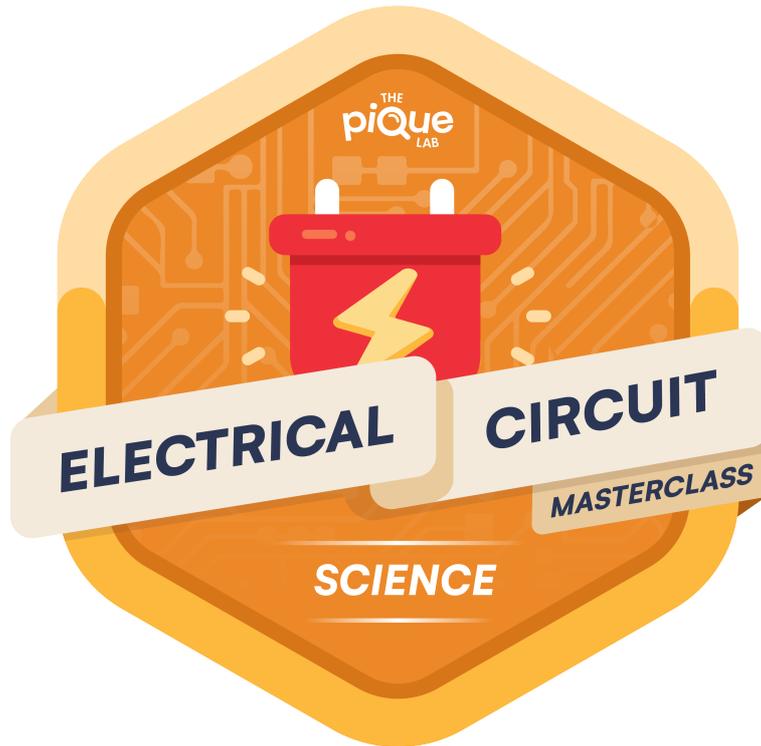




THE PIQUE LAB LEARNING CENTRE

Primary School Science Programme



ELECTRICAL CIRCUIT MASTERCLASS

Answer Booklet

Name: _____

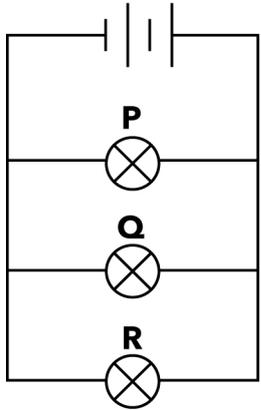
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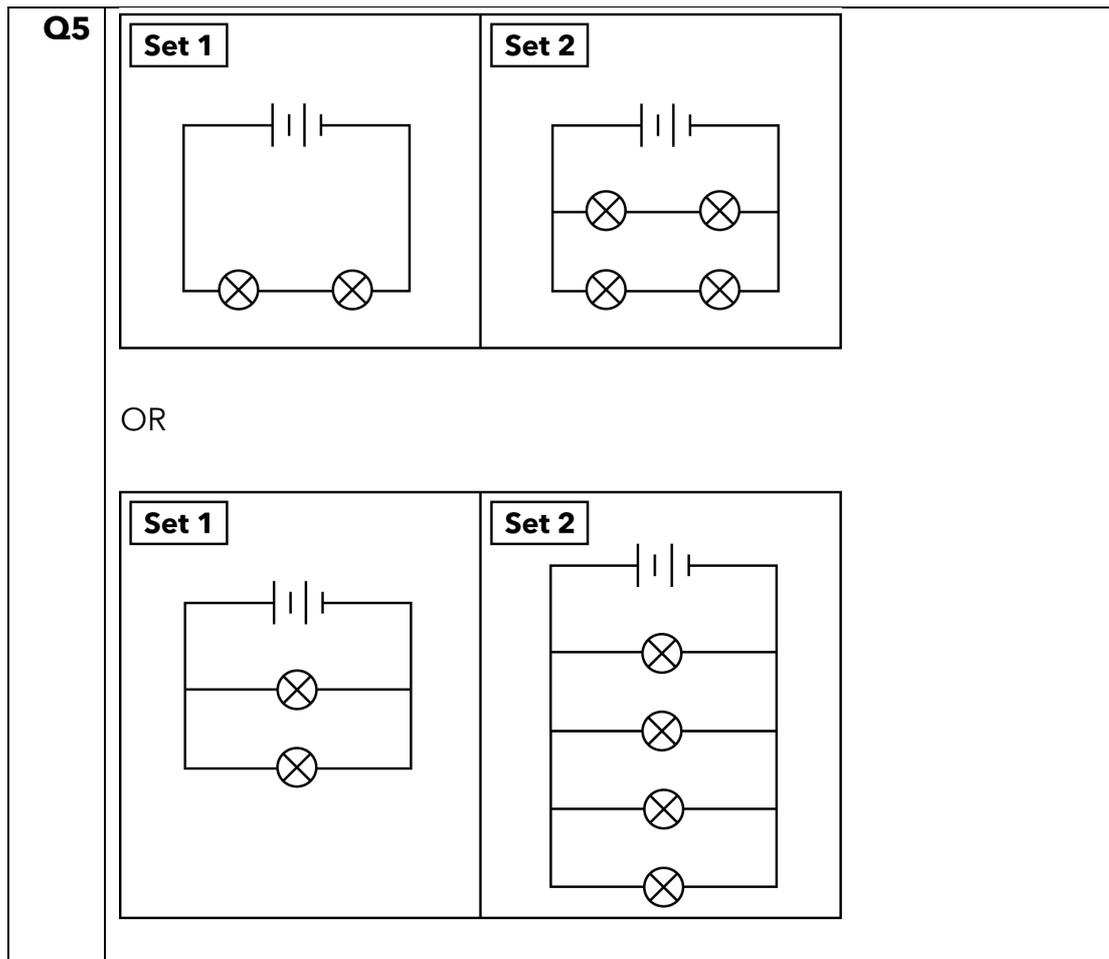
TOPICS COVERED

