

- 1 (a) output of A: 1, 1, 0, 0 c.a.o. [1]
output of B: 0, 1, 0, 0 e.c.f. from candidate's output of A [1]
- (b) dark AND hot owtte [1]
note: must be consistent with answer to (a)
- (c) B cannot provide enough power / current for lamp, or equivalent [2]
OR allows remote lamp
note: statement of function of a relay without reference to context gains 1 mark

2	<p>(a) (i) current/electricity could flow through/across switch due to dampness / humidity</p> <p>OR water (good) conductor</p> <p>danger of shock/electrocution</p> <p>accept alternative: short (circuit) (danger because) lights go out when fuse blows</p>	<p>B1</p> <p>B1</p> <p>(B1) (B1)</p>	<p>[2]</p>
	<p>(ii) pull switch with long cord of insulating material OR normal switch outside workroom OR switch with non-contact operation /insulating cover /sensor actuation</p>	<p>B1</p>	<p>[1]</p>
	<p>(b) friction with hose</p> <p>reasoning relating to charge moved <u>to/from aircraft</u> OR <u>to/from hose</u> OR rubber insulates</p>	<p>M1</p> <p>A1</p>	<p>[2]</p>
	<p>(ii) (water conducts) charge to/from aircraft OR away/to ground OR through tyres/wheels OR earthing o.w.t.t.e.</p>	<p>B1</p>	<p>[1]</p>
			[Total: 6]
3	<p>(a) (potential difference OR e.m.f. OR voltage ignore volts</p> <p>(ii) frequency accept cycles/s ignore waves/s</p> <p>(iii) power accept energy/s</p>	<p>} all 3</p> <p>B1</p>	
	<p>(b) case/frame/outside/base/parts that can be touched ignore metal parts</p> <p>(ii) electric shock/electrocution/death by electricity o.w.t.t.e. ignore anything else live wire touches case</p>	<p>B1</p> <p>B1 B1</p>	
	<p>(c) heaters in parallel with any supply (M0 if no supply, clear break in circuit, short across supply or heater) one switch controlling both heaters <u>and</u> one switch controlling one heater OR one switch in series with each element</p> <p>special case: heaters in series with supply and <u>one</u> switch shorting out <u>one</u> resistor AND another switch in series with supply</p>	<p>M1</p> <p>A1</p> <p>B2</p>	<p>[6]</p>