second

BIRZEIT UNIVERSITY

Physics 132

Coordinator: Tayseer AROURI

2nd. H. EXAM — **2nd Sem. 2012**

TIME: 85 min — **22.4.2012**

Student Name: [redacted] Student No.: [redacted]

ضع إشارة (X) في كل من المربع المقابل لمدرس شعبتك ودائرة على رقم الشعبة.

	المدرس	الشعبة		المدرس	الشعبة
☑	تيسير عاروري	1 , 2, 5	☐	يعقوب عنيني	3, 6
☐	غسان عباس	7, 8	☐	رائد حسن	4 , 9 , 10
☐			☐		

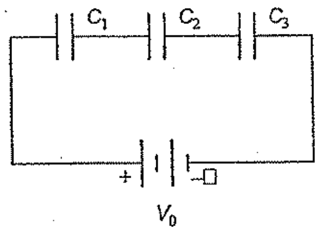
تعليمات:

1) لا تفتح ورقة الامتحان حتى يسمح لك بذلك.
2) اكتب اسمك ورقمك في أعلى هذه الصفحة.
3) اختر الجواب الأكثر قربا للجواب الصحيح وانقله على هذه الصفحة، وذلك بوضع إشارة (X) في الخانة المناسبة.
4) السؤال الذي له أكثر من إجابة يعطى علامة صفر.
5) يجب إعادة أوراق الامتحان كاملة.
6) عدد الأسئلة 17 سؤالا.

10

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A							X		X	X						X	
B	X			X										X			
C			X								X	X					
D		X				X									X		
E					X			X					X				X

Determine the energy stored in C_1 when $C_1 = 10\ \mu F$, $C_2 = 12\ \mu F$, $C_3 = 15\ \mu F$, and $V_o = 80$ V.



A) 6.5 mJ
B) 5.1 mJ
C) 3.9 mJ
D) 8.0 mJ
E) 9.8 mJ

If 5.0×10^{21} electrons pass through a 30 ohm resistor in 10 min, what is the potential difference across the resistor?

A) 15 V
B) 67 V
C) 27 V
D) 35 V
E) 40 V

A certain substance has a dielectric constant of 4.7 and a dielectric strength of 16 MV/m. If it is used as the dielectric material in a parallel-plate capacitor, the minimum area should the plates of the capacitor have to obtain a capacitance of 15 nF and to ensure (يضمن) that the capacitor will be able to withstand (يتحمل) a potential difference of 8.0 kV is:

A) 0.13 m^2
B) 0.37 m^2
C) 0.24 m^2
D) 0.18 m^2
E) 0.48 m^2

$\mu_0 = 4\pi \times 10^{-7}$ T.m /A $= 1.26 \times 10^{-6}$ T.m /A
$\varepsilon_o = 8.85 \times 10^{-12}$ C^2 / N.m^2
$e = 1.6 \times 10^{-19}$ C , $m_e = 9.1 \times 10^{-31}$ kg

1. How long will it take a charged 80-μF capacitor to lose 20% of its initial energy when it is allowed to discharge through a 75-ohm resistor?

A) 0.89 ms
B) 0.67 ms
C) 0.40 ms
D) 0.19 ms
E) 0.30 ms

2. A light bulb is rated at 100 W when operated (يشتغل، يعمل) at 120 V. How much charge enters (and leaves) the light bulb in 1.0 min?

A) 75 C
B) 15 C
C) 30 C
D) 50 C
E) 60 C

3. A 40-μF capacitor charged to 40 V and a capacitor C charged to 20 V are connected to each other, with the two positive plates connected and the two negative plates connected. The final potential difference across the 40-μF capacitor is 30 V. What is the value of the capacitance of C?

A) 40 μF
B) 25 μF
C) 80 μF
D) 55 μF
E) 120 μF

7. A velocity selector where $\vec{E} = E\hat{i}$ and $\vec{B} = B\hat{j}$, with B = 40 mT. If the selector is designed (صمم) to select 5 keV electrons, then the value of E is:

A) 21.0×10^5 V/m
B) 12.6×10^5 V/m
C) 8.4×10^5 V/m
D) 16.8×10^5 V/m
E) None of these

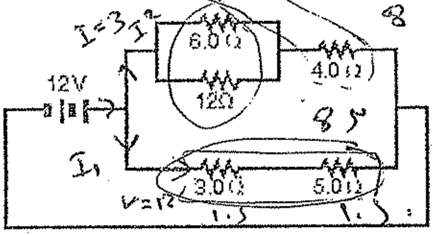
Copper contains 8.4×10^{28} free electrons/m^3. A copper wire of cross-sectional area 0.4 mm^2 carries a current of 6 A. The electron drift speed is approximately (تقريبا) :

A) 3×10^8 m/s
B) 1.1×10^{-3} m/s
C) 7.4×10^{-4} m/s
D) 1.5×10^{-3} m/s
E) 9.3×10^{-4} m/s

A charged oil drop with a mass of 6.0×10^{-3} kg is held suspended by an upward electric field of 400 N/C. The charge on the drop is:

A) $+3 \times10^{-4}$ C
B) -2×10^{-4} C
C) $+1.5 \times10^{-4}$ C
D) $+2 \times10^{-4}$ C
E) none of these

10. The current in the 5.0-Ω resistor in the circuit shown is:



A) 1.5 A
B) 2.4 A
C) 3.0 A
D) 1.0 A
E) none of these

11. A wire is 1 m long and 1 mm^2 in cross-sectional area. When connected to a potential difference of 3.2 V, a current of 8 A exists in the wire. The resistivity of this wire is:

A) $1 \times 10^{-7}\ \Omega \cdot m$
B) $2 \times 10^{-7}\ \Omega \cdot m$
C) $4 \times 10^{-7}\ \Omega \cdot m$
D) $5 \times 10^{-7}\ \Omega \cdot m$
E) $8 \times 10^{-7}\ \Omega \cdot m$

12. A battery of emf 40 V and internal resistance of 2-Ω is connected to an 18-Ω resistor. The terminal potential difference of the battery is:

