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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Design and Technology (Electronic Products)

Higher (3551)

Final Version

Mark Scheme

2008 examination - June series

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Question 1

(a) 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)*

(b) Qualified response, e.g.

conduct a survey of motorists to see which they feel are successful — 2 marks

Simple response, e.g.

conduct survey

Other methods might include: field testing of products, checking with emergency services or AA / RAC, etc. — 1 mark *(2 marks)*

(c) Any five **different** appropriate statements can be credited, e.g.

- Weatherproof / waterproof
- On/off or trigger switch
- Automatic light / dark sensor
- Battery powered
- Robust casing
- Lightweight for ease of carrying
- Stable once in place
- LEDs visible to approaching motorists — 5 x 1 mark *(5 marks)*

Total 11 marks

Question 2

(a)	Specific name of a suitable material (e.g. acrylic, HIPS, Aluminium, Mild steel, etc.)	2 marks	
		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	
	Method of accessing the case	1 mark	
	Access to the case is secure	1 mark	
	LDR indicated	1 mark	
	Appropriate position for the LDR (not on front surface)	1 mark	
	Detailed and suitable method of holding the LDR in relation to the material for the case	2 marks	
		Or	
	Limited or very basic information	1 mark	
	All materials and components labelled	2 mark	
		Or	
	Some materials and components labelled	1 mark	*(13 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	**22 marks**

Question 3

(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)	Pulse generator	1 mark	*(1 mark)*
(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	**13 marks**

Question 4

(a)	3 different reasons: Neat, Accurate, Easy to share Easy to change	3 x 1 mark	*(3 marks)*
(b)	Two different considerations Reason e.g. burns from hot acid/ferric chloride, eye damage from ultra violet light Matching detailed explanation Or Matching simple statement	2 x 1 mark 2 x 2 marks Or 2 x 1 mark	*(6 marks)*
(c)	Place mask face down in UV box With no reference to orientation just 1 mark Remove protective film from photo board and place on mask Clamp UV box Expose For a specified time (1 to 4 minutes) Develop board Rinse thoroughly Place in etching tank Remove board from tank when the process is complete Thoroughly wash and dry the board	2 marks 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark 1 mark	*(11 marks)*
		Total	**20 marks**

Question 5

(a)	Decision on Input 3 high	1 mark	
	Feedback to start if No	1 mark	
	Correct position or sequence	1 mark	
	Compare Input 1 (Yes/No decision)	1 mark	
	Less than or equal to 75	1 mark	*(5 marks)*
(b)	Output 4 on (output 2 off could be here as well)	1 mark	
	For 0.25s	1 mark	
	Output 4 off, output 2 on	1 mark	
	For 0.25s	1 mark	
	Output 2 off, output 0 on	1 mark	
	For 0.25s	1 mark	
	Output 0 off, output 2 on	1 mark	
	For 0.25s, output 2 off (could be shown at start)	1 mark	
	Repeats	1 mark	
	10 times	1 mark	*(10 marks)*
	Reference to LEDs not credited		
(c)	Output 0, 2, 4 on (accept all outputs on)	1 mark	
	For 0.5s	1 mark	
	Output 0, 2, 4 off (accept all outputs off)	1 mark	
	For 0.5s	1 mark	
	Repeat 5 times	1 mark	*(5 marks)*
(d)	Feedback in correct place	1 mark	
	To start of process	1 mark	*(2 marks)*
		Total	**22 marks**

Question 6

(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 just referring to use of cameras to replace mirrors 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