Prince Sultan University

Department of Mathematics & Physics

PHY 205- General Physics2

Second Exam

First Semester, Term 121

Thursday 13/12/2012

Examination Time : 60 minutes

Name (Please Print)_____ Student I.D. _____

CONSTANTS:

$$k = 9\times10^{9}\ \frac{N.m^2}{C^2}\ ,\quad \varepsilon_o = 8.85\times10^{-12}\ \frac{C^2}{N.m^2}\ ,\quad \mu_o = 4\pi\times10^{-7}\ \frac{T.m}{A}$$

Important Instructions:

1. You can use a scientific calculator that does not have programming or graphing capabilities.

*2. You may **NOT** borrow a **calculator** from anyone.*

*3. Do not use **RED pen**.*

*4. This is a closed books and notes exam. Do **NOT** use notes or textbooks.*

*5. There should be **NO** talking during the examination.*

*6. Your will be **expelled** immediately from the exam if your mobile phone is seen or heard.*

*7. Any signs of **cheating** may cause you being expelled from the exam.*

*8. This examination has **2 parts**. **Part 1** has **5 multiple choice** questions, each question worth **1 point**. **Part 2** has **four** workout problems each problem worth **3 points.***

Make sure your paper has all the questions and problems.

	Possible Score	**Student's Score**	**Student's Total Score**
Part 1 Questions	**5**	**1 x**	
P. # 1	**3**		
P. # 2	**3**		
P. # 3	**3**		
P. # 4	**3**		
Total	**17**		**/15**

Part 1: 5 Multiple Choice Questions (1 mark each)

1- A particle of mass 3 g and charge 6 μC has a speed $7x10^{-3}$ m/s. It is desired to use a magnetic field of 0.5 T to bend the particle into a circle. What will be the radius of this circle?

a) 0.5 m b) 12 m c) 7 m d) 2 m

2- A proton enters a solenoid. Upon entry, the proton is moving in a straight line along the axis of the solenoid. Which of the following is a correct description of the proton's motion within the solenoid?

a)The proton will be bent in a circular path.

b)The proton will continue in its straight path at constant velocity.

c) The proton will continue in its straight path and slow down.

d)The proton will continue in its straight path and speed up.

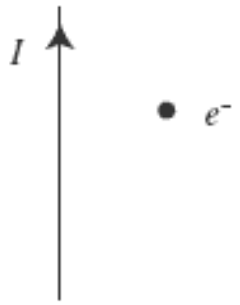
3- A wire carries a current toward the top of the page. An electron is located to the right of the wire, as shown above. In which direction should the electron be moving if it is to experience a magnetic force toward the wire?

a) into the page.

b) out of the page.

c) toward the bottom of the page.

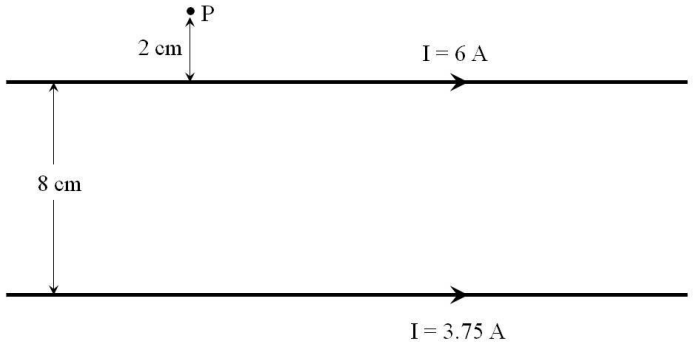
d) toward the top of the page.



4- The magnetic field produced at the centre of a current carrying circular wire is

a) directly proportional to the square of the radius of the circular wire
b) directly proportional to the radius of the circular wire
c) inversely proportional to the square of the radius of the circular wire
d) inversely proportional to the radius of the circular wire

5-Two long parallel wires 8 cm apart carry electric currents of 6 A and 3.75 A in the same direction. What is the magnitude of the net magnetic field at point P which is 2 cm away from the larger current as shown?



a) 6.75×10^{-5} T b) 5.25×10^{-5} T c) 6.75×10^{-4} T d) 5.25×10^{-4} T

Part 2: Solve the following four problems in the space provided in between showing all your steps (3 marks each)

Question 1(3 marks): An electric heater is rated at 1100 watt when operated at 220 volt.

a) How much charge passes through this electric heater in 3 minutes?

b) How many electrons pass through this electric heater in 3 minutes?

c) what is the resistance of this electric heater?

Question 2(3 marks): A 80 μf capacitor is connected to a 50 kΩ resistor thorough a battery of 200 volts. If the circuit is closed at t=0, find

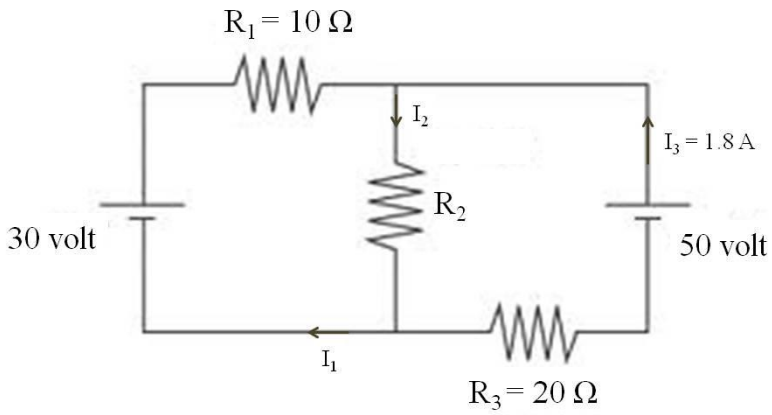
a) the time constant of the circuit.

b) the charge on the capacitor at t=2.5 s.

c) the current in the circuit at t=1.5 s'

Question 3(3 marks):

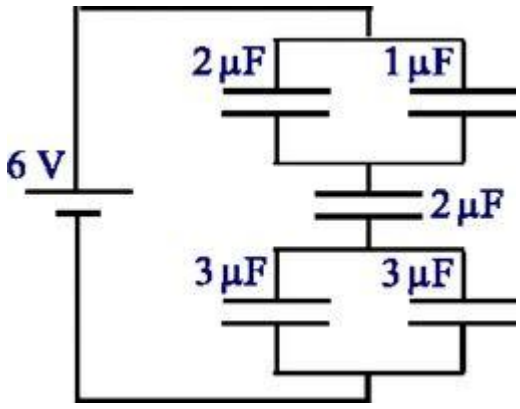
In the circuit shown, use Kirchhoff's rules to find the values of the unknowns R_2, I_1, I_2



Question 4(3 marks):

In the circuit shown, find

a) the equivalent capacitance in the circuit.



b) the charge and voltage on the middle 2 μf capacitor.