

# GCSE 2004

## *June Series*



# Mark Scheme

## Electronics

### *3432 (Foundation Tier)*

---

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.

Further copies of this Mark Scheme are available from:

Publications Department, Aldon House, 39, Heald Grove, Rusholme, Manchester, M14 4NA  
Tel: 0161 953 1170

or

download from the AQA website: [www.aqa.org.uk](http://www.aqa.org.uk)

Copyright © 2004 AQA and its licensors

#### COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales 3644723 and a registered charity number 1073334. Registered address AQA, Devas Street, Manchester. M15 6EX. *Dr Michael Cresswell Director General*

**Foundation Tier****1**

- (a) shock or paralysis (allow heart stops) ✓ burns ✓ (any order)
- (b) example answers given here, other valid answers will be awarded credit.
- 1 never work alone/without proper supervision ✓  
no one to help or get help in an emergency ✓
  - 2 carry out risk assessment ✓  
become aware/avoid dangerous activities ✓
- (c) switch off supply when overloaded ✓  
slow to act/can be insensitive ✓
- (d) transformer ✓  
reduces mains voltage to a safer low voltage ✓ (10 marks)

**2**

- |              |                  |           |
|--------------|------------------|-----------|
| resistor ✓   | limits current ✓ |           |
| op-amp ✓     | comparator ✓     |           |
| thermistor ✓ | heat sensor ✓    | input ✓   |
| NOT gate ✓   | logic gate ✓     | digital ✓ |
- (10 marks)

**3**

- (a) (i) temperature sensor ✓
- (ii) fan motor ✓
- (iii) comparator ✓
- (b) (i) comparator ✓
- (ii) temperature sensor ✓
- (iii) temperature sensor or comparator ✓
- (c) (i) current amplifier/switch/driver ✓
- (ii) relay ✓
- (iii) npn transistor ✓ MOSFET ✓ (10 marks)

**4**

(a) NOR gate✓

A	B	Q	
0	0	1✓	
0	1	0✓	
1	0	0✓	
1	1	0✓	or ecf

(b) AND gate✓

A	B	Q	
0	0	0✓	
0	1	0✓	
1	0	0✓	
1	1	1✓	or ecf

(10 marks)

**5**

(a) (i) converts radio signal✓ to an audio signal✓

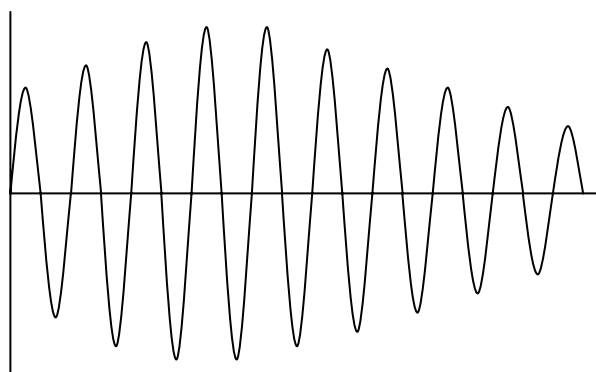
(ii) converts audio frequency electrical signal✓ to sound✓

(b) (i) cassette tape✓

(ii) CD/MP3✓

(c) (i) amplitude✓

(ii)



