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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 ثلاثة عشر صفحة)

Answer the following questions:

Group one: Questions from (1 - 9)

1) Answer (A) or (B):

(A) Write down one function for:

The transistor.

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B) Write down one function for:

The diode

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2) Answer (A) or (B):

(A) Choose the correct answer:

If the power that is produced from the secondary coil that has a number of turns 300 turn is 320 watt, and the power of the source that connected to the primary coil that has a number of turns 3000 turn is 400 watt so that this transformer is said to be.....

1) Step down transformer of efficiency 80%

2) Step up transformer of efficiency 80%

3) Ideal step down transformer.

(بقية الأسئلة فى الصفحة الثانية)

(B) Choose the correct answer:

If the induced e.m.f. in dynamo's coil when the perpendicular to the plan of the coilmakes an angle 45° to the magnetic field lines equals approximately 141.4 volts then the induced e.m.f. when the perpendicular to the plan of the coil makes an angle 90° to the magnetic field lines is .....

1) Zero 2) 200 Volts 3) 282.8 Volts

3) Answer (A) or (B):

(A) Choose the correct answer:

If the self-induction coefficient of a coil equals 0.2 H., so that the rate of change in the intensity of the current passes through the coil and causes electromotive force of 8 V. to be induced in the coil is.....

1) 30 A/s. 2) 40 A/s. 3) 50 A/s.

(B) Choose the correct answer:

If the rate of change in the intensity of the electric current passing through a coil equals 20 A/s., An electromotive force of 5 Volts is induced in the neighboring coil so that the mutual induction coefficient between the two coils is .....

1) 0.15H 2) 0.25H 3) 0.35H

4) Choose the correct answer:

On increasing the intensity of the current passing through the circuit in Ohm's experiment, so that the reading of the voltmeter .....

1) Decreases. 2) Increases. 3) Remains constant.

(بقية الأسئلة فى الصفحة الثالثة)

5) Choose the correct answer:

A light beam the frequency of its photons 6 X 10^{14} Hz falls on a metallic surface as a result of that the electrons of the surface of the metal are released without gaining any kinetic energy, if the frequency of the incident photons is increased to the double, then the work function of that metal will.....

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

6) What are the results based on.....?

Passing a continuous spectrum that is produced from a glowing object of high temperature through a cold gas and receiving the resultant spectrum on a otograph plate

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7) A rectangular coil has a number of turns 500 turns its dimensions 20 cm , 50 cm. carrying electric current of intensity 0.4 A. and revolves in a uniform agnetic flux of density 0.3 T. , Calculate the magnetic dipole moment of this coil.

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8) Choose the correct answer:

In He-Ne laser, the type of the energy which is used to excite neon atoms is .....

1) light energy 2) electric energy 3) thermal energy

9) What are the results based on .....? :

Moving a magnetic pole near to and away from the soft iron core of a spiral coil connected is series with a source of direct current and ammeter (concerning to the reading of the ammeter)

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(بقية الأسئلة فى الصفحة الرابعة)

Group two: Questions from (10 – 18)

10) Answer (A) or (B):

(A) Write down the mathematical relation that represents Faraday's law for electromagnetic induction in a coil.

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(B) Write down the mathematical relation that is used to find the average induced e.m.f. in the dynamo's coil through half cycle.

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11) Answer (A) or (B):

(A) Choose the correct answer

The magnetic torque acting on the electric motor coil is maximum when the angle between the plane of the coil and the magnetic field lines equals .....

1) 90° 2) 45° 3) Zero°

(B) Choose the correct answer

Two parallel wires the distance between them (d), a current of intensity (I) passes through each of them in the same direction , the attraction force between the two wires equals (F). So that on increasing the current passes in each wire to (3 I) and increasing the distance between the two wires to (3d) then the attraction force between the two wires .....

1) remains constant 2) increases to (3F) 3) decreases to (1/3 F)

(بقية الأسئلة فى الصفحة الخامسة)

12) Answer (A) or (B):

(A) Give reason for :

The average induced e.m.f. in the dynamo's coil during one complete cycle equals zero.

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(B) Give reason for :

The exist of a negative sign in the mathematical formula that represents Faraday's Law to calculate the induced e.m.f.

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13) What is meant by the population inversion in Laser ?

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14) What are the results based on falling of a light beam on the surface of a metal where the frequency of the photons of the light beam is greater than the critical frequency of the metal ?

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15) Choose the correct answer:

To avoid the electric noise, we use at the transmitter.....

1) Analog digital converters.

2) Digital analog converters.

3) Ideal electric transformer.

(بقية الأسئلة فى الصفحة السادسة)

16) If the value of the resistance needed to make the pointer of the ohmmeter deflects to quarter of the scale is 18000 Ω, **Calculate** the internal resistance of the device.

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17) Mention the reason for replacing the two slip rings connected to the coil of the dynamo by A hollow cylinder split into two insulated halves.

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18) A rectangular coil consists of 200 turns, the face area of each of them 0.2 m^2. A magnetic flux of density 0.3 T penetrate it, If the magnetic flux density is increased by 0.2 T in a time of 0.01 s. Calculate the electromotive force that induced in the coil.

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(بقية الأسئلة فى الصفحة السابعة)

The third group questions from (19 - 27)

19) Answer (A) or (B):

(A) Choose the correct answer :

In Ballmer's series, on returning two electrons one of them from the fourth energy level that produces a photon of wave length (λ_1), frequency (υ_1) and energy (E_1). The another electron from the fifth energy level producing a photon of wave length (λ_2) , (υ_2) and energy (E_2) , then .....

