

# General Certificate of Secondary Education

## Electronics 3432

### *Foundation Tier*

# Mark Scheme

## *2005 examination – June series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

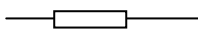
It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

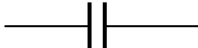
**Foundation Tier**

1 (a) live✓  
earth✓  
neutral✓ (3 marks)

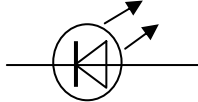
- (b) (i) 1 earth pin✓  
2 fuse✓  
3 cord grip✓
- (ii) 1 conducts current to earth in the event of a fault✓  
2 fuse fails✓ if too much current flows✓  
3 stops wires pulling out of terminals✓

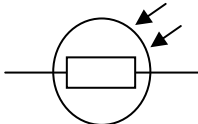
(7 marks)  
**Total 10 marks**

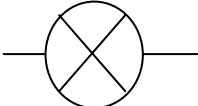
2 Resistor  ✓

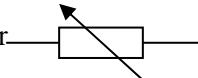
Capacitor  ✓

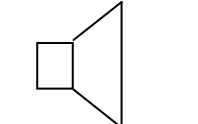
Diode  ✓

LED  ✓

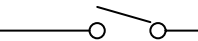
LDR  ✓

Lamp  ✓

Variable resistor  ✓

Loudspeaker  ✓

Battery  ✓

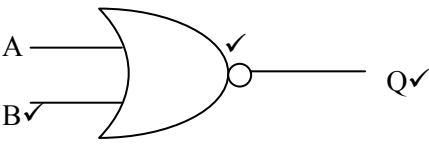
Switch  ✓

(10 marks)  
**Total 10 marks**

- 3 (a) (i) light sensor✓ movement sensor✓  
 (ii) lamp✓  
 (iii) comparator✓ (4 marks)
- (b) (i) AND gate✓  
 (ii) comparator✓  
 (iii) light sensor✓ (3 marks)
- (c) MOSFET✓ (1 mark)
- (d) (i) timer or monostable✓  
 (ii) between AND gate and MOSFET✓ (2 marks)
- Total 10 marks**

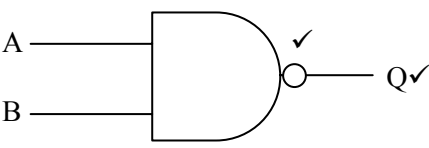
- 4 (a) (i)
- A

B✓


- (ii)
- |   |   |    |
|---|---|----|
| A | B | Q  |
| 0 | 0 | 1✓ |
| 0 | 1 | 0✓ |
| 1 | 0 | 0✓ |
| 1 | 1 | 0✓ |
- (7 marks)

- (b) (i) NAND✓
- (ii)
- A

B


- (3 marks)  
**Total 10 marks**

5 (a) capacitor✓  
 680  $\mu$ F ✓  
 40 V✓  
 polarity indicator✓ (4 marks)

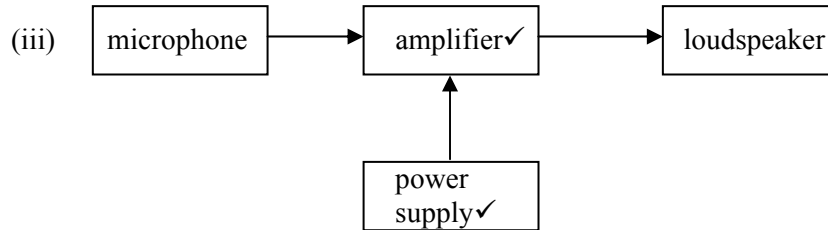
(b) resistor✓  
 3✓ 6✓ 0✓ ( $\Omega$ )  
 5%✓  
 to limit current✓ (6 marks)

**Total 10 marks**

6 (a) aerial✓ rf tuned circuit✓ demodulator✓ af amplifier✓ loudspeaker✓ (5 marks)

(b) (i)  $2 / 0.01 = \checkmark$  200✓

(ii) current amplification✓



(5 marks)

**Total 10 marks**

7 (a) collector✓  
 base✓  
 emitter✓ (3 marks)

