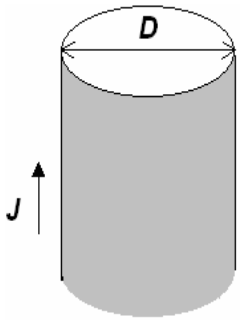
	UNIVERSITY OF GAZIANTEP **DEPARTMENT OF ENGINEERING PHYSICS** **EP 106 General Physics II** **Second Midterm Exam Questions**	**05/05/2005** **TIME 100 min.**

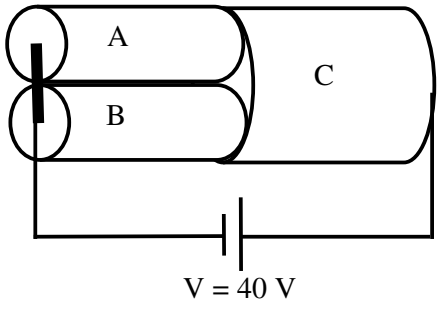
Q-1) Figure shows a long conducting wire whose diameter is D. A current density in the wire is $J(r) = kr$, where k is a constant and r is the distance from cylindrical axis, parallel to the axis of the wire as shown in Figure. Show that total current in the wire is given by:

$$i = \frac{k\pi D^3}{12}$$

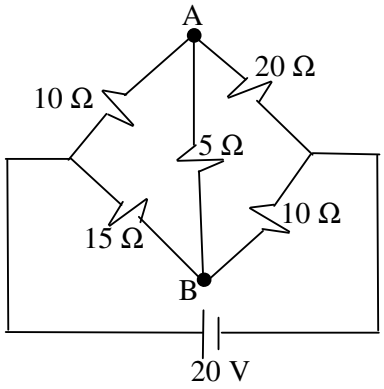


Q-2) The isolated two conductors A and B having equal length of 10m and a common radii of 2mm are connected in series to another conductor C having length of 5m and radius of 4mm as seen in figure. The resistivities of the conductors are $1.6\text{x}10^6$, $1.6\text{x}10^6$ and $3.2\text{x}10^6$ Ω-m, respectively. If a potential difference 40 volt is applied between the ends of the composite wire determine:

(a) the resistance value of each wire,
(b) the current density in each wire,
(c) the potential differences across each wire.

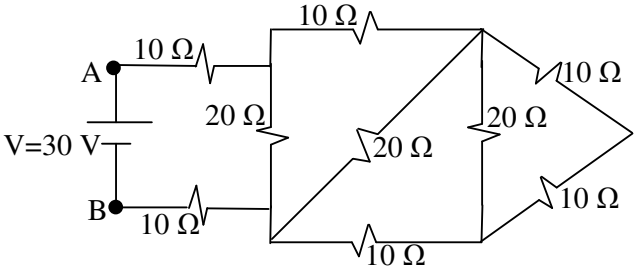


Q-3) Determine the voltage across the resistor connected between the points A and B for the circuit given below.



Q-4)

(a) What is the equivalent resistance between the points A and B in the circuit given below?
(b) What is the current through the equivalent resistance ?



Q-5) An RC circuit is discharged by closing a switch at time t=0. The initial potential difference across the capacitor is 100 V. If the potential difference has decreased to 10 Volt after 10 s, if C=0.05 μF.

(a) What is the time constant of the circuit?
(b) What will the potential difference across the capacitor after t=12 sec?
(c) What will the amount of charge be on each plate of the capacitor after t=12 sec?
(d) What is the current through the resistor after t=12 sec?