EXERCISE 1

Using the components, materials and equipment provided:

(a) Connect the circuit as shown in figure 1. (3 marks)

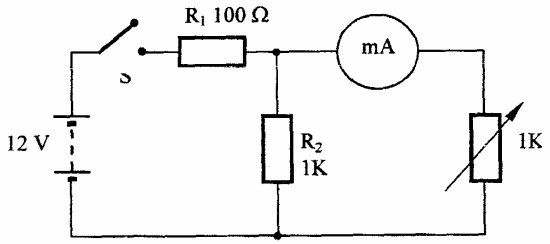


Figure 1

(b) With the switch S open, adjust the power supply to 12v. Let the examiner check your work. (1 mark)

(c) Adjust the variable resistor to obtain the current values shown in table 1. For each of the current values, measure and record the corresponding voltages.

Table 1

I (mA)	10	20	30	40	50	60
V_R (V)						

(6 marks)

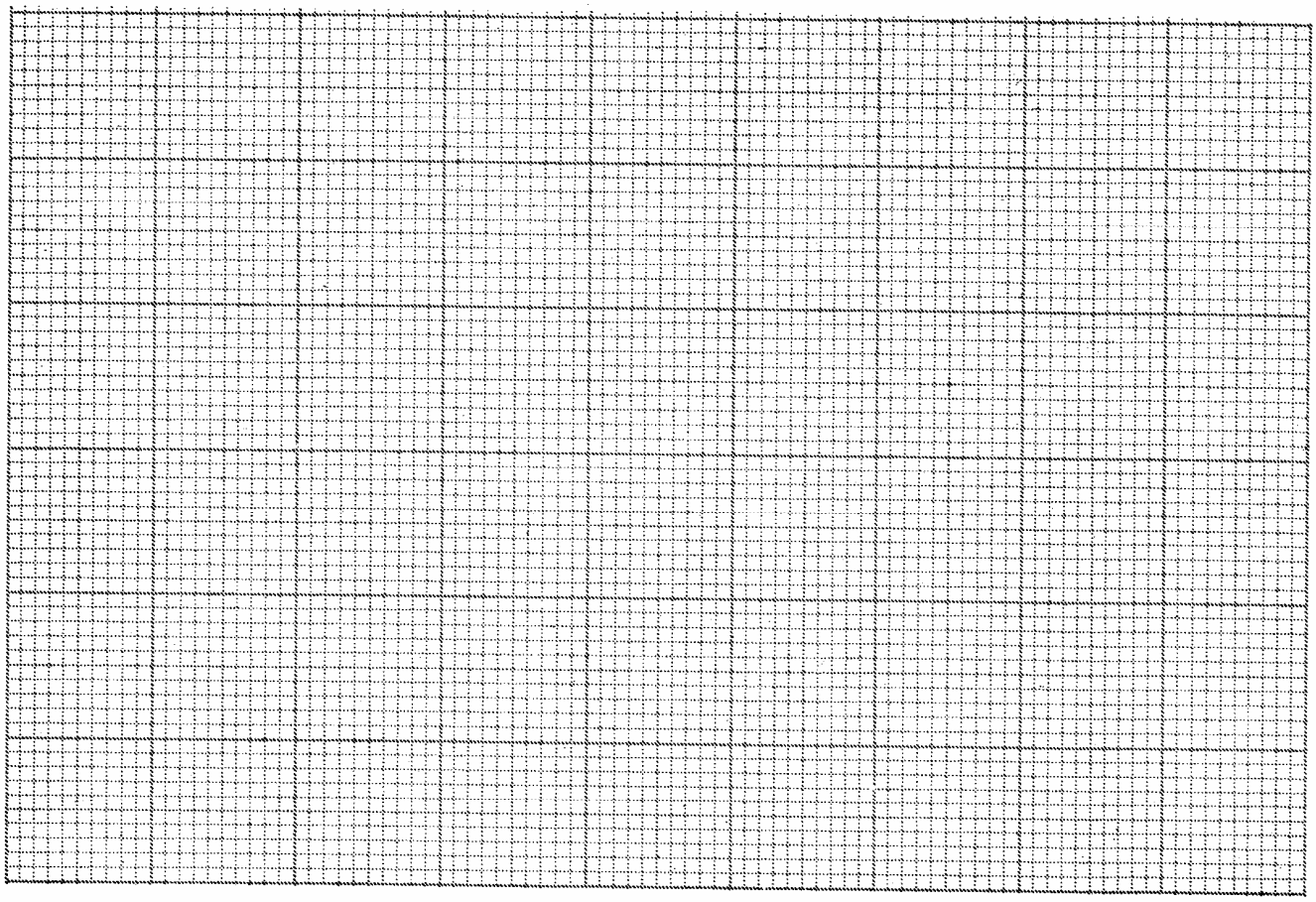
(d) Adjust the potentiometer to 1KΩ. Measure and record the current through:

