

- M1.** (a) plastic or rubber
accept any named plastic
*do **not** accept wood* 1
- it is a (good) insulator **or** it is a poor conductor
ignore mention of heat if in conjunction with electricity 1
- (b) *The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme. Maximum of 2 marks if ideas not well expressed.*
- pulls iron bolt down **or** attracts the iron bolt **or** moves bolt out of plunger
answers in terms of charges attracting
or repelling gain no credit 1
- plunger pushed / moved to the right (by spring) **or** plunger released 1
- push switch opens / goes to off / goes to right
accept circuit is broken
for maximum credit the points must follow a logical sequence
3 correct points but incorrect sequence scores 2 marks only
ignore reset action 1

[5]

M2. Quality of written communication: One mark for correct sequencing.
bolt out → plunger up → switch off / circuit broken

1

any **five** from

- high current flows
- electromagnet is stronger
- the iron bolt is pulled out
- the plastic plunger moves up
- the switch is lifted / open / off
accept circuit is broken
- no current flowing
- to re-set the plunger must be pushed down

5

[6]

M3. electromagnet becomes stronger (*not* becomes magnetic) iron moves left – implied
OK
plunger goes up push switch goes to off or circuit broken unless plunger moves down
for 1 mark each

[4]

M4. (i) relay
accept solenoid
do not accept magnetic switch 1

(ii) a current flows through the coil (of the electromagnet)
or a current flows through the electromagnet
or a (magnetic) field is produced
accept 'electricity' for 'current'
accept the electromagnet is activated or magnetised or turned on
do not accept answer in terms of magnetic charge 1

the (iron) arm is attracted to the electromagnet
accept the arm pivots or moves towards the electromagnet 1

the contacts are pushed together
do not accept contacts attract 1

[4]

- M5.** (a) current flows
coil / core magnetised / electromagnet activated / energised / turned on
attracts iron bar causing bolt to be pulled out
each for 1 mark 4
- (b) more turns
bigger current / e.m.f
softer iron core
any two for 1 mark each 2
- (c) to relock door / return iron bar / to lock door
for 1 mark 1
- (d) iron bar would still be attracted / coil still magnetised so still works
for 1 mark each
- yes + wrong answer
0 marks
- yes + current still flows
1 mark
- yes + still magnetised / iron bar still attracted
2 marks 2

[9]