A) 0
B) 45 V
C) 36 V
D) 18 V
E) 27 V

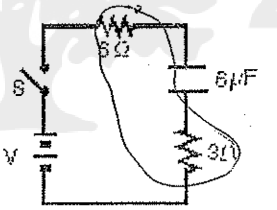
13. A wire 60 cm long lying along the x axis carries a current of 5 A in the positive x direction, through a magnetic field **B** = (0.05 T)**j** + (0.02 T)**k**. The force on the wire is:

A) - 0.08**j** + 0.12**k** N
B) 0.08**j** - 0.12**k** N
C) - 0.06**j** + 0.09**k** N
D) 0.8**j** + 0.12**k** N
E) none of these

14. Suppose the electric company charges 25 cents per kW·h. How much does it cost to use a 150 watt lamp 8 hours a day for 30 days? (1$ = 100 cents)

A) $ 1.20
B) $ 5.40
C) $ 9.0
D) $ 7.20
E) none of these

15. In the circuit shown, V = 63V and the capacitor is initially uncharged. At time t = 0, switch S is closed. If τ is the time constant, the approximate current through the 3 Ω resistor when
t = 3τ is:



A) 0.95 A
B) 0.35 A
C) 7.0 A
D) 0.13 A
E) none of these

16. An electron ($m = 9.1 \times 10^{-31}$ kg) with speed 8000 km/s is projected into a uniform magnetic field **B** of 0.2 mT with its velocity vector making an angle of 60° with **B**. The pitch of the path is:

A) 0.54 m
B) 0.80 m
C) 1.6 m
D) 0.71 m
E) none of these

17. In a Hall-effect experiment, a current of 3 A is sent through a copper strip, 8 cm long, 1 cm wide, and 1 mm thick. The magnetic field B is 0.4 T. Hall potential difference V is: (The number of charge carriers per unit volume for copper is 8.5×10^{28} electrons / m^3)

A) 2.8×10^{-8} V
B) 5.6×10^{-8} V
C) 1.2×10^{-7} V
D) 8.4×10^{-7} V
E) None of these

جامعة بيرزيت

BIRZEIT UNIVERSITY

-Physics Department-

Physics 132

2nd hour exam — **2nd Semester 2012/2013**

Time: 80:00 min — **Date:28 /4/2013**

Coordinator Ghassan Abbas

Student Name: Dana Ramahi **Student NO:.** 1110234

ضع علامة (X)هنا	Instructor Name	Section No.	
X	تيسير عاروري	1,2D	12:40 – 1:40
	غاده دوشق	3,4,5,6D	
	وفاء خاطر	7,9,10D	
	غسان عباس	8D	

Answer Sheet:

Q#	A	B	C	D	E
1					X
2		X			
3			X		
4	X				
5					X
6				X	
7		X			
8			X		
9		X			
10	X				
11			X		
12					X
13	X				
14				X	
15		X			
16					X
17				X	

15

$1\,eV = 1.6 \times 10^{-19}\,J$

$e = 1.6 \times 10^{-19} C$

$Me = 9.11 \times 10^{-31} kg$

$\epsilon_o = 8.85 \times 10^{-12}\ C^2/N.m^2$

$\mu_o = 4\pi \times 10^{-7}\ T.m/A$

Name: ________________________ Class: ___________________ Date: __________ ID: A

phys132-22-213

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. A parallel plate capacitor of capacitance C_0 has plates of area A with separation d between them. When it is connected to a battery of voltage V_0, it has charge of magnitude Q_0 on its plates. While it is connected to the battery, the space between the plates is filled with a material of dielectric constant 3. After the dielectric is added, the magnitude of the charge on the plates and the new capacitance are

a. $\frac{1}{3}Q_0, \frac{1}{3}C_0$
b. $Q_0, \frac{1}{3}C_0$
c. Q_0, C_0
d. $3Q_0, C_0$
e. $3Q_0, 3C_0$

____ 2. A certain parallel plate capacitor is filled with a dielectric material with κ=2.8 and a dielectric strength of 18MV/m ,the area of each plate is 0.63m^2,the capacitor will be able to withstand a potential difference of 4.0kV. The capacitance of this capacitor is :

a. 7.1×10^{-6}F
b. 7.1×10^{-8}F
c. 14×10^{-6}F
d. 2.5×10^{-8}F
e. 5.1×10^{-8}F

____ 3. An air-filled parallel-plate capacitor has a capacitance of 2.1 pF .The separation of the plates is doubled, and WAX is inserted between them . The new capacitance is 2.6pF .The dielectric constant of the WAX is :

a. 1.2
b. 0.8
c. 2.5
d. 5.0
e. 3.6

____ 4. How many electrons pass through a 20-Ω resistor in 10 min if there is a potential drop of 30 volts across it?

a. 5.6×10^{21}
b. 7.5×10^{21}
c. 9.4×10^{21}
d. 1.1×10^{21}
e. 3.8×10^{21}

Name: ____________________ ID: A

____ 5. Nadeen says that you can increase the resistance of a copper wire by making the wire narrower and longer. Aseel says that you can increase its resistance by heating the wire. Which one, if either, is correct, and why?

a. Aseel, because the resistivity of the wire increases when it is heated.
b. Aseel, because the resistivity of the wire decreases when it is heated.
c. Nadeen, because the resistivity of a wire is inversely proportional to its area and directly proportional to its length.
d. Nadeen, because the resistance of a wire is inversely proportional to its area and directly proportional to its length.
e. Both are correct because (a) and (d) are both correct.

