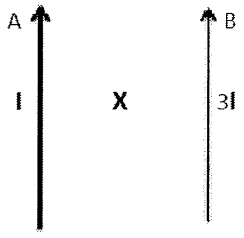
15) Write down the scientific term for the following:

The attractive force between the free electrons at the surface of the metal and the nuclei of the metal atoms which prevents the electrons to escape from the surface of the metal

.....

16) Choose the correct answer:

In the figure: two straight parallel wires in a vertical position (A,B) Carrying a current of intensity (I , 3I) respectively in the direction shown in the figure, if the magnetic flux density at point (X) at the mid distance between the two wires equals B. On moving the wire (A) away from the point (X) then .....



1) the magnetic flux density at point (X) vanishes
2) the magnetic flux density at point (X) increases
3) the magnetic flux density at point (X) decreases

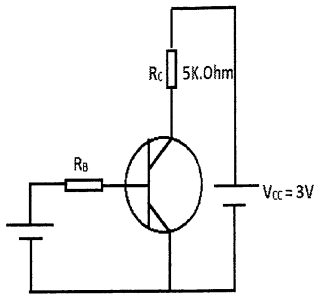
(بقية الأسئلة فى الصفحة السادسة)

17) Choose the correct answer :

An ideal electric transformer, the ratio between the number of turns of its primary coil to the number of turns of its secondary coil as the ratio of 1:10. if the primary coil of the transformer is connected to a direct current source of electromotive force (2 V.) then the magnitude of the electromotive force that produced from its secondary coil in volts Equals .....

1) 0.2 V. 2) Zero 3) 20 V.

18) Choose the correct answer:



If the value of β_e in the transistor shown in the figure equals 40 and the current of the base equals 12.5 μA then :

Firstly : The current intensity of the collector (I_c)equals .....

1) 1250 μA 2) 500 μA 3) 3.2 μA

Secondly : The output voltage (V_{CE}) of the circuit equals .....

1) 2.5 V. 2) 3V. 3) 0.5 V.

The third group questions from (19 - 27)

19) Answer (A) or (B):

A) Compare between:

p.o.c.	The torque	Magnetic dipole moment
The mathematical relation Used to calculate.		

B) Compare between:

p.o.c	Magnetic flux	Magnetic flux density
The measuring unit		

(بقية الأسئلة فى الصفحة السابعة)

20) Answer (A) or (B):

(A) Write down the scientific term for the following:

It is the spectrum resulting due to the collision of an electron has high kinetic energy with another electron near to the nucleus of the atom of the target material in Coolidge tube.

.....

(B) Write down the scientific term for the following:

It is the spectrum that results due to the decrease in the speed of the electrons during passing near to the electrons of the target material.

.....

21) Answer (A) or (B):

(A) What is meant by: The state of population inversion

.....

.....

(B) What is meant by: The resonant cavity.

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22) Choose the correct answer:

The magnitude of the stimulated current in a wire moves perpendicular to the magnetic field lines depends on.....

1) the velocity of the wire.

2) the direction of the magnetic field lines.

3) the direction of the motion of the wire.

(بقية الأسئلة فى الصفحة الثامنة)

23) If the concentration of the free electrons or holes in a pure silicon crystal is 10^{10} cm^{-3}, if phosphor atoms is added to the crystal with a concentration 10^{12} cm^{-3} **Calculate** the concentration of holes in this case.

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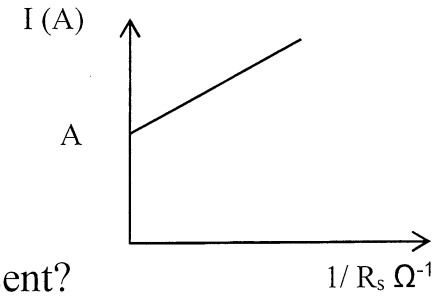
24) Choose the correct answer:

On studying Compton Effect we find that the sum. of the energies of the photon and electron after collision is..... the sum. of the energies of the photon and electron before collision.

1) smaller than 2) greater than 3) equal to

25) the graph represents the relation between the maximum intensity of the current measured by the Ammeter and the reciprocal of the current divider (shunt resistor) from the graph find:



Firstly: What does point A represent?

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Secondly: What does the slope of the straight line represent?

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26) Choose the correct answer:

A car battery has electromotive force (12V.) and internal resistance 0.5 Ω.so that the percentage of the lost electromotive force on using to operate a lamp of resistance 2Ω is .....

1) 15% 2) 20% 3) 25%

27) Explain: How can you obtain non inductive standard ohmic resistance?

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(بقية الأسئلة فى الصفحة التاسعة)

Fourth group (28 -36)

28) Answer (A) or (B):

(A) Write down the scientific term for the following:

The self-induction of a coil in which an electromotive force of 1 V. is induced when the current passing through it changes at a rate of 1A/s.

.....

(B) Write down the scientific term for the following:

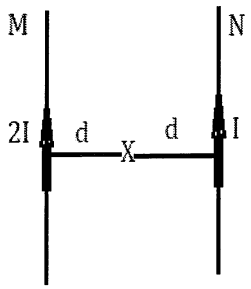
The value of the direct current which generates the same rate of thermal effect in a resistance as that generated by the considered alternating current.

.....

