

## Mark schemes

1

- (a) (i) copper **or** steel

*accept 'iron' **or** 'brass' **or** 'aluminium' **or** 'metal'*  
*do **not** accept 'a conductor'*

1

- (ii) wood **or** plastic **or** rubber

*accept any named insulator*  
*do **not** accept 'an insulator' **or** 'not a conductor'*

1

- (b) the circuit is completed **or** there is a complete circuit

*accept 'it makes a circuit'*  
*accept 'electricity can flow'*  
*do **not** accept 'because there is a contact'*

1

- (c) paint is an insulator **or** paint does not conduct electricity

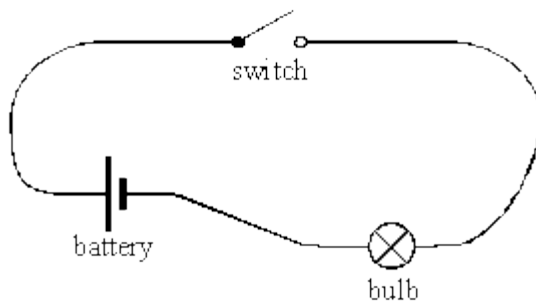
*accept 'paint is not a conductor'*  
***or** 'electricity cannot go through paint'*  
*accept 'it is not a complete circuit'*  
*do **not** accept 'the paint is in the way'*

1

[4]

2

- (a) three wires are drawn:



**all three** wires are required for the mark **all three** components must be correctly connected for the mark  
*accept a correct circuit diagram in which the pupil has drawn the symbols instead of connecting the printed symbols*

1 (L3)

- (b) It is the same brightness. ✓

*if more than one box is ticked, award no mark*

1 (L3)

(c)

position of switch 1	position of switch 2	is the bulb on or off?
<i>B</i>	<i>D</i>	<i>on</i>
<i>A</i>	<i>D</i>	<i>off</i>
<i>A</i>	<i>C</i>	<i>on</i>

*both answers are required for the mark*

1 (L4)

(d) (i) neither **or** none

*accept 'nothing' or 'it works'*

1 (L4)

(ii) it stays on

*accept 'it gets brighter'*

1 (L4)

[5]

3

switch A	switch B	Which lamp, if any, is it?	In which direction, if any, does the motor turn?	
<i>up</i>	<i>down</i>	lamp 1	<i>forwards</i>	
<i>up</i>	<i>up</i>	neither <b>or</b> none	not turning <b>or</b> none <b>or</b> off	<i>both answers are required for the mark do not accept blank boxes or dashes</i>
<i>down</i>	<i>up</i>	lamp 2	backwards	<i>award one mark for each correct answer</i>
<i>down</i>	<i>down</i>	neither <b>or</b> none	not turning <b>or</b> none <b>or</b> off	<i>both answers are required for the mark do not accept blank boxes or dashes</i>

1

2

1

(L5)

[4]

- 4 (a) bulb X  
*do not accept 'both bulbs' or 'bulb X and bulb Y'* 1 (L5)
- (b) neither **or** no bulb **or** none 1 (L5)
- (c) (i) goes out 1 (L5)
- (ii) gets brighter 1 (L5)
- (d) (i) gets brighter 1 (L5)
- (ii) goes out 1 (L5)

[6]

- 5 (a) the motor runs backwards  
*accept 'the crane lowers the load'*  
*or 'the crane drops the load'*  
*or 'the load goes in the other direction'* 1
- (b) any **one** from  
  - it will not run  
*accept 'nothing'*
  - it will stop 1
- (c) any **one** from  
  - it shorts out the batteries or cells  
*accept 'it is a short circuit'*
  - the batteries or cells or wires will get hot
  - the batteries or cells will go flat quickly  
*accept 'the battery or wires will burn out'* 1
- (d) (i) no difference **or** none  
*accept 'the crane lifts the load'*  
*or 'the resistor will not do anything'* 1

- (ii) any **one** from
- the motor turns more slowly  
*accept 'it will stop the motor working'*
  - it lowers the load more slowly
  - there is a smaller current  
*accept 'it moves the load more slowly'*  
*accept 'it gives it less power'*  
*or 'it will slow down the flow of electrons'*

1

[5]

6

- (a) switches 1 and 2  
*if more than one box is ticked, award no mark*

1 (L5)

- (b) no because switch 1 must be on **or** closed  
*both the answer and the reason are required for the mark*  
*accept 'there is no switch in the motor section of the parallel circuit, so it cannot be isolated'*

1 (L5)

- (c) it would go up  
*accept 'it would get hotter or very hot'*  
*do not accept 'it would be hot'*

1 (L5)

- (d) any **one** from
- no effect  
*accept 'the motor speeds up slightly'*
  - it would stay on

1 (L5)

[4]