____ 6. The current density in a cylindrical wire of radius R is varies with radial distance r as **J**=αr. The current in the wire is :

a. $2\alpha\pi R^3$
b. $2\alpha\pi R^2$
c. $\alpha\pi R^4/2$
d. $2\alpha\pi R^3/3$
e. $\alpha\pi R^2$

____ 7. A battery of emf 24 V is connected to a 6-Ω resistor. As a result, current of 3 A exists in the resistor. The internal resistance of the battery is:

a. 6-Ω
b. 2-Ω
c. 4-Ω
d. 3-Ω
e. zero

____ 8. A certain capacitor, in series with a 720-Ω resistor, is being charged. At the end of 10 ms its charge is half the final value. The capacitance is about:

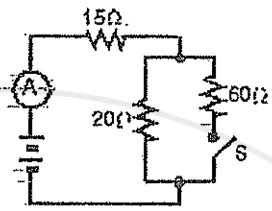
a. 9.6 μF
b. 14 μF
c. 20 μF
d. 7.2 F
e. 10 F

____ 9. A charged capacitor with Q_0 is being discharged through a resistor. At the end of two time constants the charge on the capacitor is :

a. 0.86 Q_0
b. 0.14 Q_0
c. 0.37 Q_0
d. 0.63 Q_0
e. 0.5 Q_0

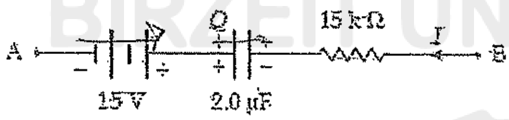
Name: ____________________ ID: A

____ 10. When switch S is open, the ammeter in the circuit shown reads 2.0 A. When S is closed, the ammeter reading:



a. increases slightly
b. remains the same
c. decreases slightly
d. doubles
e. halves

____ 11. Determine the potential difference, $V_A - V_B$, in the circuit segment shown below when $I = 2.0$ mA and $Q = 50\ \mu C$.



a. −40 V
b. +40 V
c. +20 V
d. −20 V
e. −10 V

____ 12. Aproton (charge = +1.6 × 10^{-19} C) is moving at 3 × 10^5 m/s in the positive x direction. A magnetic field of 0.8 T is in the positive z direction. The magnetic force on the ~~electron~~ is:

a. 0
b. 4 × 10^{-14} N in the positive z direction
c. 4 × 10^{-14} N in the negative z direction
d. 4 × 10^{-14} N in the positive y direction
e. 4 × 10^{-14} N in the negative y direction

____ 13. A deuteron is accelerated from rest through a 10-kV potential difference and then moves perpendicularly to a uniform magnetic field with B = 1.6 T. What is the radius of the resulting circular path? (deuteron: m = 3.3 × 10^{-27} kg, q = 1.6 × 10^{-19} C)

a. 12.7mm
b. 16 mm
c. 20.3 mm
d. 10 mm
e. 19.0 mm

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جامعة بيرزيت

BIRZEIT UNIVERSITY

-Physics Department-

-physics 132-

2nd Hour Exam
Time: 75 Minutes

First Summer 2103
7/7/2013

Student Name: [illegible]
Student Number: 1112279

ضع علامة (X) هنا	Instructor Name	Section No.
	عدنان عبد الباقي	4D
	وفاء خاطر	2،3D
X	غسان عباس	1D

Answer Sheet

Q#	A	B	C	D	E
1					X
2					X
3				X	
4		X			
5			X		
6					X
7				X	
8			X		
9	X				
10					X
11				X	
12				X	
13	X				
14	X				
15	X				
16					X

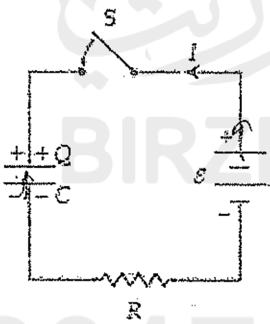
Name:____________________ Class:____________________ Date:__________ ID:

PHYS132-2ND

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Two parallel long wires carry the same current and repel each other with a force F per unit length. If both these currents are doubled and the wire separation tripled, the force per unit length becomes:
- a. $4F/9$
- b. $2F/9$
- c. $6F$
- d. $2F/3$
- e. $4F/3$

____ 2. At $t = 0$ the switch S is closed with the capacitor uncharged. If $C = 30\ \mu F$, $\varepsilon = 50$ V, and $R = 10$ kΩ, what is the potential difference across the capacitor when $I = 2.0$ mA?



- a. 25 V
- b. 20 V
- c. 45 V
- d. 15 V
- e. 30 V

____ 3. A conductor of radius r, length ℓ and resistivity ρ has resistance R. What is the new resistance if it is stretched to 4 times its original length?
- a. $4R$
- b. $\frac{1}{16}R$
- c. $\frac{1}{4}R$
- d. $16R$
- e. R

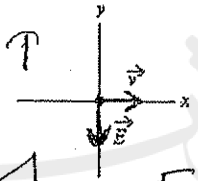
____ 4. To increase the current density in a wire of length ℓ and diameter D, you can
- a. decrease the potential difference between the two ends of the wire.
- b. increase the potential difference between the two ends of the wire.
- c. decrease the magnitude of the electric field in the wire.
- d. heat the wire to a higher temperature.
- e. combine both (b) and (d).

Name: ______________________ ID:

5. A 4.0-mF capacitor initially charged to 50 V and a 6.0-mF capacitor charged to 30 V are connected to each other with the positive plate of each connected to the negative plate of the other. What is the final charge on the 6.0-mF capacitor?

a. 12 mC
b. 20 mC
c. 230 mC
d. 10 mC
e. 8.0 mC

6. An electron is travelling in the positive x direction. A uniform electric field $\vec{E}$ is in the negative y direction. If a uniform magnetic field with the appropriate magnitude and direction also exists in the region, the total force on the electron will be zero. The appropriate direction for the magetic field is:



a. the positive y direction
b. the negative y direction
c. the negative x direction
d. out of the page
e. into the page

7. At one instant an electron (charge = -1.6×10^{-19} C) is moving in the xy plane, the components of its velocity being $v_x = 5 \times 10^5$ m/s and $v_y = 3 \times 10^5$ m/s. A magnetic field of 0.8 T is in the positive x direction. At that instant the magnitude of the magnetic force on the electron is:

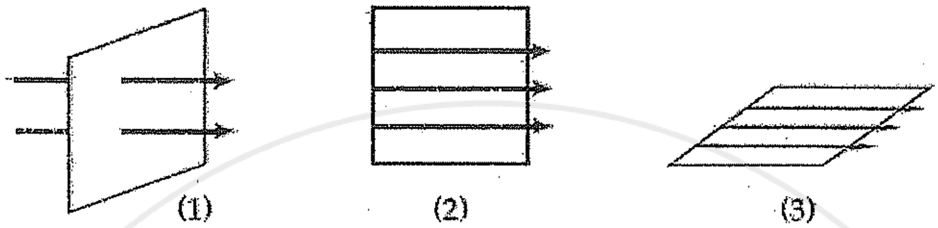
a. 6.4×10^{-14} N
b. 2.6×10^{-14} N
c. 0
d. 3.8×10^{-14} N
e. 1.0×10^{-13} N