(b) (i)  $12 - 2 - 0.5 = \checkmark$  9.5 V✓

(ii)  $9.5 / 0.025 = \checkmark$  380  $\Omega$  ✓

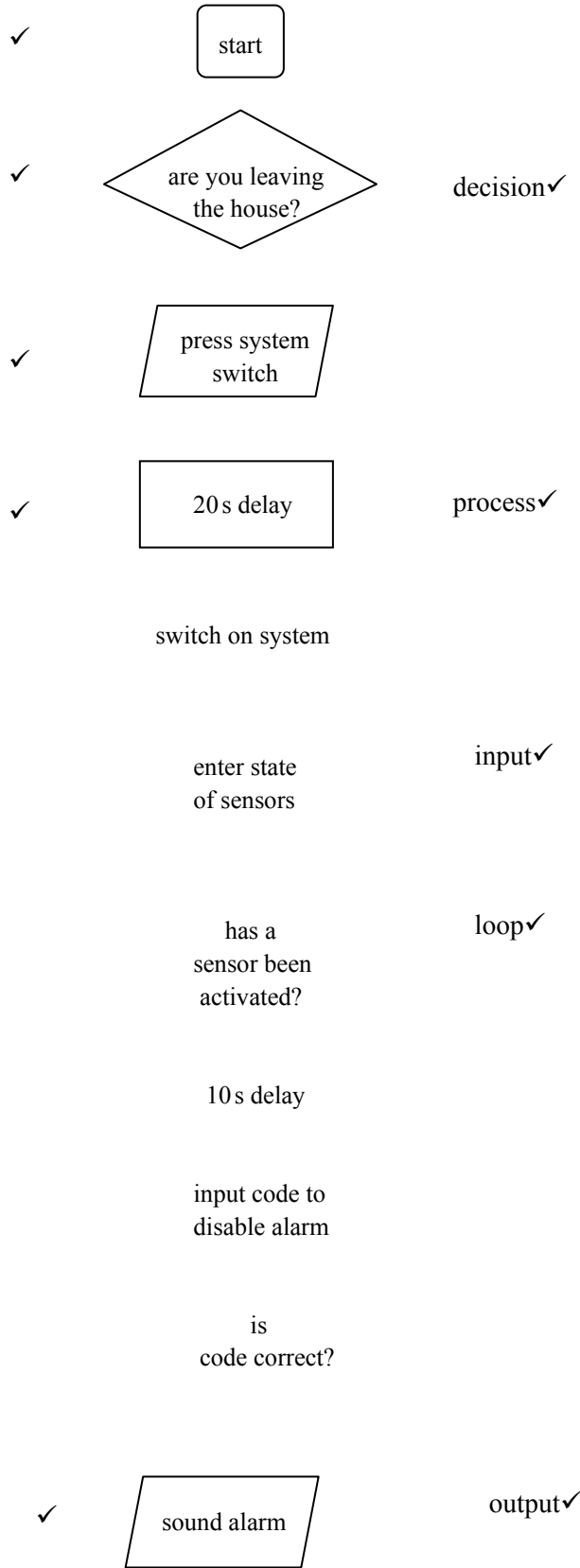
(iii) 390  $\Omega$  ✓

(iv)  $9.5 \times 0.025 = \checkmark$  0.24 W✓

(7 marks)

**Total 10 marks**

8 (a) and (b)