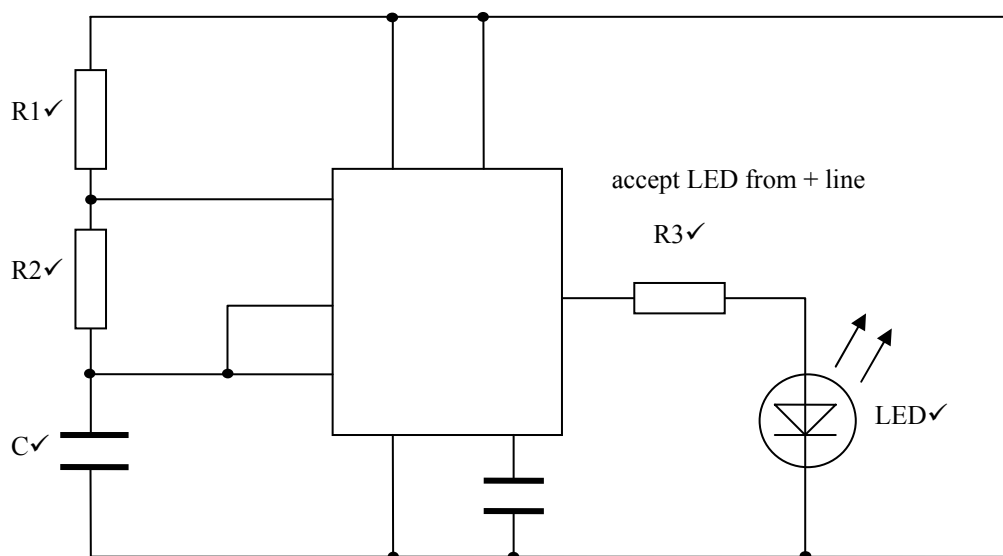
✓

(d) detect weak signals✓  
separate signals on adjacent channels✓

(10 marks)

**6**

(a)



(b) (i)  $8 - 2 = 6 \text{ V}$  ✓

(ii)  $6 / 0.02 \text{ ✓} = 300 \text{ } \Omega \text{ ✓}$

(iii) orange black ✓ brown gold ✓

(10 marks)

**7**

(a) (i) LDR ✓

(ii) op-amp ✓

(b) (i) voltage divider ✓

(ii) generate a reference voltage ✓

(c) (i) +12 V ✓

(ii) 0 V ✓

(d) (i) Watt ✓

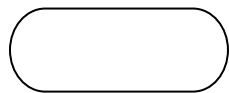
(ii)  $12 \times 15 \text{ ✓} = 180 \text{ mW (or 0.18 W) ✓}$

(iii) 3 terminal regulator ✓

(10 marks)

**8**

(a)



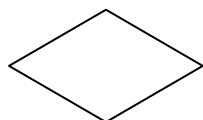
✓



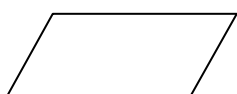
✓



✓



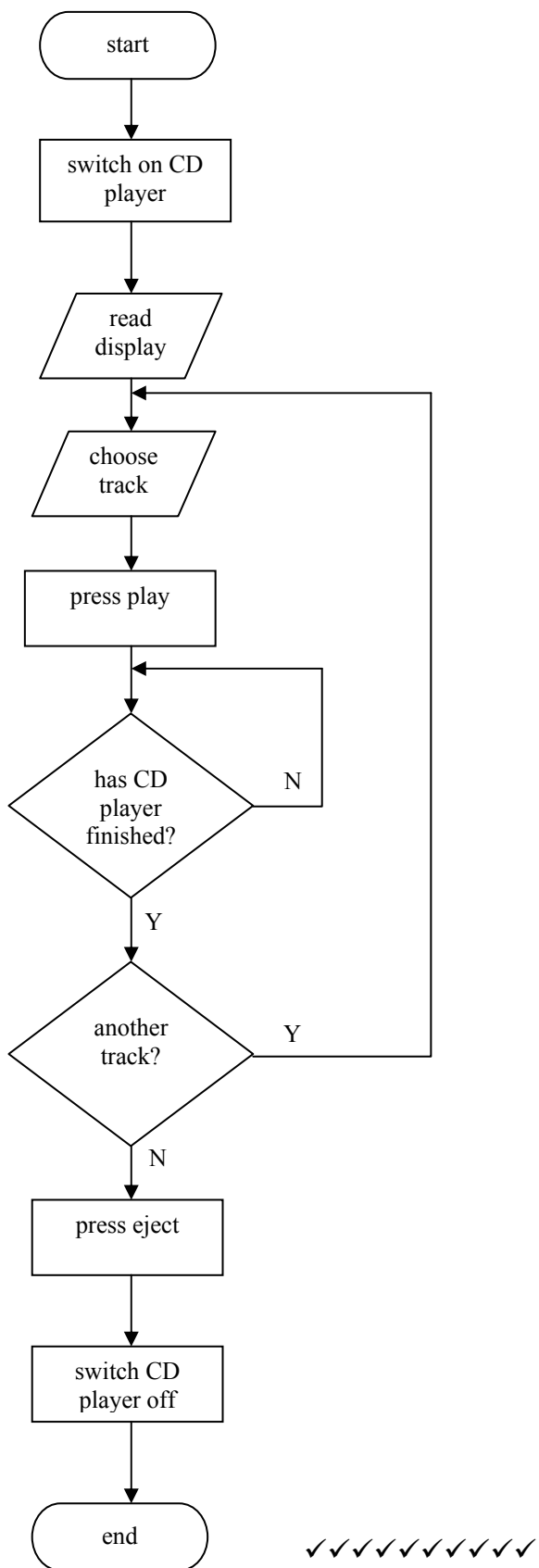
✓



✓

- (b) input boxes – begin with enter, click or input ✓  
output box – print out ✓  
compare box – diamond ✓  
process box – rectangle ✓  
loop – extreme right of flowchart, above or below end application ✓