8. A parallel-plate capacitor of capacitance C_0 has plates of area A with separation d between them. When it is connected to a battery of voltage V_0, it has charge of magnitude Q_0 on its plates. While it is connected to the battery the space between the plates is filled with a material of dielectric constant 3. After the dielectric is added, the magnitude of the charge on the plates and the potential difference between them are

a. $\frac{1}{3}Q_0, \frac{1}{3}V_0$
b. $Q_0, \frac{1}{3}V_0$
c. $3Q_0, V_0$
d. $3Q_0, 3V_0$
e. Q_0, V_0

Name: ______________________ ID:

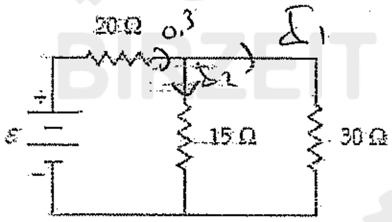
____ 9. A current loop is oriented in three different positions relative to a uniform magnetic field. In position 1 the plane of the loop is perpendicular to the field lines. In position 2 and 3 the plane of the loop is parallel to the field as shown. The torque on the loop is maximum in



(1) (2) (3)

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

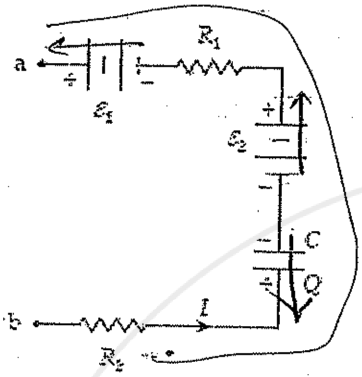
____ 10. What is the current in the 30-Ω resistor when $\varepsilon = 9.0$ V?



a. 0.30 A
b. 0.20 A
c. 0.26 A
d. 0.60 A
e. 0.10 A

Name: ____________________ ID: B

____ 11. If $\varepsilon_1 = 4.0$ V, $\varepsilon_2 = 12.0$ V, $R_1 = 4\ \Omega$, $R_2 = 12\ \Omega$, $C = 3\ \mu$F, $Q = 18\ \mu$C, and $I = 2.5$ A, what is the potential difference $V_a - V_b$?



$V_a - \mathcal{E}_1 + I_1R_1 - \mathcal{E}_2 + V_c + I_2R_2 = V_b$

$V_a - V_b = \mathcal{E}_1 - I_1R_1 + \mathcal{E}_2 - V_c - I_2R_2$

$4 - 2.5 \times 4 + 12 - 6 - 2.5 \times 12$

a. −1.0 V
b. 5.0 V
c. 30 V
d. −30 V
e. −5.0 V

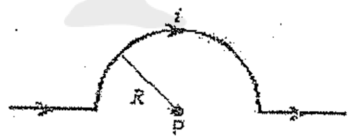
$C = \frac{q}{V}$ ⇒ $V = \frac{q}{C} = \frac{18}{3} = 6$

____ 12. An electron is launched with velocity $\vec{v}$ in a uniform magnetic field $\vec{B}$. The angle θ between $\vec{v}$ and $\vec{B}$ is between 0 and 90°. As a result, the electron follows a helix, its periodic time is:

a. $2\pi mv\cos\theta/eB$
b. $2\pi mv/eB$
c. $2\pi mv\sin\theta/eB$
d. $2\pi m/eB$
e. $2\pi r/v$

$T = \frac{2\pi m}{eB} = \frac{2\pi r}{v\sin\theta}$

____ 13. The magnitude of the magnetic field at point P, at the center of the semicircle shown, is given by:



a. $\mu_0 i/4R$
b. $2\mu_0 i/R^2$
c. $\mu_0 i/2\pi R$
d. $\mu_0 i/2R$
e. $\mu_0 i/4\pi R$

$B = \frac{\mu_0 i N}{2R} = \frac{\mu_0 i}{4R}$

____ 14. A 2.0-m wire carries a current of 15 A directed along the positive x axis in a region where the magnetic field is uniform and given by $B = (30\mathbf{i} - 40\mathbf{j})$ mT. What is the resulting magnetic force on the wire?

a. (−1.2 k) N
b. (−1.5 k) N
c. (+0.90 k) N
d. (+1.2 k) N
e. (+1.5 k) N

$i\,\vec{l} \times \vec{B}$

$15[(2\hat{i}) \times [(30\hat{i} - 40)\hat{j}]]\,10^{-3}$

80

$B = (30\hat{i} - 40\hat{j})$ mT

Name: ______________________ ID:

____ 15. A capacitor in a single-loop RC circuit is charged to 85% of its final potential difference in 2.4 s. What is the time constant for this circuit?

a. 1.3 s
b. 1.9 s
c. 1.5 s
d. 2.9 s
e. 1.7 s

____ 16. Two long straight wires enter a room through a window. One carries a current of 3.0 A into the room while the other carries a current of 5.0 A out. The magnitude in T·m of the path integral $\oint \vec{B}\cdot d\vec{s}$ around the window frame is:

a. 3.8×10^{-6} T · m
b. none of these
c. 1.0×10^{-5} T · m
d. 6.3×10^{-6} T · m
e. 2.5×10^{-6} T · m

جامعة بيرزيت

BIRZEIT UNIVERSITY

Physics 132

Coordinator: Tayseer AROURI

2nd. H. EXAM **2nd Sem. 2014**

Time: 80 min **25.5.2014**

Student Name: محمد فوزي ... Student No.: 1130840

ضع إشارة (X) في كل من المربع المقابل لمدرس شعبتك ودائرة على رقم الشعبة.

	المدرس	الشعبة		المدرس	الشعبة
☐	تيسير عاروري	2	☐	اسماعيل بدران	1 , 5 , 6
☐	غسان عباس	3 ' 8 ' 11	☐	لميس نداف	7 , 9
☐	وفاء خاطر	4 ' 10	☐		

S 10-11

تعليمات:

1) لا تفتح ورقة الامتحان حتى يسمح لك بذلك.
2) اكتب اسمك ورقمك في أعلى هذه الصفحة.
3) اختر الجواب الأكثر قربا للجواب الصحيح وانقله على هذه الصفحة، وذلك بوضع إشارة (X) في الخانة المناسبة.
4) السؤال الذي له أكثر من إجابة يعطى علامة صفر.
5) يجب إعادة أوراق الامتحان كاملة.
6) عدد الأسئلة **14** سؤالاً.

