

نموذج رقم (١)

الأزهر الشريف

قطاع المعاهد الأزهرية

نموذج إجابة

لامتحان الشهادة الثانوية الأزهرية

للعام الدراسي

١٤٤٢/١٤٤١ هـ - ٢٠١٩/٢٠٢٠ م

الدور الثاني

القسم : العلمي

مادة: الفيزياء (مترجم)

علماً بأن النموذج استرشادياً

نموذج إجابة مادة الفيزياء (مترجم) للشهادة الثانوية الأزهرية
(٢٠٢٠/٢٠١٩) (الدور الثاني) نموذج ()

النموذج استرشادي وتراعى الإجابات الأخرى الصحيحة

Question (1)				
No.	Answer		Mark	
(A)	1-	(b)	1	
	2-	(a)	1	
	3-	(c)	1	
	4-	(c)	1	
(B)	5-	If $X_L > X_C$ [OR: the total voltage leads the current].	1	
	6-	If the coil's plane normal to the magnetic field.	1	
	7-	If an external resistance double of the total resistance of the device connected to its ends.	1	
	8-	If its wire is wound.	1	
(C)	9-12	At the point (b): $I_1 + I_2 = I_3$ (1)	$\frac{1}{2}$	
		In the closed path (1): $4I_1 + 3I_2 = 12$ (2)	1	
		In the closed path (2): $2I_2 + 3I_3 = 6$ (3)	1	
		By solving (1), (2) and (3) $\therefore I_1 = \frac{21}{13} A = 1.615 A$ $I_2 = \frac{3}{13} A = 0.231 A$ $I_3 = \frac{24}{13} A = 1.846 A$	$1\frac{1}{2}$	
		($\frac{1}{2}$)	($\frac{1}{3}$)	($\frac{1}{2}$)

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Question (2)

No.	Answer	Mark
(A)	1- (a)	1
	2- (c)	1
	3- (a)	1
	4- (c)	1
(B)	5-6 1-Replacing the two metallic rings by a hollow metallic cylinder split into halves well isolated from each other. 2- Using many coils separated by small angles and the hollow metallic cylinder is pliting into a number of segments double the number of coils.	2
	7-8 1- The core is made from siliconic soft iron. 2- The core is made of thin insulated sheets. [OR: wires of the two coils made from metallic wires of least ohmic resistance].	2
(C)	9-10 $\therefore B = \frac{\mu IN}{2r} \therefore B = \frac{4\pi \times 10^{-7} \times 5 \times 10}{0.2} \therefore B = \pi \times 10^{-4} T = 3.14 \times 10^{-4} T$	2
	11-12 $\therefore R_m = \frac{V - V_g}{I_g} \therefore R_m = \frac{20 - (0.1 \times 10^{-3})}{10^{-3}} \therefore R_m = 19999.9 \Omega$	2

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Question (3)

No.	Answer	Mark
(A)	1- (c)	1
	2- (c)	1
	3- (c)	1
	4- (b)	1
(B)	5- It means that the direct current intensity that generates the same electric power as that generated by AC current in the same resistance = 20 A	1
	6- It means that the total work done inside and outside the cell to transfer an electric charge of 1C in its electric circuit = 12J OR: It means that the potential difference across poles of the cell in case of no current in its circuit (switch is opened) = 12 V	1
	7- It means that the electric charge on one plate of the capacitors which produced a potential difference between the two plates of 1v = 10^{-6} C OR: It means that the ratio between the electric charge on one of the two plates of the capacitor to the potential difference between them = 10^{-6} C/V	1
8-	It means that the minimum energy needed to liberate an electron from the metal surface without gaining kinetic energy = 8×10^{-19} J	1
(C)	9-10 $\therefore \tau = BIAN \sin\theta$ $\therefore \tau = \sqrt{2} \times 1 \times 10^{-2} \times 200 \times \frac{1}{\sqrt{2}} \therefore \tau = 2N.m$	2
	11-12 $\therefore \text{emf} = -L \frac{\Delta I}{\Delta t}$ $\therefore \text{emf} = -0.2 \times \frac{(1-0)}{0.1} \therefore \text{emf} = 2 V$	2

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Question (4)			
No.	Answer		Mark
(A)	1-	(a)	1
	2-	(c)	1
	3-	(c)	1
	4-	(c)	1
	5-	Plank's Constant (h)	1
	6-	$\frac{P}{A}$	1
(B)	7-8	<p>When a beam of photons of energy ($h\nu$) falls on a surface at rate of (ϕ_L) (photon/sec), then reflects.</p> <p>- Each photon suffering a change in its linear momentum = $2mc$</p> <p>- The rate of the change of the linear momentum oh photon bean = $2 mc \phi_L = 2 h\nu/c \phi_L = 2mc\phi_L$</p> <p>Which equals the force applied by photons beam on the surface</p> <p>$\therefore F = 2 \left(\frac{h\nu}{c}\right) \phi_L \therefore F = \frac{2P_w}{c}$ ($P_w = h\nu\phi_L$)</p>	2
(C)	9-10	$\therefore P_L mc = \frac{h\nu}{c} \therefore P_L = \frac{3.2 \times 10^{-19}}{3 \times 10^8} \therefore P_L = 1.066 \times 10^{-27} \text{ kg. m/s.}$	2
	11-12	$\therefore F = \frac{\mu I_1 I_2 \ell}{2\pi d} \therefore F = \frac{4\pi \times 10^{-7} \times 20 \times 10 \times 1}{2\pi \times 0.1} \therefore F = 4 \times 10^{-4} \text{ N}$	2

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النموذج استرشادي وتراعى الإجابات الأخرى الصحيحة

Question (5)

No.	Answer	Mark
(A)	1- Decreases	1
	2- Increases	1
	3- Decreases	1
	4- Decreases	1
(B)	5- It protects the galvanometer from being damaged. OR: It increases the measuring range of the galvanometer. OR: It makes the resistance of the whole device becomes very small so that the measures current doesn't affect.	1
	6- Dynamo Poles.	1
	7- Control the circuit frequency to resonate with the supply frequency.	1
	8- It continuously pulling the hot wire.	1
(C)	9-10 - Across the coil ends.	1
	- Because it has an impedance $Z_L = \sqrt{R^2 + X_L^2} > R$	1
	11-12 - When connected to the D.C source. - Because ⁱⁿ the case of AC source the effective value of the AC current is less than 20A. $[I_{eff} = \frac{I_{max}}{\sqrt{2}} = \frac{20}{\sqrt{2}} = 14.14A < 20A]$	1 1