(c) (Example only)



(20 marks)

9

(a)

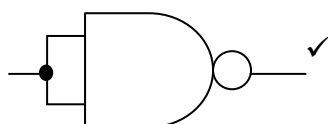
A	B	C	D	Q
0	0	0	1	1✓
0	1	0	0	0✓
1	0	0	1	1✓
1	1	1	0	1✓

(b) (i) LDR✓

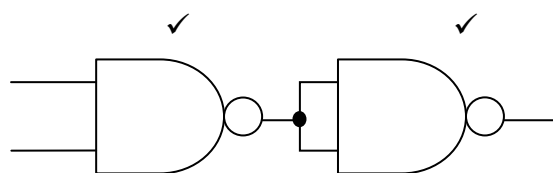
(ii) microswitch✓

(iii) door open✓ dark✓

(c) (i) NOR gate ✓

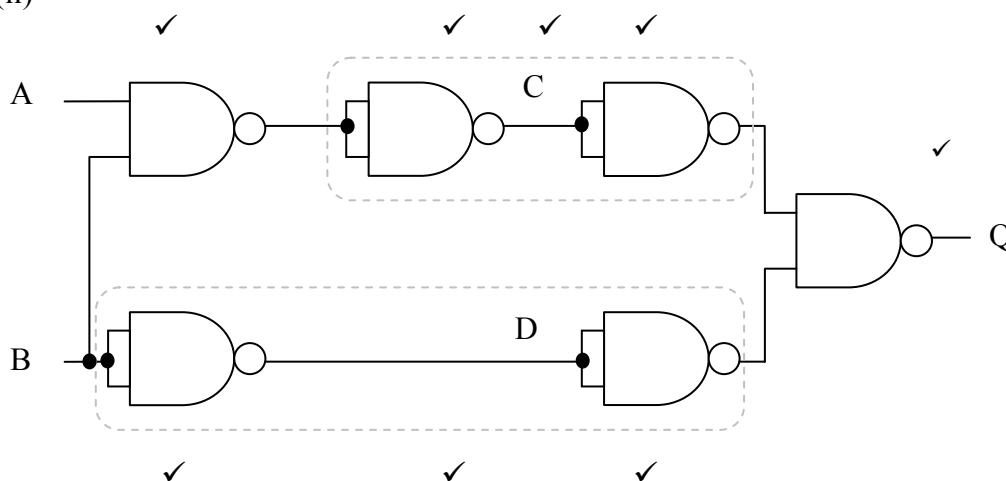


NOT gate



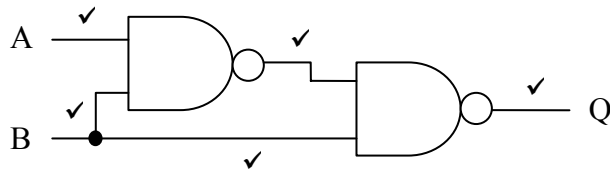
AND gate

(d)(i)  
& (ii)

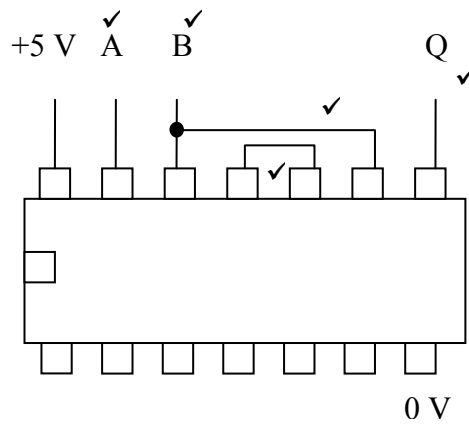




(iii)



(e)



(30 marks)

(Paper total 120 marks)