

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