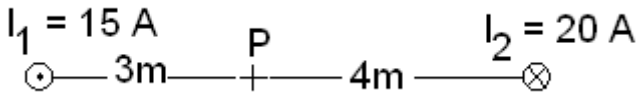
# Physics II

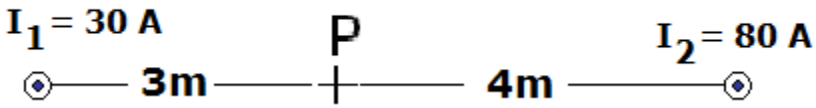
## Magnetic Field Production

Magnetic field produced by a long wire: $B = \frac{\mu_o I}{2\pi r}$, where $\mu_o = 4\pi \times 10^{-7} Tm/A$ and r is the distance to the wire.

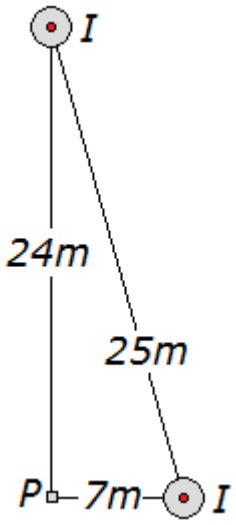
**Problem 1.-** Find the magnetic field at point "P" produced by the two long straight current carrying wires shown in the figure. Answer with magnitude and direction.



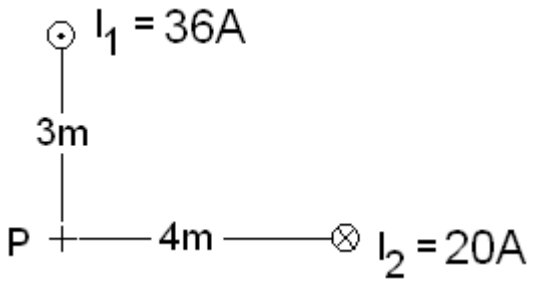

**Problem 1a.-** Find the magnetic field at point "P" produced by the two long straight current carrying wires shown in the figure. Answer with magnitude and direction.



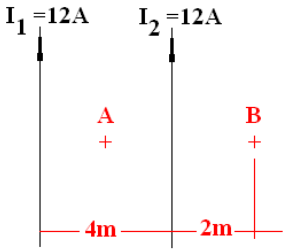

**Problem 2.-** Two long thin parallel wires are separated 25m and carry currents *I*=150A in the same direction. Calculate the magnetic field at a point *P* located 24m from one wire and 7m from the other.



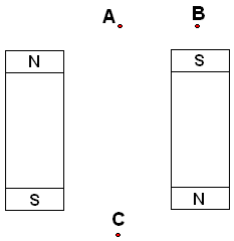
**Problem 2a.-** Find the magnetic field at point "P" produced by the two long straight current carrying wires shown in the figure:




**Problem 3.-** Calculate the magnetic field at points A and B produced by the long parallel wires shown in the figure. Point A is in the middle of the two wires.



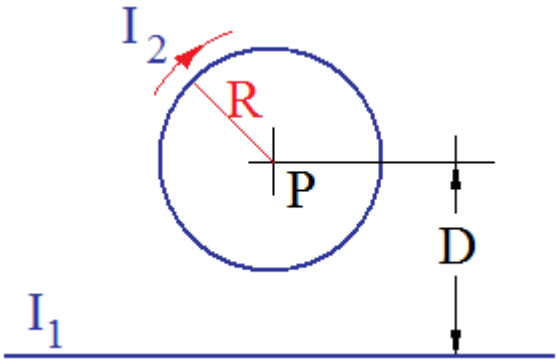

**Problem 4.-** Indicate the ***direction*** of the magnetic field at points **A**, **B** and **C** due to the two identical bar magnets.



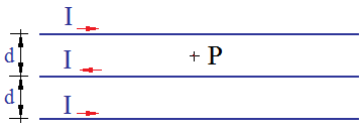

**Problem 5.-** Indicate if the following quantities are vectors or scalars and the units used to measure them:

(i) Electric potential: Vector or scalar? _____ Units? _____
(ii) Electric field Vector or scalar? _____ Units? _____
(iii) Magnetic field Vector or scalar? _____ Units? _____

**Problem 6.-** What must be the direction and magnitude of the current $I_1$ in the long straight wire if the magnetic field at P is zero?




**Problem 7.-** Three long wires carry the currents shown in the figure below. Calculate the magnetic field at P, which is the middle point between the two top wires. And calculate the magnetic force per unit length on the top conductor.




**Problem 8**.- Two wires are bent in the shape of semicircles of radius a as shown below. If the top wire has a resistance $2R$ and the bottom one $R$, find the magnetic field at the centers in terms of the total current I.