	1	2	3	4	5	6	7	8	9	10	11	12	13
A		X	X										
B					X								
C							X	X	X		X	X	
D						X							
E	X			X						X			X

13
3/4

17/17

$\varepsilon_0 = 8.85 \times 10^{-12}\ C^2 / N.m^2$

$e = 1.6 \times 10^{-19}\ C$

1. A battery of emf 24 V and internal resistance 2-Ω is connected to a 6-Ω resistor. The terminal potential difference of the battery is:

A) 30 V
B) 24 V
C) 0
D) 36 V
E) 18 V

2. In a Hall-effect experiment, a current of 6.0 A is sent through a copper strip, 8 cm long, 1 cm wide, and 0.5 mm thick. The magnetic field B is 0.51 T. Hall potential difference V:
(The number of charge carriers per unit volume for copper is 8.5×10^{28} electrons / m^3)

A) 4.5×10^{-7}
B) 1.5×10^{-7}
C) 2.5×10^{-6}
D) 6.0×10^{-7}
E) 1.25×10^{-5}

3. An electron ($m = 9.1 \times 10^{-31}$ kg) with speed 800 km/s is projected into a uniform magnetic field **B** of 0.02 T with its velocity vector making an angle of 60° with **B**. The radius of the path is:

A) 1.97×10^{-4} m
B) 4.6×10^{-2} m
C) 3.94×10^{-4} m
D) 5.1×10^{-6} m
E) 2.3×10^{-5} m

4. By using only two resistors, R_1 and R_2 (one of them or both of them), a student is able to obtain resistances of 9 Ω, 12 Ω, 36 Ω, and 48 Ω. The values of R_1 and R_2 (in ohms) are:

A) 3, 16
B) 16, 32
C) 8, 24
D) 10, 40
E) 12, 36

5. An electron ($m = 9.1\text{x}10^{-31}$ kg) with speed $6\text{x}10^{6}$ m/s is projected into a uniform magnetic field **B** of 0.45 T with its velocity vector making an angle of 60^{o} with **B.** the pitch of the path is:

A) $3.2\ \text{x}10^{-4}$ m
B) $2.4\ \text{x}10^{-4}$ m
C) $4.8\ \text{x}10^{-4}$ m
D) $9.5\ \text{x}10^{-3}$ m
E) $1.6\ \text{x}10^{-4}$ m

6. A parallel-plate capacitor has a plate separation of 0.1 mm. The charge on each plate has a magnitude of $4\text{x}10^{-6}$ C and the potential difference across the plates is 300V. The energy density between the plates is:

A) 70.8 J/m^3
B) 17.7 J/m^3
C) $4\text{x}10^{-4}$ J
D) 39.8 J/m^3
E) 35.4 J/m^3

7. A certain substance has a dielectric constant of 3.5 and a dielectric strength of 16 MV/m. If it is used as the dielectric material in a parallel-plate capacitor, the minimum area should the plates of the capacitor have to obtain a capacitance of 5 nF and to ensure that the capacitor will be able to withstand a potential difference of 8.0 kV is:

A) 0.63 m^2
B) 0.11 m^2
C) 0.081 m^2
D) 1.1 m^2
E) 0.145 m^2

8. When 240 V is applied across a wire that is 8 m long and has 0.30 mm radius, the current density is 1.5×10^4 A/m^2 . The resistivity of the wire is:

A) 1.5×10^{-3} Ω·m
B) 4.5×10^{-4} Ω·m
C) 2.0×10^{-3} Ω·m
D) 4.0×10^{-3} Ω·m
E) 8.2×10^{-4} Ω·m

9. A wire 1.0 m long lying along the x axis carries a current of 5 A in the positive x direction, through a magnetic field
$\mathbf{B} = (0.030\ \text{T})\mathbf{j} + (0.020\text{T})\mathbf{k}$. The force on the wire is:

A) - 0.8**j** N
B) - 0.08**j** + 0.12**k** N
C) - 0.1**j** + 0.15**k** N
D) 0.08**j** + 0.12**k** N
E) - 0.16**j** + 0.24**k** N

10. Copper contains 8.4×10^{28} free electrons/m^3. A copper wire of cross-sectional area 0.4 mm^2 carries a current of 16.8 A. The electron drift speed is :

A) 3.9×10^{-3} m/s
B) 3×10^{8} m/s
C) 10^{-4} m/s
D) 7.8×10^{-4} m/s
E) 3.1×10^{-3} m/s

11. A certain capacitor, in series with a 120 Ω resistor, is being charged. At the end of 5 ms its charge is half the final value. The capacitance is about:

A) 9.6 μF
B) 30 μF
C) 60 μF
D) 15 μF
E) 20 μF

12. A velocity selector where **E** = E**i** and **B** = B**j**, with B = 40 mT. If the selector is designed to select 5 keV electrons, then the value of E is:

A) 4.2×10^{5} V/m
B) 12.6×10^{5} V/m
C) 16.8×10^{5} V/m
D) 2.4×10^{4} V/m
E) 8.4×10^{5} V/m

13. A 220 potential difference is applied to a lamp whose resistance is 242 ohms. If the price for 1 kW.h is 0.2 $, then the cost to operate the lamp for one week is:

A) 2.0 $
B) 28.8 $
C) 38.5 $
D) 10.5 $
E) 6.7 $

17

جامعة بيرزيت
BIRZEIT UNIVERSITY

Physics 132

Second Hour Exam | Summer, 2014 | Time: 80 minutes

Student Name: Renad Refat Ahmad Sharif Student No.: 1130592.

