



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCSE

Design and Technology Electronic Products

3551 (Short Course)

Higher

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Design and Technology: Electronic Products

Short Course: Higher Tier

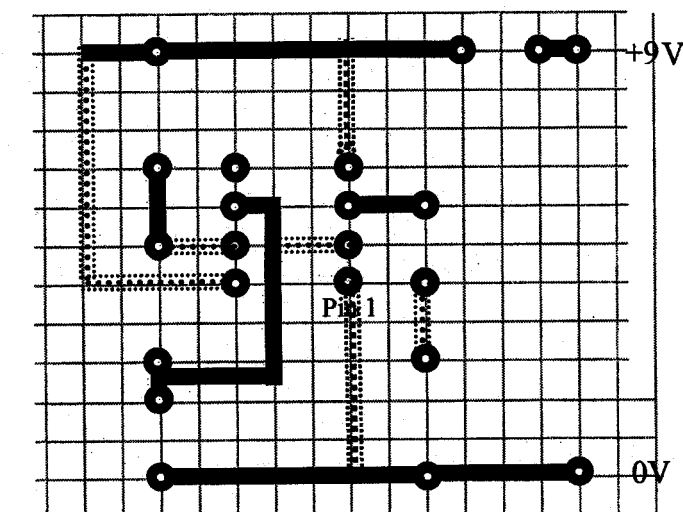
Question 1

- | | | | |
|-----|-------|---|-----------|
| (a) | (i) | 18 | (1 mark) |
| | | 000 | (1 mark) |
| | | 18k or 18000Ω (correct with unit) | (1 mark) |
| | (ii) | Tolerance can be +/- % | (1 mark) |
| | | +/- 5% | (1 mark) |
| (b) | (i) | 5% = 900Ω | (1 mark) |
| | | 18000 + 900 = 18900 | (1 mark) |
| | | Correct with Units = 18900 or 18.9 or 18K9 | (1 mark) |
| | (ii) | 18000 – 900 = 17100 | (1 mark) |
| | | Correct with Units 17100Ω or 17.1 or 17K1 | (1 mark) |
| | | Or correct answer based on (a)(i) | |
| (c) | (i) | Any correct series connection | (1 mark) |
| | (ii) | Components can be changed easily (1 mark each) | |
| | | Components can be used again or any other suitable response | |
| | | Or one qualified reason | (2 marks) |
| | (iii) | R = R1 + R2 | (1 mark) |
| | | OR | |
| | | 12000 + 150 | |
| | | Calculation to arrive at 12150 | (1 mark) |
| | | Correct with units 12150Ω, 12-15k, 12k15 | (1 mark) |

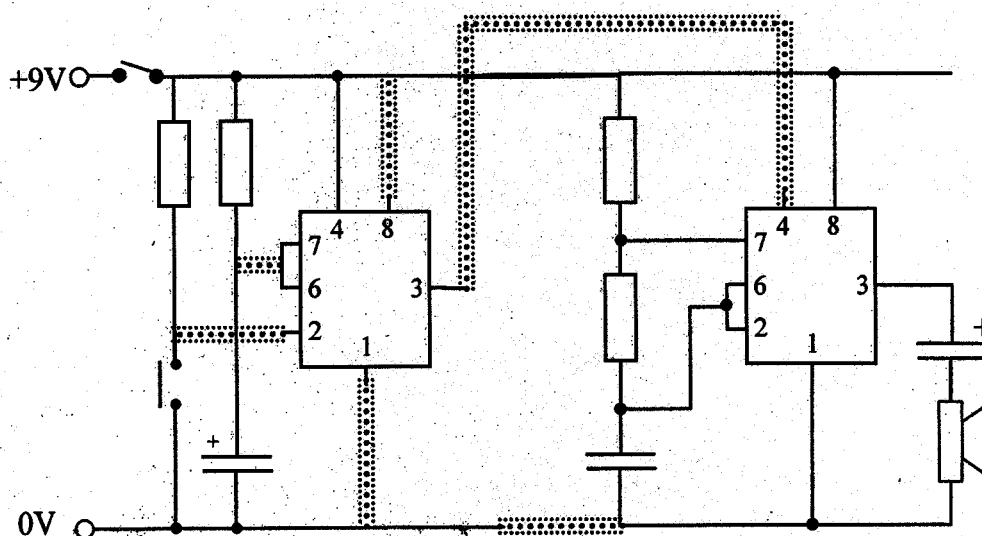
Total 16 marks

Question 2

- (a) No damage to components, 1 mark each
 Can link to CAM
 Values quickly changed
 Possible greater range of components
 High outlay/low running cost
- Any other suitable response. (3 marks)
- (b) Formula $1.44/(R1 + 2R2) \times C$ (1 mark)
 Working reference to $R1 + 2R2 = 37K$ (1 mark)
 Ref to μ ie divide by 1,000,000 or manipulation of 37k (1 mark)
 Correct working – 38 (1 mark)
 Correct answer 389Hz (1 mark)
- (c) One mark for advantage and one mark for qualification. (4 marks)
 e.g. component size correct – makes it easy to put component in place.
 Easy to change layout – to fit board size
 Any other suitable response
- (d) Pin 1 to 0V (1 mark)
 Capacitor to loudspeaker (1 mark)
 Pin 4 to +V (1 mark)
 Pin 8 to +V (1 mark)
 Pin 7 to PD (1 mark)
 Pin 2 to pin 6 (1 mark)