Topic	Title	Page
1	Arrangement/Drawing of Circuits -----	1 - 2
2	Determining the Brightness of the Bulb -----	2
3	Circuit Tester/Card -----	3
4	Electrical Conductors and Insulators -----	4
5	Electromagnets -----	5

ELECTRICAL CIRCUIT MASTERCLASS

ARRANGEMENT/DRAWING OF CIRCUITS

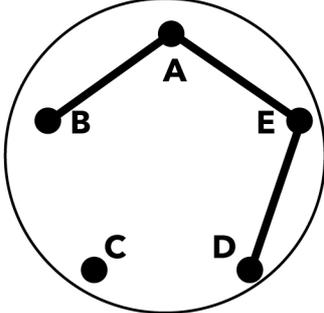
Qn	Answer
Q1	1
Q2	3
Q3	3
Q4a	4
b	 <p>Circuit Y</p>
c	<p>Step 1: When bulb R fuses,</p> <p>Step 2: (there would still be a closed circuit.</p> <p>Step 3: Thus, electric current would be able to flow through the other bulbs,)</p> <p>Step 4: the other bulbs can still light up.</p> <p><i>*Steps 2 and 3 (in parenthesis) are optional since this is a 1m question.</i></p> <p><i>*Do not accept bulbs are brighter since the question asked for another advantage</i></p> <p><i>*Do not accept bulbs can be controlled independently as there are no switches in the circuit</i></p>



DETERMINING THE BRIGHTNESS OF THE BULB

Qn	Answer
Q6	1
Q7	4
Q8	4
Q9a	As the number of batteries increases, the brightness of the bulb increases.
b	Too much electric current flowed through the filament of the bulb, causing the filament to melt and the bulb to fuse.
Q10a	She could add more batteries in circuit B. More electric current would flow through the bulbs.
b	<p>Choose: B.</p> <p>Use data: The brightness of bulbs in circuit B remained the same when more bulbs were added.</p> <p>Explain: This shows that the bulbs in circuit B are arranged in parallel. More electric current flowed through each bulb, causing the bulbs to be brighter to produce more heat.</p>

CIRCUIT TESTER/CARD

Qn	Answer
Q11	2
Q12	1
Q13	3
Q14	3
Q15	1
Q16	4
Q17a	<div style="text-align: center;">  </div> <p><i>* Any answers that connect only buttons A, B, D, and E with only 3 straight lines will be accepted.</i></p>
b	<p>Step 1: Aluminium is an electrical conductor.</p> <p>Step 2: There will always be a closed circuit.</p> <p>Step 3: Thus, electric current will always flow through the bell,</p> <p>Step 4: causing the bell to always ring.</p>

ELECTRICAL CONDUCTORS AND INSULATORS

Qn	Answer
Q18	2
Q19	4
Q20	4
Q21	3
Q22	Rod A - Electrical insulator Rod B - Not possible to tell Rod C - Electrical conductor Rod D - Electrical conductor
Q23a	X - Iron / Silver Y - Wood Z - Silver / Iron
b	<p>Object: Battery</p> <p>Explanation for position Z: Step 1: (When the <u>battery</u> was placed at position Z) The <u>battery</u> was arranged <u>wrongly</u>, where the <u>positive / negative terminals</u> of the <u>batteries</u> were connected to each other. Step 2: There was an <u>open</u> circuit. Step 3: Thus, <u>no electric current</u> flowed through the bulbs. Step 4: (preventing them from lighting up.)</p> <p>Explanation for position Y: Step 1: (When the <u>battery</u> was placed at position Y,) Step 2: There was a <u>closed</u> circuit. Step 3: <u>Electric current</u> flowed through bulbs B1 and B2. Step 4: (allowing them to light up.)</p> <p><i>*The parts in parenthesis are not required as they are already stated in the question.</i></p>

ELECTROMAGNETS

Qn	Answer
Q24a	<p>Step 1: When he closed the switch, Step 2: there was a closed circuit. Step 3: Electric current flowed through the coils of wire around the steel rod, Step 4: causing the steel rod to become an electromagnet.</p> <p>Step 1: The electromagnet attracted the magnetic metal bar Y, Step 2: resulting in an open circuit. Step 3: Thus, no electric current flowed through the sound box. Step 4: (causing the melody to stop.)</p> <p><i>*The part in parenthesis is not required as it is already stated in the question.</i></p>
b	<ol style="list-style-type: none"> 1. The material is an electrical conductor. 2. The material is non-magnetic.
c	<p>Increase the number of coils of wire around the steel rod.</p> <p>OR</p> <p>Increase the number of batteries in the circuit.</p>
Q25a	Electrical conductor
b	<p>Step 1: When the metal wheels on the toy train touched the metal pins near iron rod <u>P</u>, Step 2: there was a <u>closed</u> circuit. Step 3: Thus, electric current flowed through the <u>coils of wires around iron rod P</u>, Step 4: causing iron rod <u>P</u> to become an <u>electromagnet</u>.</p> <p>The <u>like</u> poles of the <u>electromagnet</u> and the bar magnet were facing each other, causing them to <u>repel</u>.</p>