

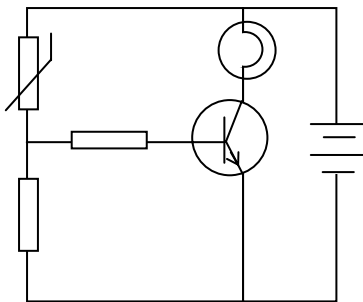
**QUESTIONSHEET 1**

(a) A base	1
B collector	1
C emitter	1
(b) $0.12 + 2.7$	1
= 2.82 mA	1
(c) Zero or very low current	1
<b>TOTAL / 6</b>	

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**QUESTIONSHEET 2**

(a)



Thermistor in place	1
Thermistor symbol correct	1
Fixed resistor in place	1
(b) Fixed resistor replaced by variable resistor	1
	1
<b>TOTAL / 5</b>	

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**QUESTIONSHEET 3**

(a) One mark for each

A on/off	B safety screen	Drill on/off
on	on	<b>on</b>
on	off	<b>off</b>
off	on	<b>off</b>
off	off	<b>off</b>

4

(b) (i) One mark per line

A	B	C
<b>1</b>	<b>1</b>	<b>1</b>
<b>1</b>	<b>0</b>	<b>0</b>
<b>0</b>	<b>1</b>	<b>0</b>
<b>0</b>	<b>0</b>	<b>0</b>

4

(ii) AND gate

1

**TOTAL / 9****QUESTIONSHEET 4**

(a)



1

(b)

A	B	Output
<b>0</b>	<b>0</b>	<b>0</b>
<b>0</b>	<b>1</b>	<b>1</b>
<b>1</b>	<b>0</b>	<b>1</b>
<b>1</b>	<b>1</b>	<b>1</b>

4

**TOTAL / 5**

**QUESTIONSHEET 5**

(a) (i) One 1

(ii)	<b>Input</b>	<b>Output</b>		
	<i>1</i>	<i>0</i>		
	<i>0</i>	<i>1</i>		2

(iii) Inverts/reverses the input 1

(b) (i) NOT and AND 1



- Correct symbols 1
- NOT gate follows 1
- AND gate 1

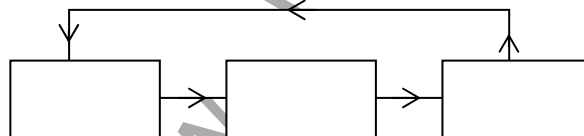
**TOTAL / 8**

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**QUESTIONSHEET 6**

(a) One mark for each point:  
 Taking some of the output 1  
 and feeding it back 1  
 to the input 1

(b) Line drawn from output to input 1




(c) One mark for each point:  
 System can check how effective it is 1  
 and change its operation if necessary 1  
 This makes it more accurate/sentitive 1

**TOTAL / 7**

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**QUESTIONSHEET 7**

- (a) Bell stops ringing 1
- (b)(i) Wire connected  between bell and relay 1
- (ii) A switch 1  
in series with bell 1
- (c) It is stable in two states/ there are two states which the circuit will stay 1  
It stays in one state unless reset 1

**TOTAL / 6**

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**QUESTIONSHEET 8**

- (a) Any Two From 2  
seat belt connected  
engine not running  
no-one sitting in passenger seat

(b)

Input A	Input B	P (A and B)	Q (Not B)	alarm
0	0	0	1	0
0	1	0	0	0
1	0	0	1	1
1	1	1	0	0

5

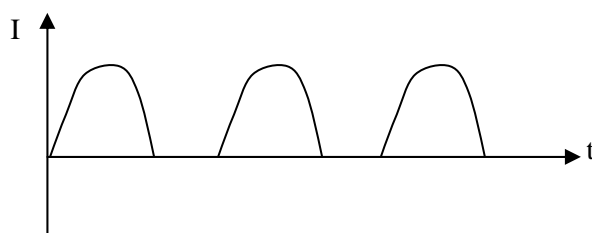
(one mark for each correctly completed column)

**TOTAL / 7**

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**QUESTIONSHEET 9**

- (a) (i) Nothing/Zero 1
- (ii) The diode only lets current flow 1  
in one direction 1
- (b) Only current in positive (or negative) direction flows 1  
Half of sine wave cut out 1  
Current only flows for half the time/ cycle 1



1

**TOTAL / 7**

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**QUESTIONSHEET 10**

(a) Input voltage / V divided up by ratio of size of resistors	1 1
(b)(i) Variable resistor/ $R_2$	1
(ii) Collector current high/ current now flows through collector	1
(iii) Lamp comes on	1
	<b>TOTAL / 5</b>

