ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark scheme June 2003

GCSE

Design and Technology Electronic Products

3551 (Short Course)

Foundation

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Registered address: Addleshaw Booth & Co., Sovereign House, PO Box 8, Sovereign Street, Leeds LS1 1HQ
Kathleen Tattersall: *Director General*

Design and Technology: Electronic Products

Short Course: Foundation Tier

Question 1

(a) series (1 mark)

(b) (i) 10 (1 mark)
00 (1 mark)
1K or 1000Ω (3 marks)

(ii) equation (1 mark)
manipulation (1 mark)
calculation (1 mark)
Answer 1K (1 mark)

(c) can be +/- % (1 mark)
all resistors not exact value (1 mark)

Total 10 marks

Question 2

(a) No damage to components, values changed easily
Simulation possible, link to CAM any suitable
Any 2 (2 marks)

(b) Astable (1 mark)

(c) Capacitor or C (1 mark)

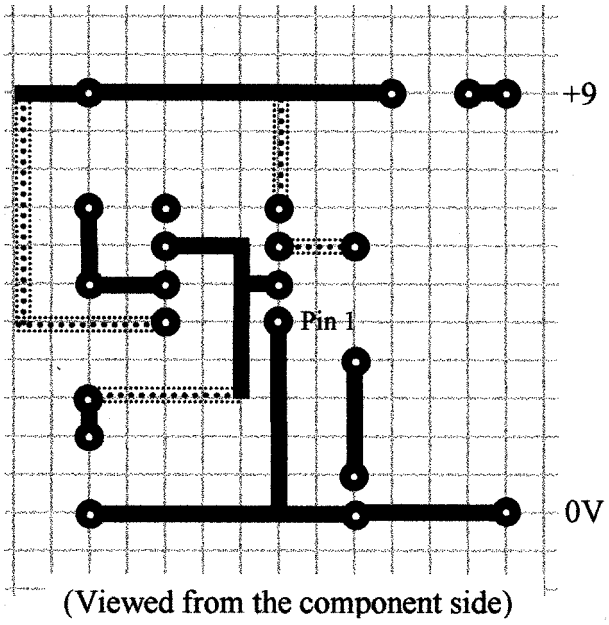
(d) (i) To protect the LED from damage (1 mark)
To protect the LED from too high a current (1 mark)

(ii) Formula (1 mark)
7-2 =5 (1 mark)
R=5/0.02 (1 mark)
Answer 250Ω (1 mark)

(e) Space (1 mark)
Mark (1 mark)
Amplitude (1 mark)

(f) Component library readily available, sizes/spacings accurate.
Different views available, zoom, easy to change
Any 2 (2 marks)

(g)



(i) Pin 4 connected to +9V rail (1 mark)

(ii) Outputs from IC through resistor and LED to 0V (1 mark)

(iii) IC connected to junction of C and R2 (1 mark)

(iv) +9V supply connected to IC (1 mark)

(h) (i) HIPS, sheet polystyrene. PVC, ABS, acrylic (1 mark)

(ii) As any blemish in the surface will show up on the surface of the plastic (2 marks)

The plastic will stretch, the rounded corners will enable it to form better and make it easier to take off, less chance of stress in plastic (2 marks)

To make it easier to take the plastic from the mould. (2 marks)

Total 26 marks

Question 3

(a)	(i)	INPUT – **Thermistor/TEMPERATURE Sensor, potential divider**	(1 mark)
		Transistor – **Control/process**	(1 mark)
	(ii)	Open loop	(1 mark)
(b)	(i)	Variable resistor/Potentiometer	(1 mark)
	(ii)	Thermistor	(1 mark)
	(iii)	Transistor	(1 mark)
	(iv)	Relay	(1 mark)
	(v)	Diode	(1 mark)
(c)	(i)	Thermistor and VR, A + B	(2 marks)
	(ii)	Resistance lowers	(1 mark)
	(iii)	Alter the level a which the heater turns on	(2 marks)
	(iv)	Goes low/reduces/gets less	(1 mark)
	(v)	0.6/0.7V	(1 mark)
(d)		V to heater	(1 mark)
		V to relay	(1 mark)
		Relay to heater	(1 mark)
(e)	(i)	Can be programmed and re programmed Can be programmed to perform varied tasks Can be tested and modified before use, set exactly Can replace a complicated circuit Reduction of size of circuit Any other valid reason Any 2	(2 marks)
	(ii)	C 1 correct (1 mark) D 2 or 3 correct (2 marks) A All correct (3 marks) B	(3 marks)
			Total 23 marks

Question 4

(a) No sharp edges to catch on skin
All parts must be larger than the size set by gov.
No loose parts that might fall of
Non toxic paint/finish
Material that will not splinter etc etc 3 x 2
One word unqualified 1 x 3