Please read these instructions and remarks before starting the exam:

- Write your name and student number in the above box.
- The exam consists of 17 multiple choice problems, answer all of them.
- Mark the correct answers of the multiple choice problems on the answer sheet.
- Turn in the whole exam sheets.
- Select the section you are registered in by inserting a ✓ mark beside the section

✓	Sec	Instructor	Time
	1	Ghassan Abbas	MTWR 09:30-10:50
	2	Wafaa Khater	MTWR 12:50-01:50
✓	3	Ghassan Abbas	MTWR 08:00-09:20
	4	Aziz Shawabkeh	MTWR 12:50-01:50

Some useful formulae and constants:

1) $\vec{F} = q\vec{v} \times \vec{B}$	5) $\vec{J} = ne\vec{v}_d$
2) $\vec{F} = i\vec{l} \times \vec{B}$	6) $e = 1.6 \times 10^{-19}$ C
3) $V = \varepsilon(1 - e^{-\frac{t}{RC}})$	7) $\varepsilon_o = 8.85 \times 10^{-12}$ F/m
4) $R = \frac{\rho L}{A}$	

Answer Sheet:

Q#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(a)			X										X				
(b)							X	X		X					X	X	
(c)	X	X										X		X			
(d)				X	X				X								X
(e)						X					X						

$t = 10\,ms$

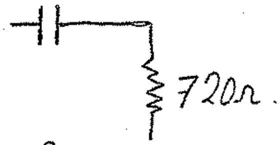
$\frac{1}{2}q = q(1-e^{-t/RC})$

$1 = 2 - 2e^{-t/RC} \Rightarrow 2e^{-t/RC} = 1$

$e^{-t/RC} = \frac{1}{2}$

$\frac{t}{RC} = 0.693$

$\frac{10\times10^{-3}}{720\,C} = 0.693$



$10\times10^{-3} = 498.96C \Rightarrow C = 2\times10^{-5}\,F$

1) A certain capacitor, in series with a 720 Ω resistor, is being charged. At the end of 10 ms its charge is half the final value. The capacitance is about:

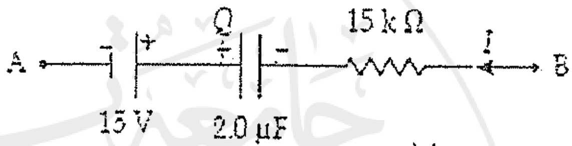
A)	9.6 µF
B)	14 µF
(C)	20 µF $2\times10^{-5} = 20\,\mu F$
D)	7.2 µF
E)	10 µF

$C = \frac{Q}{V}$, $V = \frac{Q}{C}$

2) Determine the potential difference, $V_B - V_A$, in the circuit segment shown when I = 2.0 mA and Q = 50 µC.

$V_b - 15\times10^{3}\times2\times10^{-3} + \frac{50\times10^{-6}C}{2\times10^{-6}} - 15 = V_a$

A)	-40 V
B)	+40 V
(C)	+20 V
D)	-20 V
E)	-10 V



$V_b - 20 = V_a \Rightarrow V_b - V_a = 20V$

3) A proton (mass = 1.67×10^{-27} kg, q = 1.6×10^{-19} C) is accelerated to a speed of 2.0×10^{6} m/s and then moves perpendicularly to a uniform magnetic field with B = 1.6 T. What is the radius of the resulting circular path?

$qvB = \frac{mv^2}{R} \Rightarrow R = \frac{mv^2}{qvB} = \frac{mv}{qB} = 0.013\,m \times 1000 = 13\,mm$

(A)	13.0 mm
B)	16.0 mm
C)	20.3 mm
D)	24.0 mm
E)	19.0mm

4) A conductor of radius r, length L and resistivity ρ has resistance R. What is the new resistance if it is stretched to 2 times its original length? r, L, ρ, R_1 $R_2 = ??$ $L_2 = 2L$

A)	R/16
B)	R/4
C)	R
(D)	4R
E)	16R

$A = \pi r^2$, $R = \frac{\rho L}{A}$, $R_2 = \frac{\rho\, 2L}{A/2}$

$V_1 = V_2 \Rightarrow \pi r^2 L = \pi R^2 2L$, $R = \frac{r}{\sqrt{2}}$, $A_2 = \pi R^2 = \frac{A}{2}$

$L_2 = 2L_0$, $A_2 = \frac{A_0}{2}$, $R = \frac{\rho\, 2L_0}{A_0/2} = 4\frac{\rho L_0}{A_0}$

5) A 4.0 mF capacitor initially charged to 50 V and a 6.0 mF capacitor charged to 30 V are connected to each other with the positive plate of each connected to the negative plate of the other. What is the final charge on the 6.0 mF capacitor?

A)	20 mC
B)	8.0 mC
C)	10 mC
(D)	12 mC
E)	230 mC

$q_1 + q_2 = q_1' + q_2'$

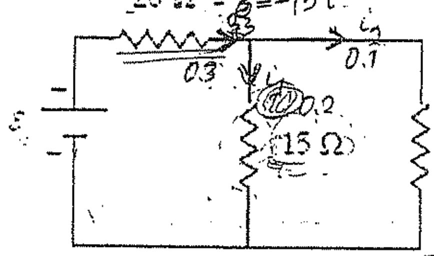
$0.2 - 0.18 = q_1' + q_2' = 0.02\,C$

$C = \frac{q}{V}$, $q = CV$

$V = \frac{q_1'}{C_1} = \frac{q_2'}{C_2} \Rightarrow \frac{0.02 - q_2}{4\times10^{-3}} = \frac{q_2}{6\times10^{-3}}$

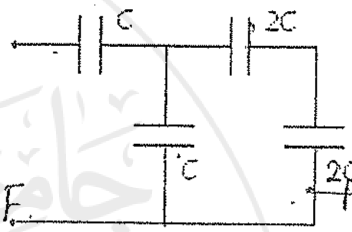
$6\times10^{-3}(0.02 - q_2) = 4\times10^{-3}q_2$

6) At what rate is thermal energy generated in the 15 Ω resistor when $\varepsilon = 9$ V



A)	0.20 Watt
B)	0.30 Watt
C)	0.10 Watt
D)	0.26 Watt
E)	0.60 Watt

7) Determine the equivalent capacitance of the combination shown when C = 48μF.



