بسم الله الرحمن الرحيم

اللهم لا سهل الا ما جعلته سهلا وأنت تجعل الحزن إذا شئت سهلا

The University of Jordan
Faculty of Science
Department of Physics

2nd Semester 2013/2014
06/05/2014
3:00-4:00 pm

Physics-2 (0302102) / Second Exam

Name (in Arabic): [redacted] Instructor: د. معروف الصايغ

Registration No.: [redacted] Section: 2

-- Choose the closest correct answer and fill the Answer Table.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
a	b	c	c	d	e	d	a	c	a	c	d	a	e	d

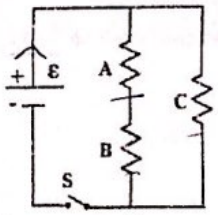
1. A 4.0 Ω resistor has a current of 4.0 A for 5.0 min. How many electrons pass through the resistor during this time interval? ($e = 1.6 \times 10^{-19}$ C)

a. 7.5×10^{21} b. 3.8×10^{21} c. 8.4×10^{21} d. 2.1×10^{21} e. 5.6×10^{21}

2. A conductor of radius r, length l and resistivity ρ has resistance R. It is melted down and formed into a new conductor, also cylindrical, with one fourth the length of the original conductor. The resistance of the new conductor is

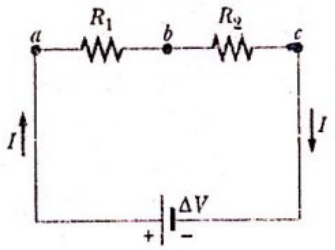
a. $\frac{1}{4}R$ b. $16R$. c. R d. $4R$ e. $\frac{1}{16}R$

3. The circuit shown contains three resistors, A, B, and C, which all have equal resistances. The *emf* ε = 110V. Which resistor generates the most thermal energy after the switch is closed?



a. A b. B c. C d. A and B
e. All three generate equal amounts of thermal energy.

4. If a piece of conducting wire is used to connect points b and c in the circuit shown, the brightness (توهج) of the light bulb R_1 will

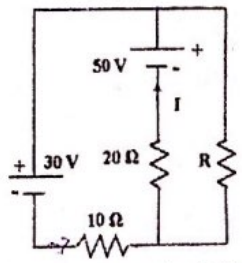


a. decrease.

b. increase.

c. remain the same.

5. Determine the magnitude and direction of the current in the 10 Ω resistor when $I = 1.9$ A.

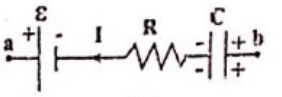


a. 1.6 A, left to right. b. 1.8 A, right to left. c. 1.2 A, right to left.
d. 1.2 A, left to right. e. 1.8 A, left to right.

6. An electron moves in a circular path in a region of space filled with a uniform magnetic field B = 0.2 T. To double the radius of the electron's path, the magnitude of the magnetic field must become:

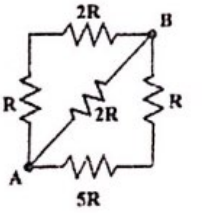
a. 0.8 T. b. 0.2 T. c. zero. d. 0.3 T e. 0.1 T.

7. If $R = 4.0\ \text{k}\Omega$, $C = 3.0\ \text{mF}$, $\varepsilon = 9\ \text{V}$, $Q = 12\ \text{mC}$, and $I = 2.0\ \text{mA}$, what is the potential difference $V_b - V_a$ in the circuit segment shown?



a. +8 V b. -19 V c. -3.0 V d. +3 V e. -8 V

8. What is the equivalent resistance between points A and B in the figure when $R = 25\ \Omega$?

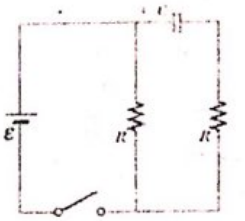


a. 25 Ω b. 10 Ω c. 20 Ω d. 15 Ω e. 3.2 Ω

9. Two resistors (R_1 and R_2) are connected in series across a potential difference. R_1 has twice the resistance of R_2. If the current carried by R_1 is I, then the current carried by R_2 is:

a. I/2. b. 4I. c. 2I. d. I. e. I/4.

10. Consider the circuit in the figure shown and assume that the battery has no internal resistance. If the switch is closed for a very long time, the current in the battery is



a. zero b. $\varepsilon/2R$ c. ε/R d. $2\varepsilon/R$ e. impossible to determine

11. Which of the following statements is a characteristic of both electric and magnetic forces?

a. The force exerted on a stationary charged object is nonzero.
b. The force exerted on a stationary charged object is zero.
c. The force exerted on a charged object is proportional to its speed.
d. Positive and negative charges feel forces in opposite directions.
e. None of the above.

$F_B = qvB$

$F = m\frac{v^2}{r}$

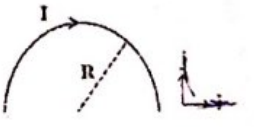
12. An electron moves in the plane of this paper toward the top of the page. A magnetic field is also in the plane of the page and directed to the right. The direction of the magnetic force on the electron is

a. toward the top of the page. b. toward the bottom of the page.
c. toward the left edge of the page. d. into the page. e. out of the page.

13. A velocity selector consists of electric and magnetic fields described by the expressions $\vec{E} = E\hat{k}$ and $\vec{B} = B\hat{j}$, with $B = 20\ \text{mT}$. Find the value of E such that a 1.6×10^7 m/s electron moving in the negative x direction is undeflected.

a. 320 kV/m b. 160 kV/m c. 420 kV/m d. 120 kV/m e. 240 kV/m

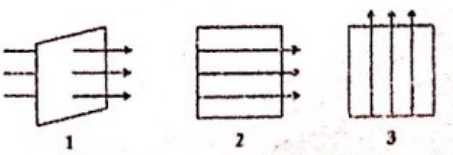
14. A wire is bent into a semicircle of radius R as shown. The wire carries a current (I) and lies in the xy-plane in a region of uniform magnetic field $\vec{B} = B\hat{j}$. Find the magnetic force acting on the wire.



a. $\pi RIB\hat{k}$ b. $-\pi RIB\hat{k}$ c. $2RIB\hat{k}$ d. $-2RIB\hat{k}$ e. zero.

15. A current loop and a uniform magnetic field are oriented in three different positions. In position 1 the plane of the loop is perpendicular to the field lines. In positions 2 and 3 the plane of the loop is parallel to the field as shown. The torque on the loop is zero in

a. position 1. b. position 2. c. position 3.
d. positions 2 and 3. e. all three positions.



-- ALL THE BEST --