

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)	Name: Resistor	
	Use: Resist current/potential divider/protects components	
	Name: Pliers / long nose / snipe nose Use: Holds components/wire/cuts wire	
	Name: Capacitor	
	Use: Stores voltage/charge/timer circuit/decouples/DC block/AC pass (6 x 1)	(6)
1 (b)	One action given:	
	They close/make/change over / switch over / connect the circuit /pin 3 & 4 open / pin 3 & 5 closed	(1)
1 (c)(i)	Two other reasons given:	
	 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) 	
	output (1) (2 x 1)	(2)
1 (c)(ii)	(1) 1 3 2 4 5 (1) output to loud bell circuit	
	(only acceptable answers) (2 x 1)	(2)
	Total for question	11

Question	Answer	Mark
Number 2 (a)(i)	Four components named:	
` / ` /		
	PTM / Push to make (1)Diode (1)	
	• Buzzer (1)	
	Battery/cells (not cell on its own)/ power supply (1)	
	(only acceptable answers) (4 x 1)	(4)
2 (a)(ii)	One action stated:	
	It operates/fires/latches/triggers/turn(s) on /conducts/switch(es)/switch(es) on (1)	(1)
2 (a)(iii)	One action stated:	
	Stays operated/latched/ stays on /keeps the circuit working / the buzzer stays on (1)	(1)
2 (a)(iv)	One reason given:	
	Switches circuit off / breaks the latch / switches the buzzer off / resets the circuit / shorts out TH1 (1)	(1)
2 (a)(v)	One reason given:	
	Protects the thyristor / removes back voltage / EMF from wound buzzer (1)	(1)
2 (b)(i)	One mark only for either of these answers	
	68268 (to any decimal)	
	Two marks for	
	• 6K8	
	• 6.8K • 6800	
	(only acceptable answers)	(2)
2 (b)(ii)	One meaning given:	
	The maximum percentage range that the value/size may vary (1)	(1)
	(only acceptable answer but likely to be in candidate speak)	(')
	Total for question	11

Question	Answer	Mark
Number 3 (a)	Three each of the following, one under each heading:	
	Specification points Reasons	
	Reasons	
	(i) Market	
	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	
	Point: It must be easy to testReason: Safety/make sure it is working	
	Point: It must have a quick release screw	(2)
	Reason: Easy to change the batteries	, ,
	(ii) Quality	
	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	
	 Point: It must be easy to change the batteries Reason: Fitted to the ceiling/hands above head 	
	Point: It must have a smoke vent	(2)
	Reason: So it can detect smoke quickly	
	(iii) Environment	
	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	
	 Point: It must be made from white plastic Reason: White goes with any colour scheme 	(2)
	Some flexibility should be given as some points may cross over descriptions.	

Light (1) Rigid (1) Rigid (1) Does not rust (1) Non-magnetic (1) Easily shaped/die cast (1) Easy to recycle (1) Two reasons given: 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) Two properties given with two reasons: Property: Good conductor of electricity Reason: Easy to produce/ can bend without breaking Property: Is malleable Reason: Easy to produce/ can bend without breaking Property: Not magnetic Reason: Will not be affected by electro-magnetic devices Property: Does not corrode easily Reason: Long component life/long product durability Property: Ductile Reason: Allows components to be soldered to it (2 x 1) (2 x 1) (2 x 1) (3 d) Two electronic quality control checks named: Detection to activation time/working check (1) Test button function ease (1) PCB continuity check (1) Battery to PCB check (1) ED function check (1) Speaker/buzzer loudness check (1) Speaker/buzzer loudness check (1) Tracks may be laid at 45 eigeres to save space (2)	3 (b)(i)	Two reasons given:		
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 Battery to PCB check (1) LED function check (1) Speaker/buzzer loudness check (1) One way described: The tracks are close together making it the only viable method Complicated PCB needs to fit into small space 		` '		
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Speaker/buzzer loudness check (1) 3 (e) One way described: The tracks are close together making it the only viable method Complicated PCB needs to fit into small space				
 (2 x 1) One way described: The tracks are close together making it the only viable method Complicated PCB needs to fit into small space 		· ·		
 3 (e) One way described: The tracks are close together making it the only viable method Complicated PCB needs to fit into small space 		Speaker/buzzer toudness check (1)	(2 × 1)	(2)
 The tracks are close together making it the only viable method Complicated PCB needs to fit into small space 			(Z X I)	(2)
Complicated PCB needs to fit into small space	3 (e)	One way described:		
Complicated PCB needs to fit into small space		The tracks are close together making it the only viable method		
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3 (f)(i) & (ii)	 (i) The alarm sound must be clearly heard. 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 (ii) Have a means of fixing to a ceiling. 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 	(2)
	Total for question	22
	Total for paper	44