(3 marks) (6 marks)

(b) Colours that are attractive to children etc
Safety requirements – law etc BSI
Visits to nursery interview staff, anthropometric data
observations of children at play
one word unqualified 1 x 3
qualified 2 x 3 (6 marks)

(c) (i) Suitable material - (1 mark)
Detailed reason (2 marks)
Basic reason (1 mark each) (3 marks)

(ii) Detailed sequence of construction related to material (3 marks)

Detail of construction method (2 marks)

Brief reference to construction method (1 mark)

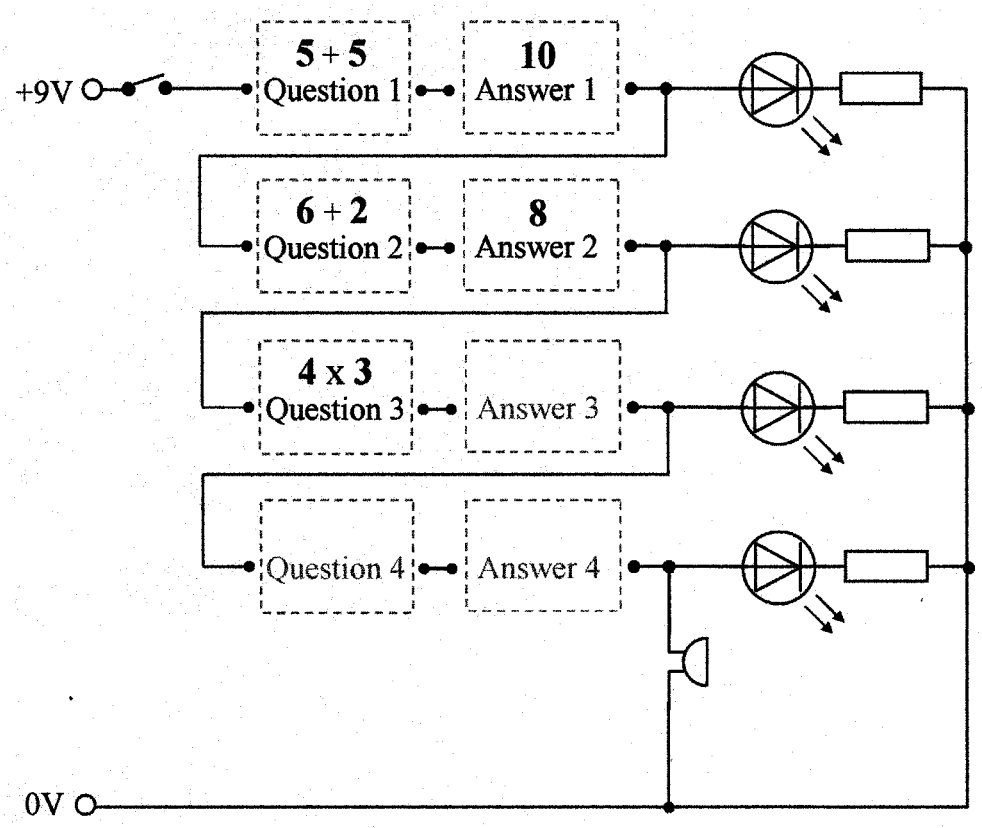
Detailed provision of the housing for the blocks suitable for the material stated. (2 marks)

Some provision of the housing for the blocks (1 mark)

Clear 3D drawing with or without rendering
Drawing that can be interpreted (1 mark) (2 marks)

(iii) Circuit fixed neatly in place (2 marks)
Circuit held in place (1 mark)
Clear 3D/side/plan/ technical drawing (2 marks)
Understood but lacking in quality/detail (1 mark)

(d)



(i) Correct symbol (1 mark)
Parallel with last LED. (1 mark)

(ii) Reed Switch, Push to make, basic contacts (1 mark)
Pressure Pad, LDR, Push switch,
Any other suitable response (1 mark for each) (1 mark)

(e) (i) Greater profit margins, long production runs, less staff required, built in QC, etc
Some qualification required Any 2 (2 marks)

(ii) quality, wider range, competition so better prices etc.
Some qualification required Any 2 (2 marks)

(f) Any suitable testing procedure/method but to be related to evaluation (1 x 2 marks)

Total 36 marks

Question 5

Use of energy, sustainable use, pollution, waste deposits
Removal of minerals/materials might leave top soil vulnerable to erosion. etc (1 mark)

Workers conditions, waste disposal, air, noise pollution
Pollution of atmosphere, use of energy (2 marks)

Energy when being used, pollutants emitted during use
Air, noise pollution, (1 mark)

Lack of landfill, pollution of earth, atmosphere,
Public health (1 mark)

Total 5 marks

Total for paper 100 marks