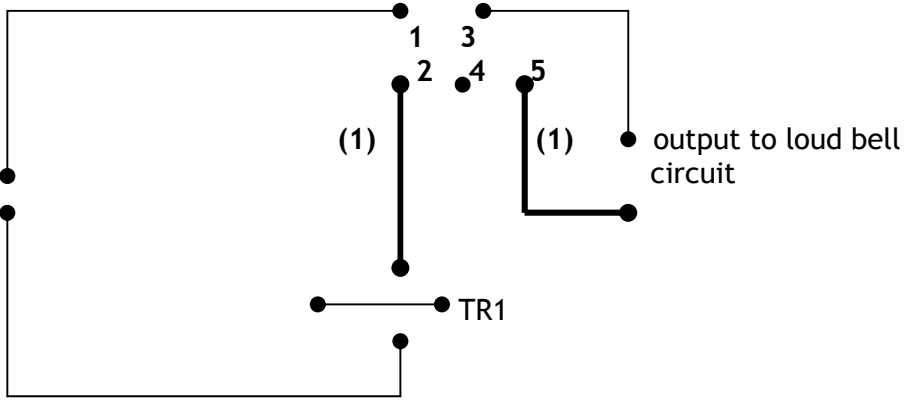


Mark Scheme (Results) Summer 2008

GCSE

GCSE Design & Technology: Systems & Control Technology (3974) Paper 2F

3974 2F Mark Scheme

Question Number	Answer	Mark
1 (a)	<p>Name: Resistor Use: Resist current/potential divider/protects components</p> <p>Name: Pliers / long nose / snipe nose Use: Holds components/wire/cuts wire</p> <p>Name: Capacitor Use: Stores voltage/charge/timer circuit/decouples/DC block/AC pass</p> <p style="text-align: right;">(6 x 1)</p>	(6)
1 (b)	<p>One action given:</p> <p>They close/make/change over / switch over / connect the circuit / pin 3 & 4 open / pin 3 & 5 closed</p>	(1)
1 (c)(i)	<p>Two other reasons given:</p> <ul style="list-style-type: none"> • The transistor is not powerful enough to run the bell / The loud output device needs more current (1) • No feedback to the input signal (1) • Output device needs to be distant from the electronic circuit (1) • Allows a low current / voltage circuit to run a high current / high voltage output (1) <p style="text-align: right;">(2 x 1)</p>	(2)
1 (c)(ii)	 <p style="text-align: center;">(only acceptable answers)</p> <p style="text-align: right;">(2 x 1)</p>	(2)
Total for question		11

Question Number	Answer	Mark
2 (a)(i)	<p>Four components named:</p> <ul style="list-style-type: none"> • PTM / Push to make (1) • Diode (1) • Buzzer (1) • Battery/cells (<i>not cell on its own</i>)/ power supply (1) <p><i>(only acceptable answers)</i></p> <p style="text-align: right;">(4 x 1)</p>	(4)
2 (a)(ii)	<p>One action stated:</p> <ul style="list-style-type: none"> • It operates/fires/latches/triggers/turn(s) on /conducts/switch(es)/switch(es) on (1) 	(1)
2 (a)(iii)	<p>One action stated:</p> <ul style="list-style-type: none"> • Stays operated/latched/ stays on /keeps the circuit working / the buzzer stays on (1) 	(1)
2 (a)(iv)	<p>One reason given:</p> <ul style="list-style-type: none"> • Switches circuit off / breaks the latch / switches the buzzer off / resets the circuit / shorts out TH1 (1) 	(1)
2 (a)(v)	<p>One reason given:</p> <ul style="list-style-type: none"> • Protects the thyristor / removes back voltage / EMF from wound buzzer (1) 	(1)
2 (b)(i)	<p>One mark only for either of these answers</p> <ul style="list-style-type: none"> • 682 • 68... (<i>to any decimal</i>) <p>Two marks for</p> <ul style="list-style-type: none"> • 6K8 • 6.8K • 6800 <p><i>(only acceptable answers)</i></p>	(2)
2 (b)(ii)	<p>One meaning given:</p> <ul style="list-style-type: none"> • The maximum percentage range that the value/size may vary (1) <p><i>(only acceptable answer but likely to be in candidate speak)</i></p>	(1)
Total for question		11