A)	30 μF
B)	32 μF
C)	34 μF
D)	36 μF
E)	38 μF

8) A certain parallel plate capacitor is filled with a dielectric material with κ=2.8 and a dielectric strength of 18MV/m, the area of each plate is 0.63 m^2; the capacitor will be able to withstand a potential difference of 4.0 kV. The capacitance of this capacitor is :

A)	7.0×10^{-6} F
B)	7.0×10^{-8} F
C)	14×10^{-6} F
D)	2.5×10^{-8} F
E)	5.1×10^{-8} F

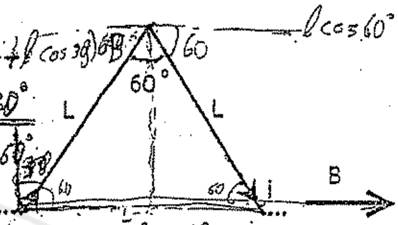
9) The current density in a cylindrical wire of radius R varies with radial distance r as J=cr, where c is a constant. The current in the wire is:

A)	$2c\pi R^3$
B)	$2c\pi R^2$
C)	$c\pi R^4/2$
D)	$2c\pi R^3/3$
E)	$c\pi R^2$

10) How many electrons pass through a 20 Ω resistor in 1 min if there is a potential drop of 30 volts across it?

A)	5.6×10^{21}
B)	5.6×10^{20}
C)	9.4×10^{21}
D)	1.1×10^{22}
E)	3.8×10^{21}

11) A straight wire of length 2L is bent into the shape shown. A magnetic field B to the right acting on it. The net magnetic force on the wire is:



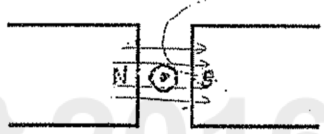
A)	*IBL* into the page
B)	*IBL* out of the page
C)	1.4 *IBL* out of the page
D)	1.7 *IBL* out of the page
E)	Zero

12) At one instant an electron is moving in the x-y plane, the components of its velocity being $v_x = 5\times10^5$ m/s and $v_y = 3\times10^5$ m/s. A magnetic field of 0.8 T is in the positive x direction. At that instant the magnitude of the magnetic force on the electron is:

A)	0
B)	2.6×10^{-14} N
C)	3.8×10^{-14} N
D)	6.4×10^{-14} N
E)	1.0×10^{-13} N

13) The diagram shows a straight wire carrying a current out of the page. The wire is between the poles of a permanent magnet. The direction of the magnetic force exerted on the wire is:

A)	↑
B)	↓
C)	↗
D)	→
E)	↙



14) You are facing a loop of wire which carries a clockwise current of 3.0 A and which surrounds an area of radius 0.1 m. The magnetic dipole moment of the loop is:

A)	3.00 A.m^2, into the page
B)	3.00 A.m^2, out of the page
C)	0.09 A.m^2, into the page
D)	0.09 A.m^2 out of the page
E)	0.17 A.m^2, from left to right

15) An isolated conducting sphere whose radius R is 5 cm has a charge q = 1.25 μC. The potential energy stored in the electric field of this charged conductor is

A)	0
B)	0.14 J
C)	1.4 mJ
D)	2.8 J
E)	2.8 μJ

$0.4\,cm^2 \times \frac{1m}{100\,cm}$ $= 0.4 \times 10^{-}$

16) The electron density in copper is 8.49×10^{28} electrons/m^3. When a 1.00 A current is present in a copper wire with a 0.40 cm^2 cross-section, the electron drift velocity, in m/s, is

A)	1.84×10^{-8}
(B)	1.84×10^{-6}
C)	1.84.
D)	5.43×10^{5}
E)	5.43×10^{-6}

$i = neAv_d$

$v_d = \frac{i}{neA}$

17) A parallel plate capacitor of capacitance C_0 was fully charged to a potential V_0 and charge Q_0 when connected to a battery. It is then disconnected from the battery and the plates are pulled apart to twice the plate separation without discharging them. After being pulled, the magnitude of the charge on the plates and the potential difference between the plates are

A)	$Q_0/2,\ V_0$ ✓
B)	$Q_0,\ V_0/2$ X
C)	$2Q_0,\ V_0$ X
(D)	$Q_0,\ 2V_0$ ✓
E)	$2Q_0,\ 2V_0$ X

C_0, V_0, Q_0, d, $2d$

$Q_0,\ 2V_0$

$C_0 = \frac{\varepsilon_0 A}{d}$

$Q = CV = \frac{C_0}{2} V_0 = \frac{Q_0}{2}$

$C = \frac{\varepsilon_0 A}{2d} = \frac{C_0}{2}$

$C = \frac{Q}{V}$

$Q_0 = C_0 V_0$

$Q = \frac{C_0}{2} V$

$Q = \frac{C_0}{2} \times \frac{2Q}{C_0}$

$V = \frac{Q_0}{C_0/2}$

$V = \frac{2Q}{C_0}$

$V = \frac{Q}{C} = \frac{Q_0}{2C_0} = 2V_0$

$V = \frac{Q}{C} = \frac{Q_0}{\frac{C_0}{2}}$

$V = \frac{2Q_0}{C_0} = 2V_0$

(16)

BIRZEIT UNIVERSITY

Physics 132

Second Hour Exam

Summer, 2014

Time: 80 minutes

Student Name: Hana' Halaseh   Student No.: 1110909

Please read these instructions and remarks before starting the exam:

- Write your name and student number in the above box.
- The exam consists of 17 multiple choice problems, answer all of them.
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	2	Wafaa Khater	MTWR 12:50-01:50
✓	3	Ghassan Abbas	MTWR 08:00-09:20
	4	Aziz Shawabkeh	MTWR 12:50-01:50

Some useful formulae and constants:

1) $\vec{F} = q\vec{v} \times \vec{B}$	5) $\vec{J} = ne\vec{v}_d$
2) $\vec{F} = i\vec{l} \times \vec{B}$	6) $e = 1.6 \times 10^{-19}$ C
3) $V = \varepsilon(1 - e^{-\frac{t}{RC}})$	7) $\varepsilon_o = 8.85 \times 10^{-12}$ F/m
4) $R = \frac{\rho L}{A}$	

Answer Sheet:

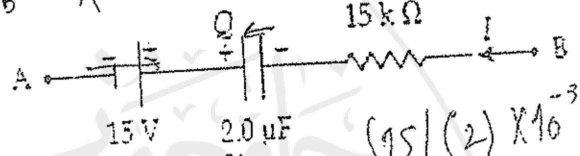
Q#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(a)			✓										✓				
(b)							✓	✓		✓					✓	✓	✓
(c)	✓	✓										✓		✓			
(d)				✓	✓				✓								
(e)						✓					✓						

1) A certain capacitor, in series with a 720 Ω resistor, is being charged. At the end of 10 ms its charge is half the final value. The capacitance is about:

A)	9.6 μF
B)	14 μF
C)	20 μF
D)	7.2 μF
E)	10 μF

2) Determine the potential difference, $V_B - V_A$, in the circuit segment shown when I = 2.0 mA and Q = 50 μC.

