ARAB REPUBLIC OF EGYPT [٧٩] ث.ع / أول / ج

Ministry of Education

General Secondary Education Certificate Examination, 2011

[Second Stage – First Session]

PHYSICS **Time: 3 Hours**

الفيزيـاء [باللـغـة الإنجـلـيـزية]

تنبيه هام : يسلم الطالب ورقة امتحانية باللغة العربية مع الورقة المترجمة **[الأسئلة فى أربع صفحات]**

Answer FIVE questions only from the following:

Question[1]

A- Mention one use for each of the following:

1- The mercury barometer.
2- Dewar's flask
3- The electric motor.
4- The multiplier resistor in voltmeter

B- Explain the scientific idea on which the function of the following is based:

1- The optical fibers **2**- Laser **3**- Induction furnaces

C- A light ray falls on the face of a triangular prism with a 45^o angle and emerges from the other side with a 52^o angle. Given that the refractive index for the prism material is **1.5**, **calculate** the angle of the prism.

Question[2]

A- What's meant by each of the following:

1- Coefficient of viscosity of a liquid.
2- The dispersive power for a triangular prism.
3- Hologram.
4- Work function.

B- Write down the equivalent unit of the following and mention the physical quantities that are measured by each of them:

1- Henry **2**- N/m^2 **3**- $weber/m^2$

C- A step down transformer of **100%** efficiency, has **600** turns on its secondary coil used to operate a device of power **48 watt** and potential difference **24 volt**, using an electric source of e.m.f **200 volt. Calculate:**

1-The number of turns in the primary coil.
2- Current intensity in the secondary coil.
3- Current intensity in the primary coil.

[بقية الأسئلة فى الصفحة الثانية]

Question[3]

A- Write down the scientific concept for each of the following:

1- The ratio between the cross-sectional area of large piston to the cross-sectional area of small piston in hydraulic press.
2- Scale deflection per unit current intensity through the coil of the galvanometer.
3-The wavelength at maximum radiation intensity is inversely proportional to temperature.
4- Superposition between two waves of same amplitude, but their frequencies are slightly different.

B- Mention the factors affecting the force acted on a straight wire carrying current in a normal magnetic field then:

1- Write the mathematical relation between the force and these factors.
2- Deduce a definition for magnetic flux density.

C- A gas of volume **30 cm^3**, its pressure **75 cm Hg** and its temperature **300k.** Concerning the laws of gases, complete the shown table.

Pressure in cm.Hg	Volume in cm^3	Temperature in Celsius
76	.....	27
74	20	.....
.....	30	57

Question[4]

A- Mention the necessary condition for the occurrence of each of the following:

1- The equality of the incidence angle for a light ray and the angle of emergence on a triangular prism.
2- Vanishing of the electric resistance in some metals.
3- The release of electron out of the metal surface when light falls on it.
4- Vanishing of the induced current in a straight wire moving in a uniform magnetic field.

[بقية الأسئلة فى الصفحة الثالثة]

B- Compare between each of the following:

1- Fleming's left hand rule and Ampere's right hand rule (with respect to application).

2- Spontaneous emission and stimulated emissions (with respect to occurrence).

3- Destructive interference and constructive interference (with respect to path difference).

C- A spherical balloon of volume **4000 cm^3** contains helium at an (inside) pressure of **1.2×10^5 P_a**. How many moles of helium are in the balloon if the average kinetic energy of helium atoms is **3.6×10^{-22} J**? (given that Boltzmann constant = **1.38×10^{-23} J/k** & universal gas constant = **8.31J/mole.k**)

Question[5]

A- Choose the correct answer from those between brackets:

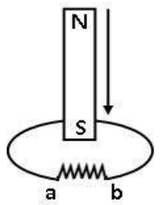
1- The wavelength of the fourth harmonic tone for a vibrating string is given from the relation. λ = ……

($\frac{2\ell}{5}$ - $\frac{\ell}{2}$ - $\frac{2\ell}{3}$ **)**

2- Monochromatic means that laser has ……

(one wavelength - a band of wavelengths - doesn't obey inverse square law **)**

3- In the opposite figure, if the bar magnet is being moved towards the loop, the potential of point (a) should be …… the potential of point (b).



(greater than - less than - equal to **)**

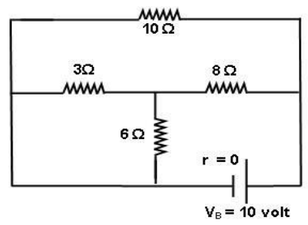
4- The ratio between the photon energy after collision to its energy before collision is …… in Compton Effect.

(greater than one - equal one - less than one **)**

B- Prove that; in steady flow, the velocity of the liquid at any point in the tube is inversely proportional to cross-sectional area of the tube at that point.

[بقية الأسئلة فى الصفحة الرابعة]

C- From the shown circuit, calculate:



1- The equivalent resistance of the circuit.

2- The total current intensity passing through the circuit.

3- The electric current intensity passing through 6 Ω.

Question[6]

A- What are the implications of each of the following?

1- The transfer of sound waves from a gas medium of less density to a denser gas medium.

2- The increase of the distance between the two slits in Thomas Young's experiment for interference of light.

3- Passing of electric current in the same direction in two parallel wires.

4- The replacement of two metallic rings by a metallic cylinder split into two insulated halves in dynamo.

B- Explain **with drawing** an experiment to show that equal volumes of different gases expand equally when heated through the same of temperature rise at constant pressure.

C- The following table illustrates the relation between the pressure **(P)** at a point inside the water of a lake and the depth **(h)** of this point below the water surface.

P (bar)	1.4	1.8	2.2	2.6	3
h (meters)	4	8	12	16	20

Draw a graph between the pressure **(P)** on the Y-axis and the depth **(h)** on the X-axis. From the graph, **find:**

1- The value of the atmospheric pressure in Pascal.

2- The density of lake water given that **$g = 10\ m/s^2$**.

[انتهت الأسئلة]