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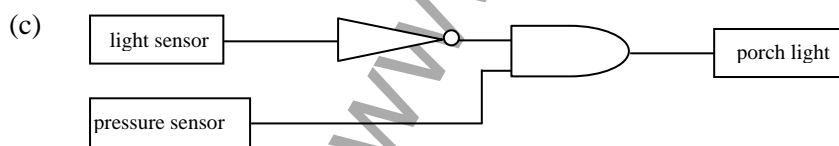
**QUESTIONSHEET 11**

(a) One mark for each point: Resistance goes up	1
Voltage across transistor increases	1
Transistor switches on	1
Lamp comes on	1
(b) Thermistor	1
	<b>TOTAL / 5</b>

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**QUESTIONSHEET 12**

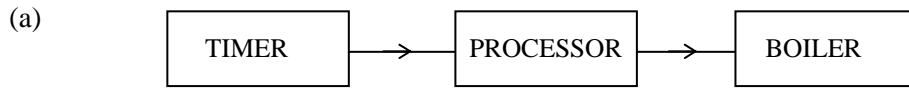
(a) LDR	1
Pressure	1
(b) NOT	1
AND	1



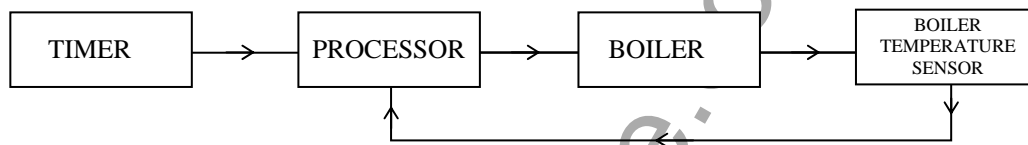
Light sensors connected to NOT gate	1
Pressure sensor forms one input to AND gate	1
Output from NOT gate forms second input	1
Output from AND gate connected to porch light	1

**TOTAL / 8**

**QUESTIONSHEET 13**



- (b)(i) System cannot monitor the water temperature 1  
 The central heating system could get hotter indefinitely/  
 the home would overheat 1
- (ii) Boiler temperature sensor loop 1  
 Feedback loop 1  
 Line drawn from boiler temperature sensor to the processor 1



2

**TOTAL / 7**

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**QUESTIONSHEET 14**

- (a) Thermistor 1  
 Switch for alarm 1
- (b) AND 1
- (c) Buzzer/ bell/ LED/ lamp 1
- (d) Replace alarm 1  
 By relay switch 1  
 Connect to heater 1

**TOTAL / 7**

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**QUESTIONSHEET 15**

(a) (i)	falls/gets lower	1
	(ii) increases/gets higher	1
	(iii) replace lamp with buzzer/bell	1
	ensure room light plays on LDR	1
(b) (i)	change sensitivity/adjust required light level for operation	1
	(ii) light on LDR falls/gets less	1
	resistance increases to exceed that of $R_2$	1
	current flows though lamp	1
<b>TOTAL / 8</b>		


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**QUESTIONSHEET 16**

(a) (i)	circuit with two switches in series	1
	(ii) two inputs passing through AND gate to machine	1
	(iii) electronic components less likely to fail lower current used	1
(b)	thermistor	1
	LDR	1
	Buzzer or bell	1
<b>TOTAL / 9</b>		

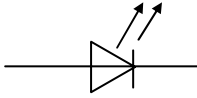
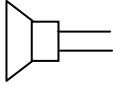
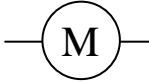
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**QUESTIONSHEET 17**

(a)		3
(b) (i)	Any one of: microphone, pressure switch, thermistor, light dependent resistor	1
	(ii) Any one of: loudspeaker, bell, buzzer, light emitting diode, lamp, motor	1
<b>TOTAL / 5</b>		

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## QUESTIONSHEET 18

Name	Symbol	What is the output?
LED		Light
Loudspeaker		Sound
Motor		Movement

4

TOTAL / 4

## QUESTIONSHEET 19

- (a) Light-emitting diode 1
- (b) lower current used 1  
less likely to fail 1  
do not get hot 1
- (c) (i) 7 1
- (ii)  2
- (iii) 8 shows when all LEDs are lit 1  
rapid change makes all appear to be lit 1

TOTAL / 9



**QUESTIONSHEET 20**

- |         |  |   |
|---------|--|---|
| (a) (i) | light comes on/lamp lights                       | 1 |
| (ii)    | light/lamp goes out                              | 1 |
| (b) (i) | use normally closed switch on door/door jam      | 1 |
|         | magnet on door jam/door                          | 1 |
|         | when door opens switch closes and operates alarm | 1 |
| (ii)    | normally open switch on body/door                | 1 |
|         | magnet on door/body                              | 1 |
|         | when door opens switch opens and turns off power | 1 |

**TOTAL / 8**

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