1) $\lambda_1 > \lambda_2$ 2) $\upsilon_1 > \upsilon_2$ 3) $E_1 > E_2$

(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.

20) Answer (A) or (B):

(A) Choose the correct answer :

The measuring instruments in which the reading depends on a pointer are called .....

1) Analog instruments
2) Digital instruments
3) Analog digital instruments

(B) Choose the correct answer :

The ratio between the resistance of the current divider in the ammeter to the total resistance of the same ammeter ..... one

1) greater than 2) less than 3) equals to

(بقية الأسئلة فى الصفحة الثامنة)

21) Answer (A) or (B) :

(A) What is the role of the hollow cylinder that is splitted into two isolated halves and connected to the coil of the electric motor?

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(B) How can you explain ?

The increase in the temperature of a metallic core of a coil connected to alternating current source .

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22) Give reason for :

The current of the base in the transistor is very small.

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23) Choose the correct answer :

If the resistance of the coil of galvanometer equals (R) then the value of the current divider resistor needed to decrease the sensitivity of the galvanometer to quarter equal .....

1) R 2) R/2 3) R/3

24) Choose the correct answer:

The energy of the produced photon from the spontaneous emission is ..... the energy of the photon that is used in the excitation of the atom

1) more than 2) less than 3) equal to

(بقية الأسئلة فى الصفحة التاسعة)

25) Choose the correct answer :

From the devices in which eddy currents are used.....

1) the electric transformer

2) the induction furnaces

3) the dynamo

26) Choose the correct answer :

On connecting two resistors (4R) and (R) in parallel to a source of direct current so that the power dissipated in the resistor (4R) is ..... the power dissipated in the resistor (R).

1) 4 times 2) half 3) quarter

27) Choose the correct answer :

A copper wire of length (ℓ) is shaped in the form of a circular coil consists of (3) turns and connected to a battery so that the magnetic flux density at the center of the coil was (B_1) . if the wire is reshaped in the form of a coil consists of (9) turns and connected to the same battery the magnetic flux density at the center of the coil was (B_2) . then the ratio between $\frac{B_1}{B_2}$ equals.....

1) $\frac{1}{3}$ 2) $\frac{1}{9}$ 3) $\frac{3}{1}$

Fourth group (28 -36)

28) Answer (A) or (B):

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

"**The** opposition of the conductor to the flow of the electric current through it".

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

The reciprocal of the resistivity.

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(بقية الأسئلة فى الصفحة العاشرة)

29) Answer (A) or (B)

(A) What is the role of the two spiral springs in the galvanometer? (One point only)

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(B) What is the role of the potential multiplier in the voltmeter? (One point only)

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30) Answer (A) or (B):

(A) Choose the correct answer :

The direction of the induced e.m.f. in the dynamo's coil can be determined by using .....

1) Lenz's rule 2) Amber's right hand rule 3) Fleming's right hand rule

(B) Choose the correct answer :

The magnetic dipole moment of the coil of the electric motor when its plan is parallel to the magnetic field ..... after the rotation of the coil and its plan becomes perpendicular to the magnetic field.

1) decreases 2) increases 3) remains constant

31) Choose the correct answer :

the spectral line series produced from the hydrogen atom in visible light zone is called .....

1) Pfund's series 2) Paschen's series 3) Balmer's series

32) Choose the correct answer:

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

1) the velocity of the moving wire
2) the direction of the magnetic field lines
3) the direction of the motion of the wire

(بقية الأسئلة فى الصفحة الحادية عشر)

33) Write down the scientific term:

The attractive force that prevents the electrons to escape from the surface of the metals .

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34) Choose the correct answer:

Two parallel wires the intensity of the current passes in each of them is (I) in two opposite directions, if the intensity of the magnetic flux produced from one of the two wires at the mid points between the two wires equals (B) then the total magnetic flux density at the mid-point between the two wires equals .....

1) B 2) 2B 3) Zero

35) If the magnitude of the induced e.m.f. in the dynamo's coil when its plan makes an angle 60^{o} with the magnetic field lines equals 100 Volts. **Find** the magnitude of the average induced e.m.f. in the coil during quarter cycle from the perpendicular position.

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36) 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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(بقية الأسئلة فى الصفحة الثانية عشر)

Fifth group (37 – 45)

37) Answer (A) or (B):

(A) Define :

The Tesla.

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(B) Define:

The magnetic flux density at a point.

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38) Answer (A) or (B):

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

The spectrum that results due to the transfer of the electron from the excited levels to the lower energy levels.

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(B) Right down the name of the device:

That is used to obtain pure spectrum.

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39) Answer (A) or (B):

(A) Choose the correct answer:

Laser beam is used in three dimensional imaging because the photons of laser are.....

1) Highly monochromatic. 2) Highly coherent. 3) Highly intense.

(B) Choose the correct answer:

The emission that responsible for producing laser is.....

1) line emission. 2) stimulated emission. 3) spontaneous emission.

(بقية الأسئلة فى الصفحة الثالثة عشر)

40) Choose the correct answer:

The equivalent measuring unit for the Henry is.....

1) Ω.s 2) V.s 3) Ω.C.

41) Choose the correct answer:

The digit in the decimal system that corresponding to $(11001)_2$ code in the binary System is .....

1) 20 2) 25 3) 30

42) Give reason for:

The wave length associated to the motion of the electron beam in the electron microscope decreases as the potential difference applied on it increases.

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43) Mention the reason:

The wire that is carrying a current and placed along the interior axis of solenoid carrying current doesn't affect by a magnetic force.

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44) 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%

45) How can you decrease the loss in the electric energy of the transformer?

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(انتهت الأسئلة)