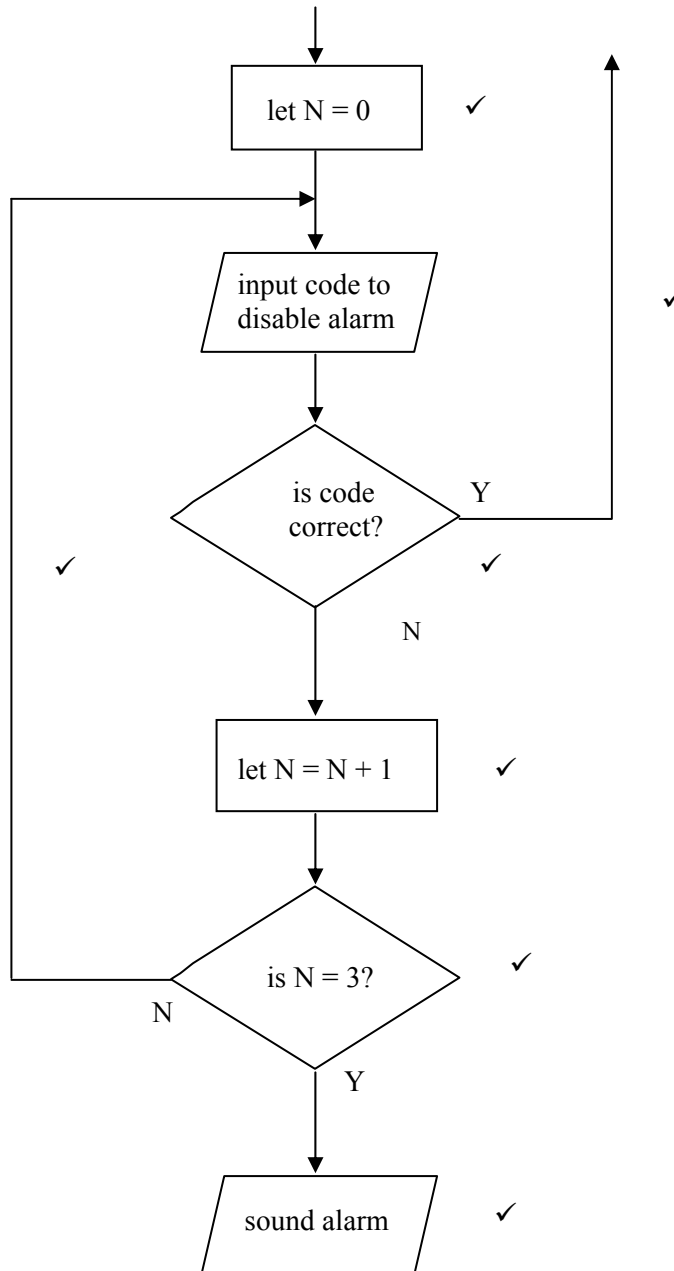


(10 marks)

- 8 (c) state entered into system ✓  
 system detects activated sensor ✓  
 delay 10 seconds ✓  
 no correct code entered ✓  
 alarm is sounded ✓

(5 marks)

- (d) example answer, others possible

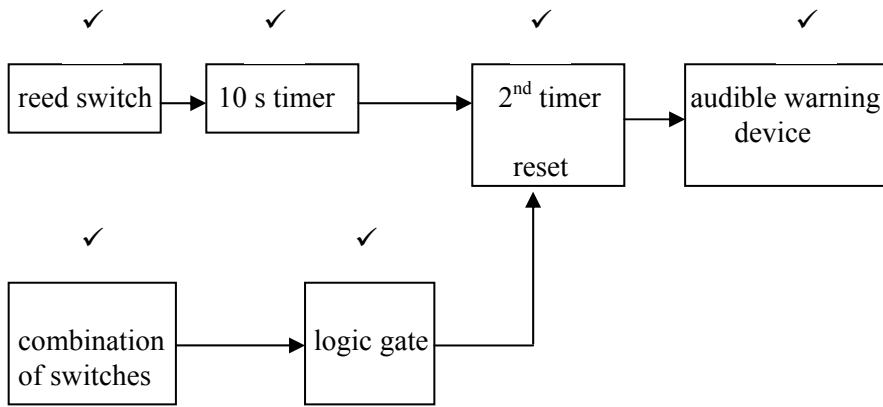


(5 marks)

**Total 20 marks**

9

(a)



(6 marks)