(5 marks)

(i) R1 _____

(ii) R2 _____

(e) Plot the graph of voltage against current. (3 marks)



(f) From the graph, determine the voltage when the current is 35mA. (2 marks)

EXERCISE 2

Using the tools, materials and equipment provided, fabricate the stand as shown in figure 2.
(20 marks)

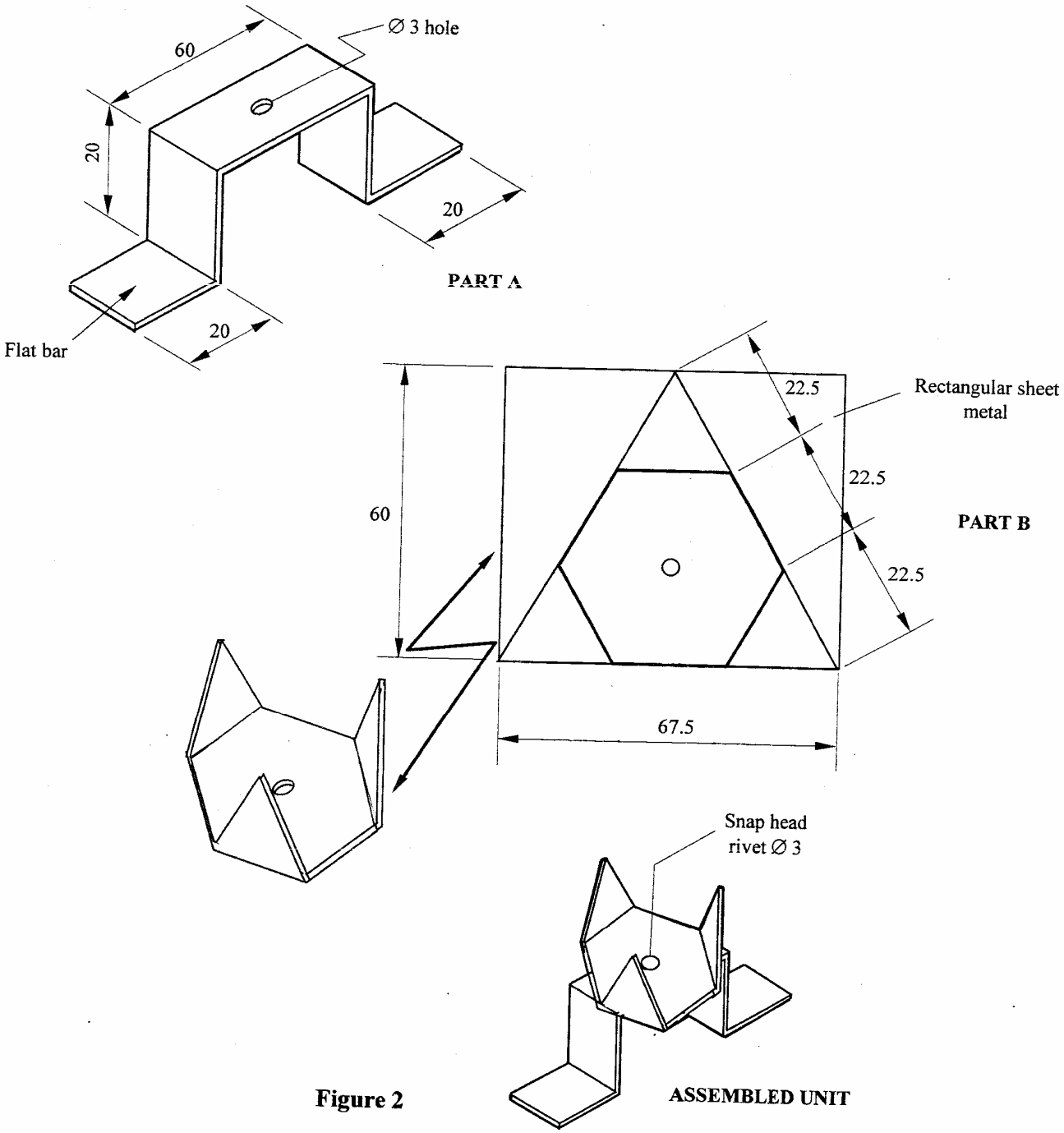


Figure 2

EXERCISE 3

Using the components, materials and equipment provided, carry out the following tasks:

(a) Connect the circuit as shown in figure 3.

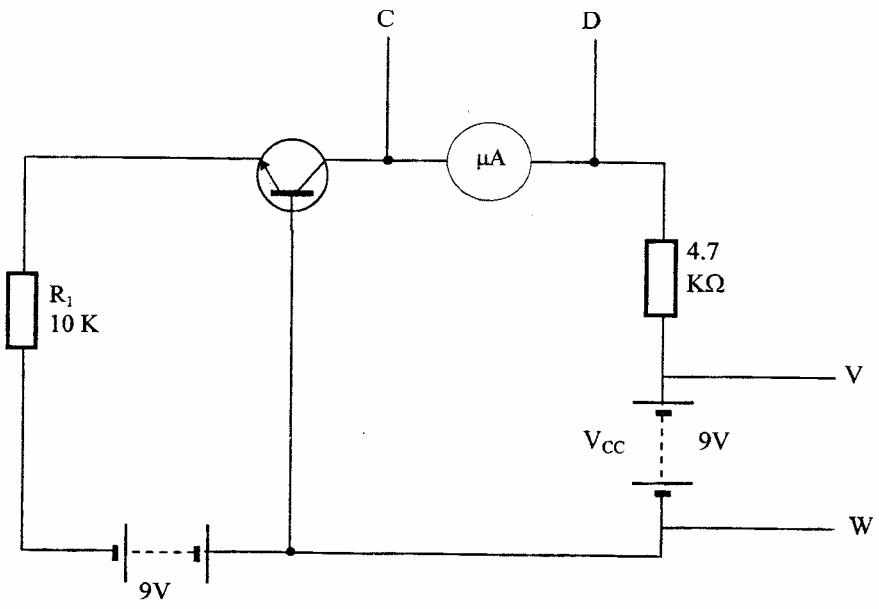


Figure 3

(5 marks)

Let the examiner check your work.

(b) Adjust Vcc to the values shown in table 2 and for each voltage value measure and record the corresponding value of the collector current, Ic

(6 marks)

Table 2

Vcc (v)	9	7	5	3	1	0.5
Ic (mA)						

(c) Repeat step in (b) above for the Vcc values shown in table 3 and complete the table.

(3 marks)

Table 3

Vcc (v)	10	8	6	4	2	0.5
Ic (mA)						

(d) From the results obtained in (b) and (c) above, make two comments about the collector current Ic. (4 marks)

(e) State **two** factors that determine the value of collector current. (2 marks)

EXERCISE 4

Figure 4 shows a block diagram of a prefabricated circuit provided.

