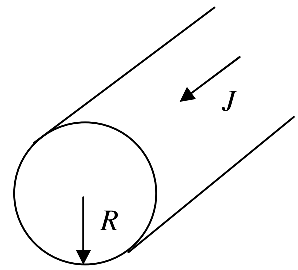
	UNIVERSITY OF GAZIANTEP DEPARTMENT OF ENGINEERING PHYSICS EP 106 General Physics II Second Midterm Exam Questions	04/08/2005 TIME 90 min. SUMMER SCHOOL

[1]. Figure shows a long copper wire having radius R. The current density parallel to the cylindircal axis in the wire is given by

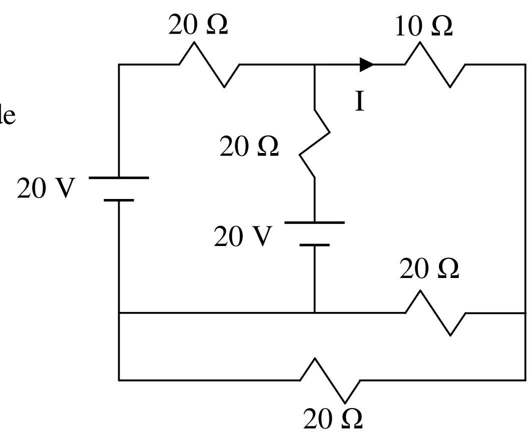
$$J(r) = \frac{r}{R}$$

where r is the distance from the cylindircal axis.

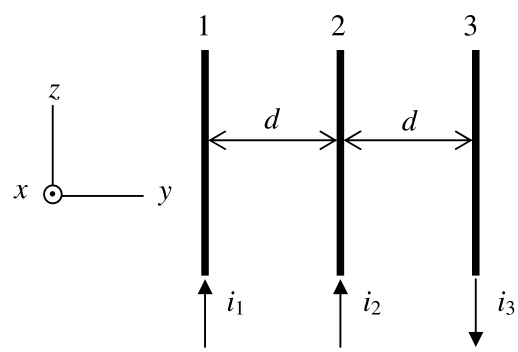


(a) What is the total current passing through the wire?
(b) What is the magnetic field at points where $r>R$?

[2].
For the circuit given right, what is the magnitude of the current the through 10 Ω resistor?



[3]. Three long wires that are parallel to each other carry currents i_1 = 10 A, i_2 = 5 A and i_3 = 20 A respectively, shown in Figure. The distance between the wires is d = 10 cm. Using unit vector notation, find
(a) the magnitude and direction of resulting magnetic field, **B**, acting on the second wire.
(b) the the magnitude and direction of the resulting magnetic force per unit length acting on the second wire.



[4]. A charged particle of charge q enters a region of uniform magnetic field B with a kinetic energy K moving at right angles to B. The orbit radius of the particle is r.
Find an expression for:
(a) the linear momentum of the particle in terms of B, q and r.
(b) the mass of the particle interms of B, q, r and K.
(c) the angular momentum of the particle in terms of B, q and r.

Constants:
e=1.6x10^{-19} C, k= 9x10^{9} N.m^2/C^2 , ε_o=8.85x10^{-12} C^2/N.m^2 , μ_o=4πx 10^{-7} T.m/A, 1μC = 10^{-6}C