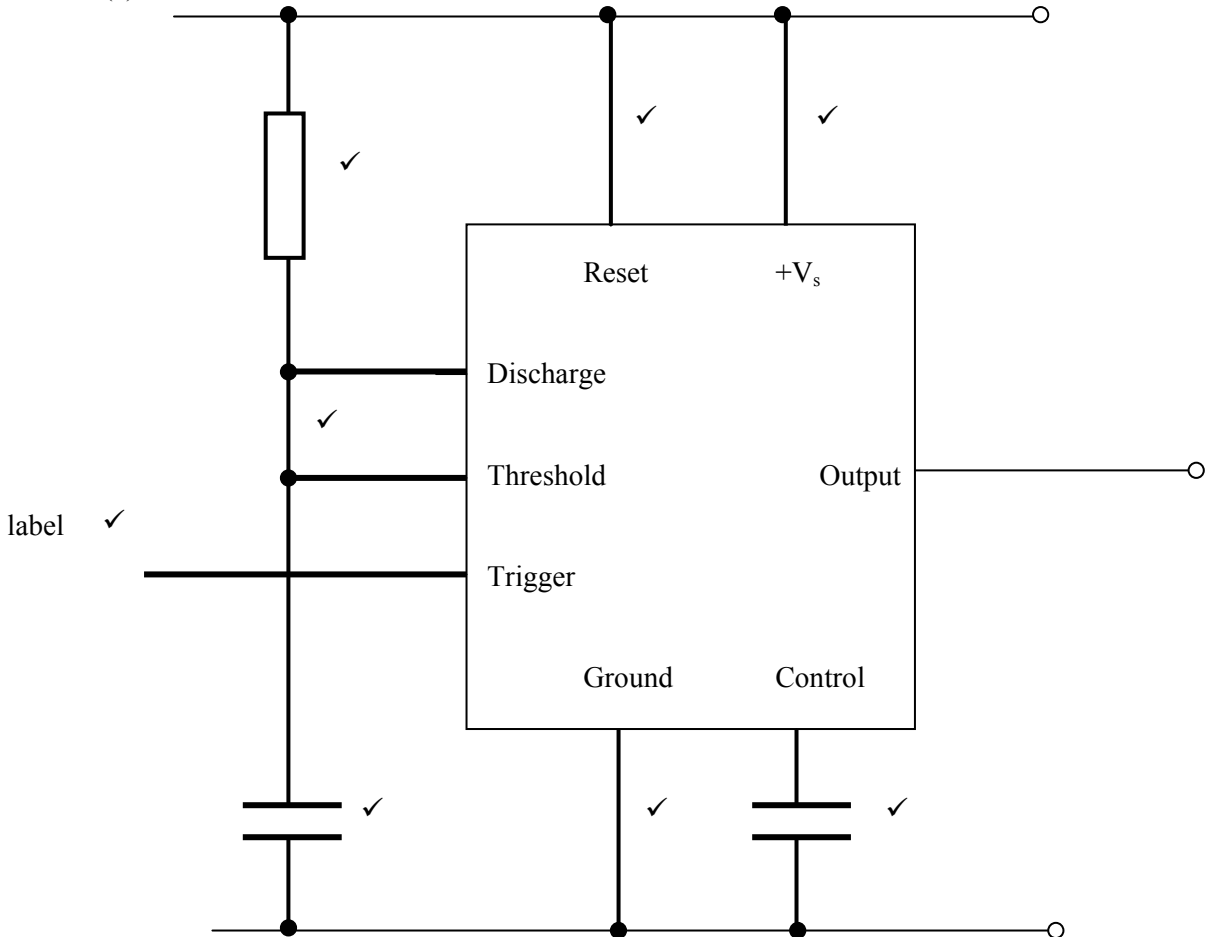
(b)

(i) 12 V ✓  
0 V ✓

(ii)  $12 \text{ V} / 10 \text{ k}\Omega = 1.2 \text{ mA}$  ✓

(4 marks)

(c)



(8 marks)

(d)

(i) door opens, output from circuit goes low ✓  
m/s needs input voltage to drop ✓  
below a certain level ✓  
to trigger ✓

- (ii) 0 V ✓  
V<sub>s</sub> ✓

(6 marks)

- (e) (i) S<sub>1</sub> open ✓  
S<sub>2</sub> closed ✓
- (ii) 0 ✓
- (iii) NAND gate requires logic 1 at both inputs ✓  
to give out logic 0 ✓  
and reset 2<sup>nd</sup> timer ✓

(6 marks)

**Total 30 marks**

**Paper Total 120**