PHYS 102:General PhysicsII KOÇ UNIVERSITY Spring Semester 2014

College of Sciences

Section 2 Quiz 7 27 March 2014

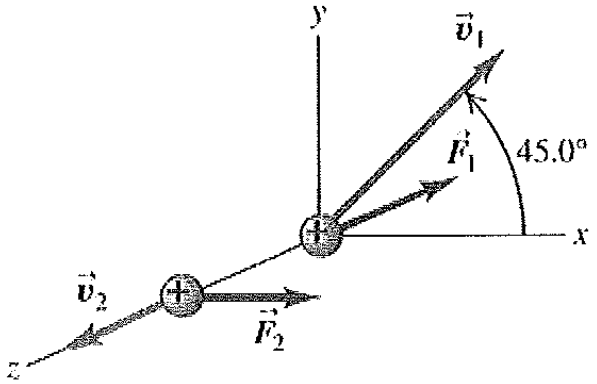
Closed book. No calculators are to be used for this quiz.
Quiz duration: 15 minutes

Name: **Student ID:** **Signature:**

When a particle of charge q>0 moves with a velocity of $\vec{v}_1$ at 45^0 from the x axis in the xy-plane, a uniform magnetic field exerts a force $\vec{F}_1$ along the –z-axis as shown in the figure. When the same particle moves with a velocity $\vec{v}_2$ with the same magnitude as $\vec{v}_1$ but along the +z-axis, a force $\vec{F}_2$ of magnitude F_2 is exerted along the +x-axis.

a) What are the magnitude (in terms of q, v, and F_2) and direction of the magnetic field?

b) What is the magnitude of $\vec{F}_1$ in terms of F_2?



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Section 3 Quiz 7 27 March 2014

Closed book. No calculators are to be used for this quiz.
Quiz duration: 15 minutes

Name: **Student ID:** **Signature:**

A particle with charge q is moving with speed v in the –y-direction. It is moving in a uniform magnetic field $\vec{B} = B_x\hat{i} + B_y\hat{j} + B_z\hat{k}$.

a) What are the components of the force $\vec{F}$ exerted on the particle by the magnetic field?

b) If $q>0$, what must the signs of the components of $\vec{B}$ if the components of $\vec{F}$ are all nonnegative?

c) If $q<0$, and $B_x = B_y = B_z > 0$, find the direction of $\vec{F}$ and find the magnitude of $\vec{F}$ in terms of $|q|$, v, B_x

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Section 4 **Quiz 7** **27 March 2014**

Closed book. No calculators are to be used for this quiz.
Quiz duration: 15 minutes

Name: **Student ID:** **Signature:**

A particle with charge q and initial velocity $\vec{v}_0 = v_{x0}\hat{\imath} + v_{y0}\hat{\jmath}$ enters a region of uniform electric and magnetic fields. The magnetic field in the region is $\vec{B} = B_x\hat{\imath} + B_z\hat{k}$.
Calculate the magnitude and direction of the electric field in the region if the particle is to pass through undeflected.

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Section 5 Quiz 7 27 March 2014

Closed book. No calculators are to be used for this quiz.
Quiz duration: 15 minutes

Name: Student ID: Signature:

A group of particles are travelling in a uniform magnetic field of unknown magnitude and direction. You observe that a proton moving at 1.00 km/s in the +x direction experience a force of $2.00\text{x}10^{-16}$ N in the +y direction, and an electron moving at 4.50 km/s in the –z direction experiences a force of 8.00×10^{-16} N in the +y direction.

a) What are the magnitude and direction of the magnetic field?
b) What are the magnitude and direction of the magnetic force on an electron moving in the –y direction at 3.00 km/s? ($e=1.60\times10^{-19}$ C)

(Neglect the other forces between the particles.)

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Section 6 Quiz 7 27 March 2014

Closed book. No calculators are to be used for this quiz.
Quiz duration: 15 minutes

Name: Student ID: Signature:

A particle with charge $7.00\mu C$ is moving with velocity $\vec{v} = -(3.00\times10^{-3} m/s)\,\hat{j}$. The magnetic force on the particle is measured to be $\vec{F} = +(7.00\times10^{-3} N)\hat{i} - (5.00\times10^{-3} N)\hat{k}$.

a) Calculate all the components of the uniform magnetic field your can from this information.
b) Are there components of the mahnetic field that are not determined by the measurement of the force? Explain.
c) Calculate the scalar product of $\vec{B}\cdot\vec{F}$. What is the angle between $\vec{B}$ and $\vec{F}$?

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Section 1 Quiz 7 27 March 2014

Closed book. No calculators are to be used for this quiz.
Quiz duration: 15 minutes

Name: Student ID: Signature:

A particle with charge -5.00 nC is moving in a uniform magnetic field $\vec{B}$ =-(1.50T)$\hat{k}$. The magnetic force on the particle is measured to be $\vec{F}$ =-$(3.00\times 10^{-7}N)\ \hat{i} + (7.00\times 10^{-7}N)\ \hat{j}$.

(a)Calculate all the components of the velocity of the particle that you can from this information .

(b) Are there components of the velocity that are not determined by the measurement of the force? Explain.

(c)Calculate the scalar product $\vec{v}\,.\,\vec{F}$. What is the angle between $\vec{v}$ and $\vec{F}$?