Question Number	Answer	Mark
3 (a)	<p>Three each of the following, one under each heading:</p> <p>Specification points Reasons</p> <p>(i) Market</p> <ul style="list-style-type: none"> • Point: It must be cost effective/cheap • Reason: So that more people buy them • Point: It must have a LED indicator • Reason: To give confidence that it is working • Point: It must be easy to test • Reason: Safety/make sure it is working • Point: It must have a quick release screw • Reason: Easy to change the batteries <p>(ii) Quality</p> <ul style="list-style-type: none"> • Point: The battery must last a long time • Reason: To keep the alarm working • Point: Must keep going during a fire/fireproof • Reason: To alert if fire is close to the alarm • Point: It must be easy to change the batteries • Reason: Fitted to the ceiling/hands above head • Point: It must have a smoke vent • Reason: So it can detect smoke quickly <p>(iii) Environment</p> <ul style="list-style-type: none"> • Point: It must be made from recyclable materials • Reason: To conserve the earth's resources • Point: It must be discrete in the home • Reason: So it fits the surroundings • Point: It must be made from white plastic • Reason: White goes with any colour scheme <p><i>Some flexibility should be given as some points may cross over descriptions.</i></p>	<p>(2)</p> <p>(2)</p> <p>(2)</p>

3 (b)(i)	<p>Two reasons given:</p> <ul style="list-style-type: none"> • Light (1) • Rigid (1) • Does not rust (1) • Non-magnetic (1) • Easily shaped/die cast (1) • Easy to recycle (1) <p style="text-align: right;">(2 x 1)</p>	(2)
3 (b)(ii)	<p>Two reasons given:</p> <ul style="list-style-type: none"> • The bracket can be the same colour as the case (1) • It is a low temperature process (1) • Plastic layer protects - sharp edges - scraping ceiling (1) • It is a self finishing process (1) <p style="text-align: right;">(2 x 1)</p>	(2)
3 (c)	<p>Two properties given with two reasons:</p> <p>Property: Good conductor of electricity Reason: small power loss</p> <p>Property: Is malleable Reason: Easy to produce/ can bend without breaking</p> <p>Property: Not magnetic Reason: Will not be affected by electro-magnetic devices</p> <p>Property: Does not corrode easily Reason: Long component life/long product durability</p> <p>Property: Ductile Reason: Can be drawn into a wire</p> <p>Property: Low temperature coefficient Reason: Allows components to be soldered to it</p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
3 (d)	<p>Two electronic quality control checks named:</p> <ul style="list-style-type: none"> • Detection to activation time/working check (1) • Test button function ease (1) • PCB continuity check (1) • Battery to PCB check (1) • LED function check (1) • Speaker/buzzer loudness check (1) <p style="text-align: right;">(2 x 1)</p>	(2)
3 (e)	<p>One way described:</p> <ul style="list-style-type: none"> • The tracks are close together making it the only viable method • Complicated PCB needs to fit into small space • Tracks may be laid at 45 degrees to save space 	(2)

3 (f)(i) & (ii)	<p>(i) The alarm sound must be clearly heard.</p> <ul style="list-style-type: none"> • A loud buzzer/siren sounds which is loud enough to be heard all over the house. • When smoke is detected an electronic timing circuit drives a high frequency buzzer • The vent in the case allows a loud sound to be emitted <p>(ii) Have a means of fixing to a ceiling.</p> <ul style="list-style-type: none"> • An aluminium ceiling bracket has two slots which screws go through to fix to the ceiling • The case slots onto the ceiling bracket and is held in place by the quick release screw 	<p style="text-align: right;">(2)</p> <p style="text-align: right;">(2)</p>
	Total for question	22
	Total for paper	44