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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Design and Technology (Electronic Products)

Foundation (3551)

Final Version

Mark Scheme

2008 examination - June series

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Question 1

(a)	Two different features with appropriate matching reason. Feature – Reason, e.g. On / off switch - triggers the device Battery powered - portable / placed anywhere Waterproof – so can be used in all weather conditions	2 x 1 mark	
	Have LEDs which flash - attract attention	2 x 1 mark	*(4 marks)*
(b)	Qualified response, e.g. Visit local car parts store (Halfords) make notes on features of products Simple response, e.g. Visit local car parts store (Halfords) Second method must be different, possible responses are: Search for information on Internet via on line shops ('research on internet' only 1 mark)		
	Survey motorists to see what products are used	2 x 1 mark 2 x 1 mark	*(4 marks)*
		Total	**8 marks**

Question 2

(a)		Specific name of a suitable material (e.g. acrylic, HIPS, Aluminium, Mild steel, etc.)	2 mark Or	
		General material (metal or plastic)	1 mark	
		Clear design which increases base size or base weight to make stable	2 marks Or	
		Limited detail to the design	1 mark	
		Feasible design, either through notes or sketches, which shows how it is suitable for storing in the car	2 marks Or	
		Limited detail in the design	1 mark	*(6 marks)*
(b)		LEDs in visible position	1 mark	
		Not at edge	1 mark	
		An appropriate method of holding the LED – clip, bezel, etc.	2 marks Or	
		Or Interference fit	1 mark	
		Appropriate position of switch	1 mark	
		Detail of how fitted in the case	1 mark	
		Method of accessing the case	1 mark	
		Access to the case is secure	1 mark	
		All materials and components labelled	2 mark Or	
		Some materials and components labelled	1 mark	*(10 marks)*
	QoC	Clear, detailed sketch(s) with full annotation	3 marks	
		Clear sketch(s) with some annotation	2 marks	
		Limited detailed	1 mark	*(3 marks)*
			Total	**19 marks**

Question 3

(a)	(i)	B	1 mark	
	(ii)	C	1 mark	
	(iii)	A	1 mark	
	(iv)	F	1 mark	*(4 marks)*
(b)	(i)	LED or Light Emitting Diode	1 mark	
	(ii)	Thermistor	1 mark	
	(iii)	Fuse	1 mark	
	(iv)	Thyristor	1 mark	*(4 marks)*
(c)	(i)	Output	1 mark	
	(ii)	Process	1 mark	
	(iii)	Output	1 mark	
	(iv)	Input	1 mark	*(4 marks)*
			Total	**12 marks**

Question 4

(a)	Clear correct response, e.g. Component has positive / anode and negative / cathode legs and must be connected correct way round in the circuit	2 marks	
	Simple answer, e.g. Has polarity; must be right way round	1 mark	*(2 marks)*
(b)	Cathode	1 mark	
	Anode	1 mark	*(2 marks)*
(c)	Band shown at top of cylinder (arrow end)	1 mark	*(1 mark)*
(d)	1 mark per relevant response e.g. SW1 allows power to the circuit SW2 triggers the thyristor Thyristor latches Thyristor switches buzzer on 2K2 Resistor limits voltage 1K Resistor stops thyristor resetting	4 x 1 mark	*(4 marks)*
		Total	**9 marks**

Question 5

(a)	Pin 7 to between R1 and R2	1 mark	
	Either		
	Pin 2 and 6 joined together	1 mark	
	Pin 2/6 to between R2 and C1	1 mark	
	Or		
	Pin 6 to between R2 and C1	1 mark	
	Pin 2 to between R2 and C1	1 mark	*(3 marks)*
(b)	Add a variable resistor / potentiometer in series with R1 / R2	2 marks	
	Replace R2 or R1 with a variable resistor or add variable resistor	1 mark	*(2 marks)*
(c)	Formula: V = I x R	1 mark	
	Formula re-arranged: R = V / I (if put straight down or 'triangle', 2 marks)	1 mark	
	Substitute values: R = 9 - 2V / 20 mA (if R = 9 / 20 is 0 marks, but give credit for correct calculation to show 450)	1 mark	
	Answer = 350	1 mark	
	Units – Ohm or Ω or R	1 mark	*(5 marks)*
(d)	**Explanation**		
	Different voltage or current	1 mark	
	Between Pin 3 and supply voltage	1 mark	
	Modification		
	Change value of resistor	1 mark	
	Lower the value in the resistors going to 0V	1 mark	*(4 marks)*
		Total	**14 marks**

Question 6

(a)	Top row horizontally	1 mark	
	Vertical columns above centre line	1 mark	
	Vertical columns below centre line	1 mark	
	Bottom row horizontally	1 mark	*(4 marks)*
(b)	Break between columns	1 mark	
	Correct spacing for an I.C. / chip	1 mark	*(2 marks)*
(c)	Marks can only be awarded for reference to breadboard advantages and disadvantages		
	2 different advantages, e.g. • Low start up costs • Can be used anywhere • Become familiar with actual components • Tests circuits in a real life situation	2 x 1 mark	
	2 different disadvantages, e.g. • Components can be damaged • Fiddly to connect • Connections can become unreliable • Need to have components to test circuit idea • Limited to available components	2 x 1 mark	*(4 marks)*

(d) Reasons must be different

Qualified response, e.g.

- Changes can easily be made without having to redraw the whole circuit
- Designs can be shared electronically quickly and easily
- Very accurate for spacing of legs / components
- Easy to make neat and compact 3 x 2 marks

Simple response, e.g.

- Easy to change
- Accurate
- Neat
- Sharing 3 x 1 mark *(6 marks)*

Easy to use is not an acceptable response

Total 16 marks

Question 7

(a)	Suitable material (e.g. MDF)	1 mark	
	Suitable thickness	1 mark	
	Cut to shape	1 mark	
	Draft angle between 4^o and 10^o	1 mark	
	Sharp corners removed	1 mark	
	Sharp edges removed (if general smoothing, just 1 mark of the two available)	1 mark	
	Air / breathing holes	1 mark	*(7 marks)*
(b)	Qualified response, e.g.		
	Additional breather holes required to be drilled, draft angle not great enough or consistent or two simple statements	2 marks	
	Simple statement	1 mark	*(2 marks)*
(c)	HIPS, Acrylic, Perspex, polystyrene, etc.	1 mark	*(1 mark)*
		Total	**10 marks**

Question 8

(a) **Quality of response answer:**

Detailed response considering both positive and negative aspects 4 to 6 marks

Limited response or a response to only one aspect 1 to 3 marks

Examples of possible suggestions:

Positive points

- Improve road safety
- Reduce speed / maintain speed limits
- Help prevent accidents
- Reduce injuries in accidents
- Prevent accident black spots

Negative points

- Perceived as threatening by motorists
- Can distract drivers
- Causes anxiety / stress in drivers
- Cost of installation & use
- Excessive braking
- Less police patrol cars on the road
- Less chance of catching serious incidents, e.g. drink driving

(6 marks)

(b) **Quality of response answer:**

Detailed response suggesting innovative uses of technology	4 to 6 marks
Limited response	1 to 3 marks

Examples of possible suggestions:

- Cameras to replace mirrors – reduced size reduced drag
- Multiple cameras looking down and back on each door
- Rear view camera to see behind trailer unit – a major blind spot
- Monitor on dashboard showing multi-screen images
- Heads up display on wind screen in front of driver
- External links of camera images – better security / safety *(6 marks)*

Total 12 marks

Total for Paper 100 marks