A)	-40 V
B)	+40 V
C)	+20 V
D)	-20 V
E)	-10 V



3) A proton (mass = 1.67×10^{-27} kg, q = 1.6×10^{-19} C) is accelerated to a speed of 2.0×10^{6} m/s and then moves perpendicularly to a uniform magnetic field with B = 1.6 T. What is the radius of the resulting circular path?

A)	13.0 mm
B)	16.0 mm
C)	20.3 mm
D)	24.0 mm
E)	19.0mm

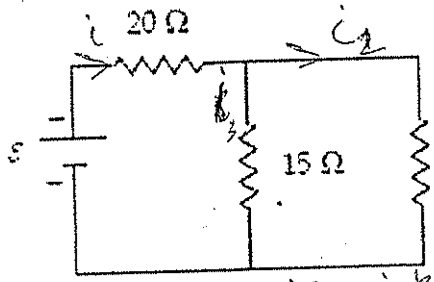
4) A conductor of radius r, length L and resistivity ρ has resistance R. What is the new resistance if it is stretched to 2 times its original length?

A)	R/16
B)	R/4
C)	R
D)	4*R*
E)	16*R*

5) A 4.0 mF capacitor initially charged to 50 V and a 6.0 mF capacitor charged to 30 V are connected to each other with the positive plate of each connected to the negative plate of the other. What is the final charge on the 6.0 mF capacitor?

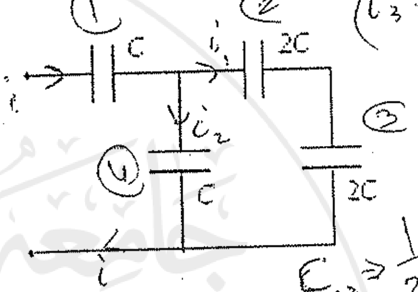
A)	20 mC
B)	8.0 mC
C)	10 mC
D)	12 mC
E)	230 mC

6) At what rate is thermal energy generated in the 15 Ω resistor when $\varepsilon = 9$ V



A)	0.20 Watt
B)	0.30 Watt
C)	0.10 Watt
D)	0.26 Watt
E)	0.60 Watt

7) Determine the equivalent capacitance of the combination shown when C = 48μF.



A)	30 μF
B)	32 μF
C)	34 μF
D)	36 μF
E)	38 μF

8) A certain parallel plate capacitor is filled with a dielectric material with κ=2.8 and a dielectric strength of 18MV/m, the area of each plate is 0.63 m^2; the capacitor will be able to withstand a potential difference of 4.0 kV. The capacitance of this capacitor is:

A)	7.0×10^{-6} F
B)	7.0×10^{-8} F
C)	14×10^{-6} F
D)	2.5×10^{-8} F
E)	5.1×10^{-8} F

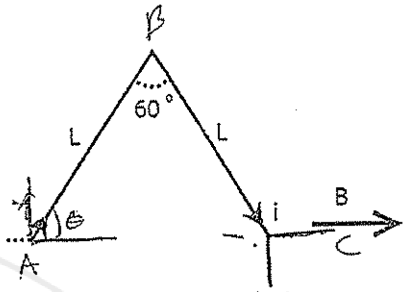
9) The current density in a cylindrical wire of radius R varies with radial distance r as J=cr, where c is a constant. The current in the wire is:

A)	$2c\pi R^3$
B)	$2c\pi R^2$
C)	$c\pi R^4/2$
D)	$2c\pi R^3/3$
E)	$c\pi R^2$

10) How many electrons pass through a 20 Ω resistor in 1 min if there is a potential drop of 30 volts across it?

A)	5.6×10^{21}
B)	5.6×10^{20}
C)	9.4×10^{21}
D)	1.1×10^{22}
E)	3.8×10^{21}

11) A straight wire of length 2L is bent into the shape shown. A magnetic field B to the right acting on it. The net magnetic force on the wire is:

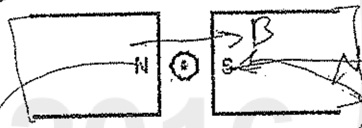


A)	*IBL* into the page
B)	*IBL* out of the page
C)	1.4 *IBL* out of the page
D)	1.7 *IBL* out of the page
E)	Zero

12) At one instant an electron is moving in the x-y plane, the components of its velocity being $v_x = 5\times10^5$ m/s and $v_y = 3\times10^5$ m/s. A magnetic field of 0.8 T is in the positive x direction. At that instant the magnitude of the magnetic force on the electron is:

A)	0
B)	2.6×10^{-14} N
C)	3.8×10^{-14} N
D)	6.4×10^{-14} N
E)	1.0×10^{-13} N

13) The diagram shows a straight wire carrying a current out of the page. The wire is between the poles of a permanent magnet. The direction of the magnetic force exerted on the wire is:



A)	↑
B)	↓
C)	↗
D)	→
E)	↙

14) You are facing a loop of wire which carries a clockwise current of 3.0 A and which surrounds an area of radius 0.1 m. The magnetic dipole moment of the loop is:

A)	3.00 A.m^2, into the page
B)	3.00 A.m^2, out of the page
C)	0.09 A.m^2, into the page
D)	0.09 A.m^2 out of the page
E)	0.17 A.m^2, from left to right

15) An isolated conducting sphere whose radius R is 5 cm has a charge q = 1.25 μC. The potential energy stored in the electric field of this charged conductor is

A)	0
B)	0.14 J
C)	1.4 mJ
D)	2.8 J
E)	2.8 μJ