29) Answer (A) or (B)

A) Choose the correct answer:

The figure represents two straight parallel wires M,N carrying a current 2I,I respectively, the two wires attract each other by a force (F).if the direction of the current in the wire(M) is changed then the force between the two wires will .....



1) decrease **2) increase** **3) change its type**

B) Choose the correct answer:

A spiral coil is connected in series to a battery has negligible internal resistance, if the coil is compressed to decrease the distance between it-s turns to the half and reconnected to the same battery, then the magnetic flux density at any point along the interior axis of the solenoid will

1) decrease to half **2) increase to the double** **3) remains constant**

30) Answer (A) or (B):

(A) Give reason for: The metallic core in the transformer is splitted into insulated sheets.

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(بقية الأسئلة فى الصفحة العاشرة)

(B) Give reason for:

The coil of direct current motor is connected to a hollow metallic cylinder splitted into two Insulated halves.

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31) Explain: The role of Helium atoms in producing laser

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32) Choose the correct answer:

A light falls on the surface of a metal as a result the electrons are released, if the intensity of the incident light on the surface of the same metal is increased then

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1) The number of the released electrons will increase and their kinetic energy remains constant.
2) The number of the released electrons will increase and their kinetic energy increases too.
3) The same number of the electrons will release and the kinetic energy of each electron will increase.

33) Choose the correct answer:

Which of the following devices can be used to make sure that the pn junction (diode) is functioning?

1) The ammeter 2) The voltmeter 3) The ohmmeter

(بقية الأسئلة فى الصفحة الحادية عشر)

34) Choose the correct answer:

A voltmeter the resistance of its coil equals 400Ω can measure a potential difference up to 4V.then the value of the potential multiplier needed to make the device able to measure a potential difference up to 20V.equals.....

1) 8000Ω 2) 2000Ω 3) 1600Ω

35) In faraday's experiment, if the magnitude of the electromotive force induced in a coil of surface area (A)due to a magnet passes through the coil in a time(t)is 2V.if the surface area of the coil is increased to(2A)and the time taken by the magnet to pass through the coil is decreased to (t/2) calculate the magnitude of the electromotive force that induced in this case

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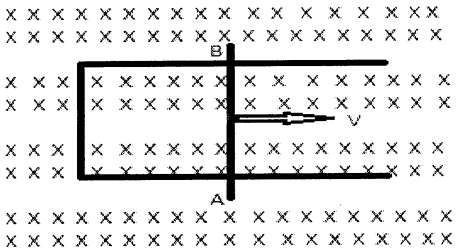
36) Choose the correct answer:

In the shown figure the potential of point B is ..... The potential of point A.



1) less than. 2) greater than. 3) equal to

Fifth group (37 – 45)

37) Answer (A) or (B):

(A) Choose the correct answer:

The wave length of the characteristic radiation of X-Rays is given by the relation .....

1) $\lambda = 2\pi r$ 2) $\lambda = \frac{h.c}{\pi}$ 3) $\lambda = \frac{h.c}{\Delta E}$

(بقية الأسئلة فى الصفحة الثانية عشر)

(B) Choose the correct answer:

The intensity of X-rays that produced from Coolidge tube increases on

.....

1) Increasing the potential difference between the filament and the target.

2) Increasing the potential difference applied on the filament.

3) Increasing the atomic number of the target material.

38) Answer (A) or (B):

(A)Right down the mathematical relation that is used to calculate the magnetic flux density at the center of spiral coil.

.....

(B) Right down the mathematical relation that is used to calculate the magnitude of the magnetic force acting on a straight wire carrying current placed perpendicular to a uniform magnetic field.

.....

39) Answer (A) or (B):

(A) Mention one application on the eddy currents.

.....

(B) Mention one application on the mutual induction between two coils.

.....

40) Choose the correct answer:

Which of the following choices can be used as an impurity In N-type silicon crystal?

1) B^{+3} 2) P^{+5} 3) Al^{+3}

41) Choose the correct answer:

The magnetic torque acting on a current carrying rectangular coil placed in a uniform magnetic flux is maximum when the angle between the plan of the coil and the magnetic flux equals .....

1) Zero° 2) 45° 3) 90°

(بقية الأسئلة فى الصفحة الثالثة عشر)

42) Give reason for:

Laser beam is used in three dimensional imaging.

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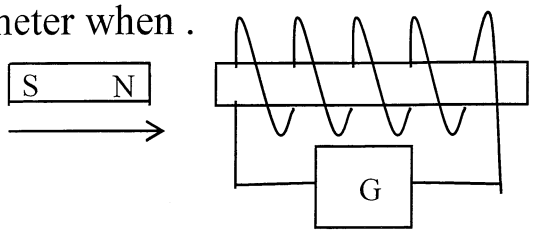
43) In the figure a spiral coil is wound around a soft iron core and connected in series with a galvanometer its zero position at the middle of the scale **Mention** what would happen to the pointer of the galvanometer when .



(A) Moving the magnet towards the coil.

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.....

(B) The magnet remains stationary in touch with the soft iron core

.....

44) Choose the correct answer:

When the cross sectional area of the wire is increased to double and its length is decreased to half its original value, then the conductivity of the wire material will.....

1) increase to double 2) increase 4 times 3) remains constant

45) An ohmmeter of resistance (R), **calculate** the magnitude of the measured resistance when the current passes through the coil of the device decreases to quarter.

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(انتهت الأسئلة)