NAME: _____ **KP ITM:** _____

TEST 2 –– Set 2- April 2nd 2009

Answer ALL questions ON the paper provided to you. DO NOT USE ADDITIONAL PAPERS.

QUESTION 1 (32 marks)

a) Figure 1 shows an arrangement of resistors connected together. Obtain the (total) resistance for the circuit shown in Figure 1.

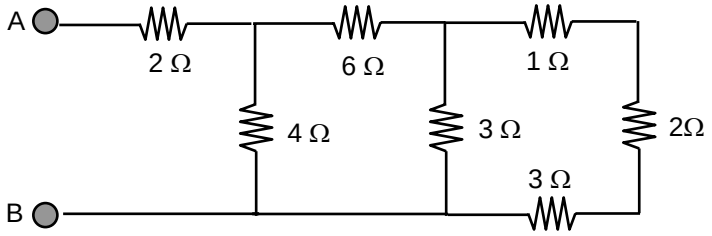
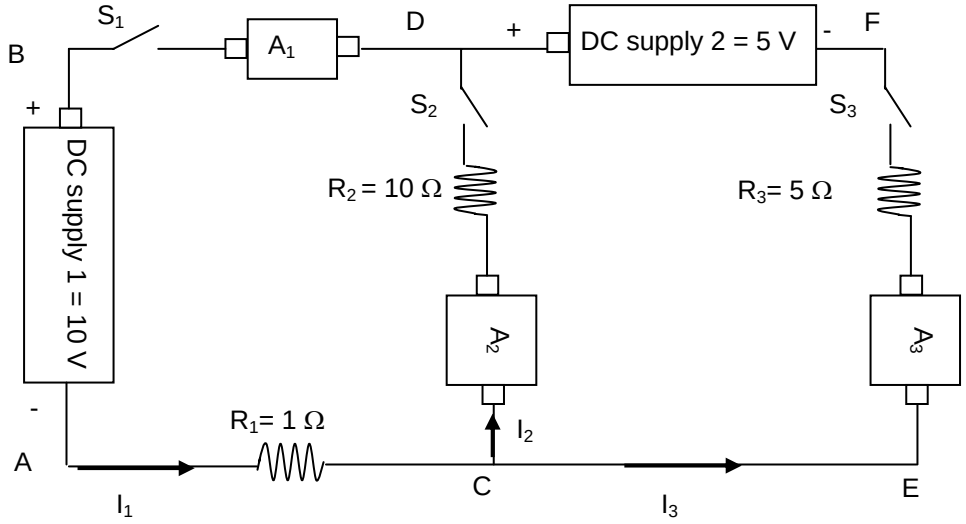


Figure 1

(10 marks)

b) Given the circuit below with switches S_1, S_2 and S_3 thrown down;



i) Label the '**+**' and '**–**' signs at the ends of each resistor to indicate the high and low potential.

ii) At junction D, apply Kirchoff's current law.

iii) Apply Kirchoff's voltage laws for loop BDCAB and for loop DFECD respectively using point B and D as your reference points.

iv) Use results of part (ii) and (iii) to determine the currents I_1, I_2, and I_3 registered by ammeters A_1, A_2 and A_3. Show ALL your work.

(3+3+6+8=20 marks)

QUESTION 2 (38 marks)

a) i) Draw the magnetic field lines in each of the configuration shown in Figure 3.
ii) For the long wire in Fig 3(ii), write the strength of the magnetic field and indicate the field direction halfway between the wires (let the separation be a distance ***a*** between the wires) due to the left wire and due to the wire on the right respectively.
iii) For the wire loop in Fig 3(iii), label the magnet's polarity and write the field intensity (strength) at the center of the wire loop.

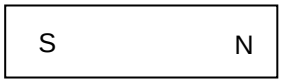
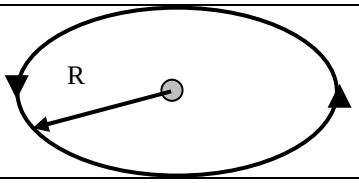
		
3(i) Permanent Magnet	3(ii) Top view of 2 long wires carrying current *I*	3(iii) A wire loop of radius R carrying current *I*

Figure 3

(9 marks)

b) For each of the configuration in Figure 4, draw the direction and write the magnetic field strength produced by each of the magnetic field source along the line of motion of the charged particle. Then determine the total magnetic field (direction and strength) along that line of motion. Finally, obtain the strength and the direction of the magnetic force exerted on the moving charge in terms of the charge *q*, the speed *v*, the current *I* and the distance *r*.

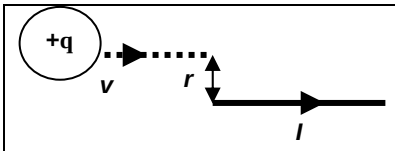
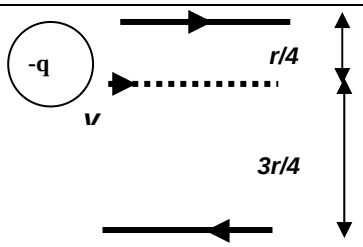
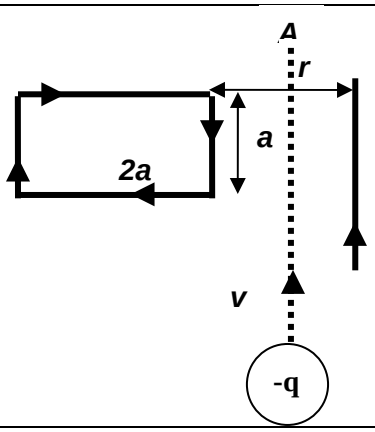
		
4(i) Charge +*q* passing near a long wire carrying current *I.*	4(ii) Charge -*q* passing in between wires carrying current *I* in opposing directions.	4(iii) Charge -*q* passing in between a wire loop carrying current *I* and a long wire carrying current *I.*

Figure 4

(19 marks)

STAY COOL AND DO NOT COPY