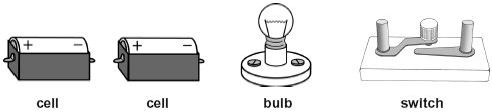
**Q1.**

|  |  |
| --- | --- |
| Ben makes a series circuit using two identical cells, a bulb and a switch to turn the bulb on and off. |  |



(a)     Draw a circuit diagram of Ben’s circuit. Use the correct symbols.

The cells have been drawn for you.



3 marks

(b)     Which part of the circuit supplies the energy?

......................................................................................................................

1 mark

(c)     Ben adds another identical bulb to the circuit in series.  
How does the **brightness** of the first bulb change?

......................................................................................................................

1 mark

(d)     How will the **brightness** of the bulbs change when the cells shown below are placed into Ben’s circuit?

(i)      

.............................................

1 mark

(ii)     

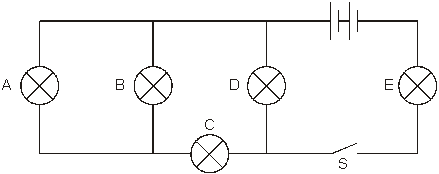
.............................................

1 mark

maximum 7 marks

**Q2.**

(a)     Max built **circuit 1** as shown below.



**circuit 1**

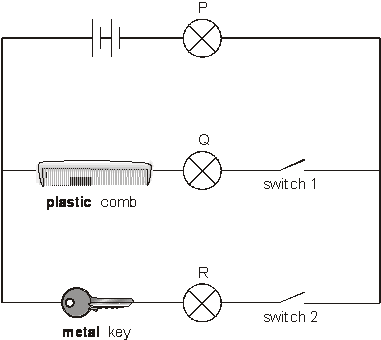
          He closed the switch, S, and all the bulbs came on.  
One of the bulbs then broke and **all** the bulbs went off.

          Which bulb must have broken?  
Give the letter.

...............

1 mark

(b)     Max built **circuit 2** as shown below.  
He connected a plastic comb and a metal key in different parts of the circuit.



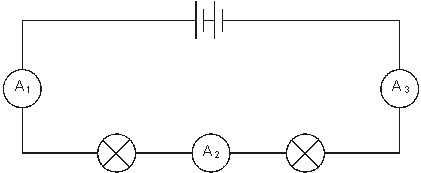
**circuit 2**

          Look carefully at **circuit 2**.  
Complete the table below to show which bulbs in circuit 2 will be on or off when  
different switches are open or closed.  
Write **on** or **off** in the boxes below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **switch 1** | **switch 2** | **bulb P** | **bulb Q** | **bulb R** |
| open | open | off | off | off |
| open | closed |  |  |  |
| closed | open |  |  |  |

2 marks

(c)     Max built **circuit 3** using a battery, two bulbs and three ammeters.



**circuit 3**

          The current reading on ammeter A1 was 0.8 amps.  
What would be the reading on ammeters A2 and A3?  
Place **one** tick in the table by the correct pair of readings.

|  |  |
| --- | --- |
| **readingon                   reading on    ammeter A2 (amps)      ammeter A3 (amps)** | **correct pair of readings** |
| 0.8                                0.8 |  |
| 0.8                                0.4 |  |
| 0.4                                0.8 |  |
| 0.4                                0.4 |  |

1 mark

maximum 4 marks