- (e) (i) Mono - Pin 8 to +V (1 mark)
 Pin 1 to 0V (1 mark)
 Pin 2 to sw/res Junction. (1 mark)
 Pins 6/7 to Res/cap Junction (1 mark)
- (ii) Mono to astable – Pin 3 to pin 4 (2 marks)
 or pin 3 to + V rail (1 mark)
 0V rail to 0V (1 mark)
 a V rail 9V or pin 4 to V rail (1 mark)



- Quality of drawing (1 mark)
 Straight lines (1 mark)
 Knowledge of Junction dots (1 mark)

- (f) Can be programmed and re programmed (One mark each)
 Can be programmed to perform varied tasks
 Can be tested and modified before use, set exactly
 Reduced in size of the circuit
 Can replace a complicated circuit (2 marks)
 any other suitable response

- (g) C
 D 1 correct mark 1 mark
 A 2 or 3 correct 2 marks
 B All correct 3 marks

Total 33 marks

Question 3

- (a) V to heater (1 mark)
Heater to relay (com/No) (1 mark)
relay (Com/No) to V (1 mark)
- (b) (i) e.g. to protect the transistor (1 mark)
from too much current (1 mark)
or
to bias/set base current
for relay requirement.
- (ii) To protect the transistor (1 mark)
from back emf (1 mark)
- (c) Resistance in thermistor increases (1 mark)
Voltage at base of transistor increases above that set by VR (1 mark)
Transistor switches (1 mark)
Relay activated (1 mark)

Total 11 marksQuestion 4

- (a) Basic answer – safe any answer (3 marks)
(1 x 3)
Qualified answer
No sharp edges to catch on skin
Non toxic paint/finish so as not to cause problem if chewed
Material that will not splinter etc etc (3 x 2) (6 marks)

(b)

Information that I need	Where I might find the information
How children learn, degree of difficulty, educational needs, Development levels	Nursery or primary schools
Range, prices, availability, properties and costing of materials	<i>Local Suppliers materials catalogue</i>
<i>A range of toys already on the market</i>	Toys catalogue, magazines, visit toy shops ask assistants
<i>Legal requirements for safety, size for age range, finish requirements, H/S</i>	British Standards Institution
Range of sizes of the age groups to use toy. Hand sizes, what can be gripped easily	<i>Anthropometric Data</i>

1 mark each (maximum 5 marks)

(c)	(i)	Suitable material	(1 mark)
		basic reasons	(1 x 2 marks)
		or	
		detailed reason	(2 marks)
	(ii)	Suitable shape for overall construction method chosen.	
		E.g. Vac Form, rounded corners/draft angle or details of any jointing.	(2 marks)
		or	
		A recognised construction method but not fully suited to the material	(1 mark)

		Detailed provision of the housing for the blocks suitable for the material stated.	(2 marks)
		or	
		Reference to provision of the housing for the blocks	(1 mark)

		Any other details – sizes, fitting of base, finish, colours etc	(1 mark)

		Clear 3D drawing with or without rendering	(2 marks)

		Drawing that can be interpreted	(1 mark)

	(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)	Reed Switch, Push to make, basic contacts, microswitch Pressure Pad, LDR or any other suitable response (1 mark for each)	(2 marks)
	(ii)	Detailed sectional view or fully annotated explanation Some evidence of knowledge and annotated detail	(2 marks) (1 mark)
	(iii)	Method that clearly shows how all blocks will work independently and match up	(4 marks)
		Method that shows some probability that all blocks will work independently and match up	(3 marks)
		Method that shows that some blocks will work independently and match up	(2 marks)
		Method that shows that some thought has gone into the positioning of contacts/sensors	(1 mark)
			Total 33 marks

Question 5

Use of energy, sustainable use, pollution, waste deposits Removal of minerals/forests can leave top soil very vulnerable to erosion. Etc.	(1 mark)
Workers conditions, waste disposal, air, noise Pollution of atmosphere, use of energy	(2 marks)
Energy when being used, pollutants emitted during use Air, noise pollution,	(2 marks)
Lack of landfill, pollution of earth, atmosphere, Public health	(2 marks)
Total 7 marks	

Total mark for paper 100