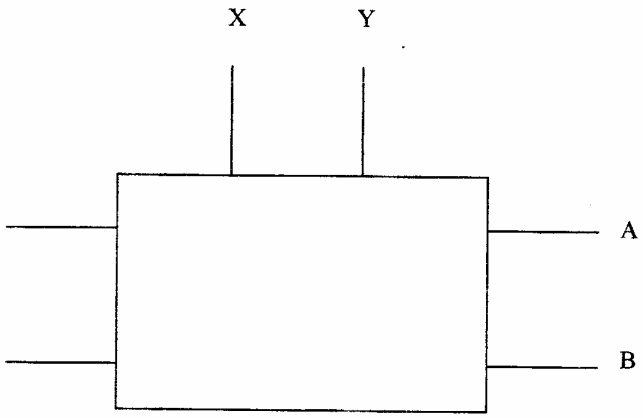


Figure 4

Perform the following tasks:

(a) Adjust the power supply to 10V. (1 mark)

(b) Connect the milliameter between points X and Y then connect the circuit to the power supply.
Let the examiner check your work. (1 mark)

(c) Turn on the power supply.

(d) Measure and record the following:

(i) Potential drop across A – B

V = ...

(ii) Voltage across Rs

V = ...

(iii) the circuit current

I = ... (6 marks)

(e) Increase the power supply to 12v and repeat steps (d) (i) (ii) and (iii) above.

(i) .....

(ii) .....

(iii) ..... (6 marks)

(f) When voltage was increased from 10 to 12 volts, comment on the:

(i) voltage across R_L;

(ii) voltage across R_s;

(iii) current through R_S (3 marks)

(g) State the function of component Q in the circuit. (2 marks)

(h) Disconnect the circuit and let the examiner check your work. (1 mark)

EXERCISE 5

Figure 5 shows a layout of a final sub-circuit. Using PVC conduit wiring system, install the circuit such that the lamp is controlled from the two switching positions. (15 marks)

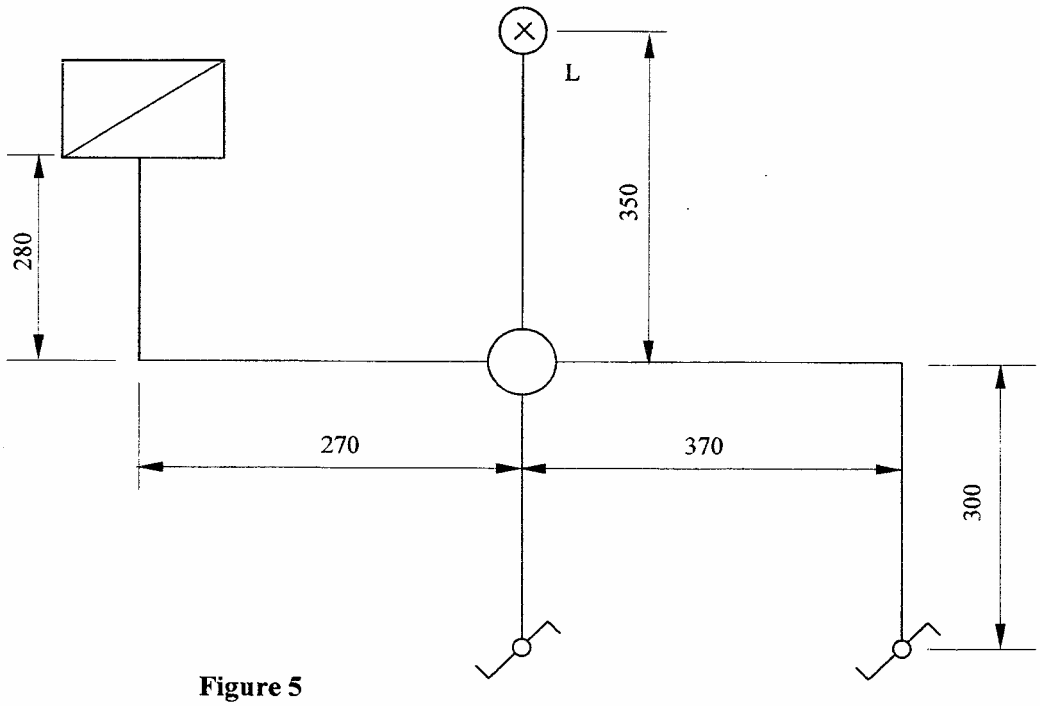


Figure 5