PHYS 102:General PhysicsII KOÇ UNIVERSITY Spring Semester 2016

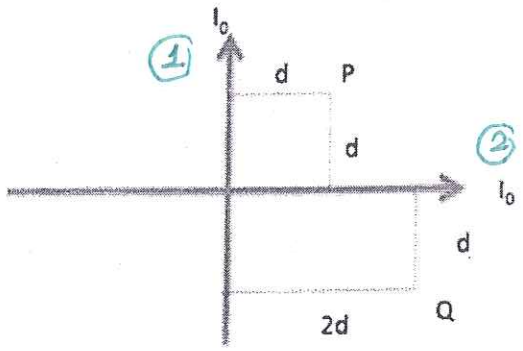
College of Sciences

Section 1 Quiz 8 07 April 2016

Closed book. No calculators are to be used for this quiz.
Quiz duration: 10 minutes

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

Two very long wires perpendicular to each other in the same plane carry currents as shown in the figure. Find the magnitude of the net magnetic field these wires produce at point P and Q.



The magnetic field generated by infinite wire is given by

$$B = \frac{\mu_0 I}{2\pi \ell}$$

ℓ has the dimension of length

at point P: $B_1(P) = -\frac{\mu_0 I_0}{2\pi d}$ (⊗)

$B_2(P) = \frac{\mu_0 I_0}{2\pi d}$ (⊙)

The net magnetic field at point P $B(P) = \frac{\mu_0 I_0}{2\pi d} - \frac{\mu_0 I_0}{2\pi d} = 0$

at point Q: $B_1(Q) = -\frac{\mu_0 I_0}{2\pi d}$ (⊗)

$B_2(Q) = -\frac{\mu_0 I_0}{4\pi d}$ (⊗)

The net magnetic field at point Q

$$B(Q) = B_1(Q) + B_2(Q) = -\frac{\mu_0 I_0}{2\pi d} - \frac{\mu_0 I_0}{4\pi d} = -\frac{3\mu_0 I_0}{4\pi d}$$

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Section 2 Quiz 8 07 April 2016

Closed book. No calculators are to be used for this quiz.
Quiz duration: 10 minutes

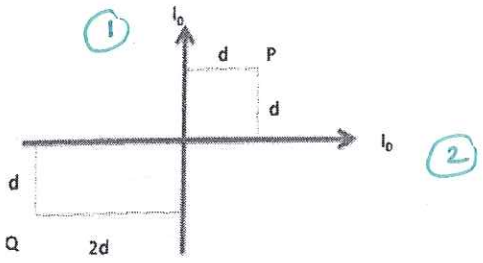
Name: **Student ID:** **Signature:**

Two very long wires perpendicular to each other in the same plane carry currents as shown in the figure. Find the magnitude of the net magnetic field these wires produce at point P and Q.

The magnetic field generated by infinite wire is

$$B = \frac{\mu_0 I}{2\pi \ell}$$

ℓ has the dimension of length



at point P: $B_1(P) = -\frac{\mu_0 I_0}{2\pi d}$ (x) $B_2(P) = \frac{\mu_0 I_0}{2\pi d}$ (·)

The net magnetic field

$$B(P) = B_1(P) + B_2(P) = -\frac{\mu_0 I_0}{2\pi d} + \frac{\mu_0 I_0}{2\pi d} = 0$$

at point Q: $B_1(Q) = +\frac{\mu_0 I_0}{4\pi d}$ (·) $B_2(Q) = -\frac{\mu_0 I_0}{2\pi d}$ (x)

The net magnetic field

$$B(Q) = B_1(Q) + B_2(Q) = -\frac{\mu_0 I_0}{2\pi d} + \frac{\mu_0 I_0}{4\pi d} = -\frac{\mu_0 I_0}{4\pi d}$$ (x)

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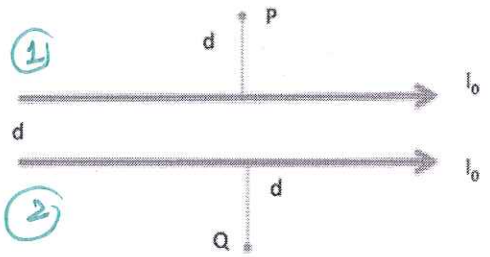
Section 3 **Quiz 8** **07 April 2016**

Closed book. No calculators are to be used for this quiz.
Quiz duration: 10 minutes

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

Two very long wires parallel to each other in the same plane carry currents as shown in the figure. Find the magnitude of the net magnetic field these wires produce at point P and Q.



The magnetic field produced by infinite (very long) wire is

$$B = \frac{\mu_0 I}{2\pi \ell}$$

ℓ has the dimension of length

at point P: $B_1(P) = \frac{\mu_0 I_0}{2\pi d}$ ⊙ $B_2(P) = \frac{\mu_0 I_0}{4\pi d}$ ⊙

The net magnetic field

$$B(P) = B_1(P) + B_2(P) = \frac{\mu_0 I_0}{2\pi d} + \frac{\mu_0 I_0}{4\pi d} = \frac{3\mu_0 I_0}{4\pi d}$$ ⊙

at point Q: $B_1(Q) = -\frac{\mu_0 I_0}{4\pi d}$ ⊗

$$B_2(Q) = -\frac{\mu_0 I_0}{2\pi d}$$ ⊗

The net magnetic field

$$B(Q) = B_1(Q) + B_2(Q) = -\frac{\mu_0 I_0}{4\pi d} - \frac{\mu_0 I_0}{2\pi d} = -\frac{3\mu_0 I_0}{4\pi d}$$ ⊗

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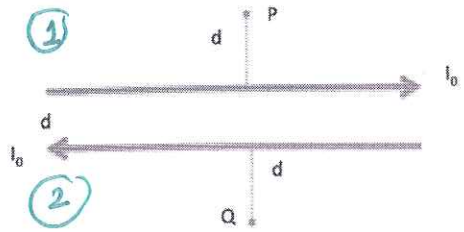
Section 4 **Quiz 8** **07 April 2016**

Closed book. No calculators are to be used for this quiz.
Quiz duration: 10 minutes

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

Two very long wires parallel to each other in the same plane carry currents as shown in the figure. Find the magnitude of the net magnetic field these wires produce at point P and Q.



The magnetic field produced by infinite wire (very Long) is

$B = \frac{\mu_0 I}{2\pi \ell}$ ℓ has the dimension of length

at point P: $B_1(P) = \frac{\mu_0 I_0}{2\pi d}$ ⊙ $B_2(P) = -\frac{\mu_0 I_0}{4\pi d}$ ⊗

The net magnetic field $B(P) = B_1(P) + B_2(P) = \frac{\mu_0 I_0}{4\pi d}$ ⊙

at point Q: $B_1(Q) = -\frac{\mu_0 I_0}{4\pi d}$ ⊗

$B_2(Q) = \frac{\mu_0 I_0}{2\pi d}$ ⊙

The net magnetic field at point Q is

$B(Q) = B_1(Q) + B_2(Q) = \frac{\mu_0 I_0}{4\pi d}$ ⊙