Version 1.0: 0708

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Electronics 3432

Tier H Higher

Mark Scheme

2008 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.

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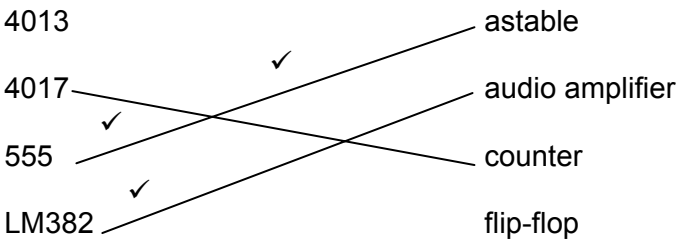
1 (a)



(b) (i) stores charge✓

(ii) fuse✓

(iii) earth✓

(iv) brown✓

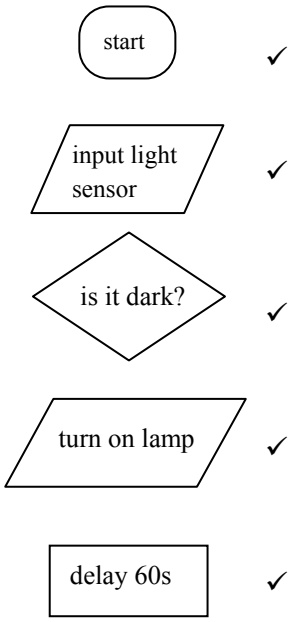
(v) (bridge)rectifier/diode✓

(vi) signal generator✓

(vii) coaxial cable/twisted pair✓

Total – 10

2 (a)



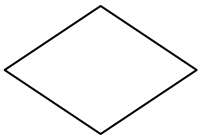
✓

✓

✓

✓

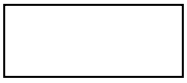
✓

(b) (i) decision box  ✓

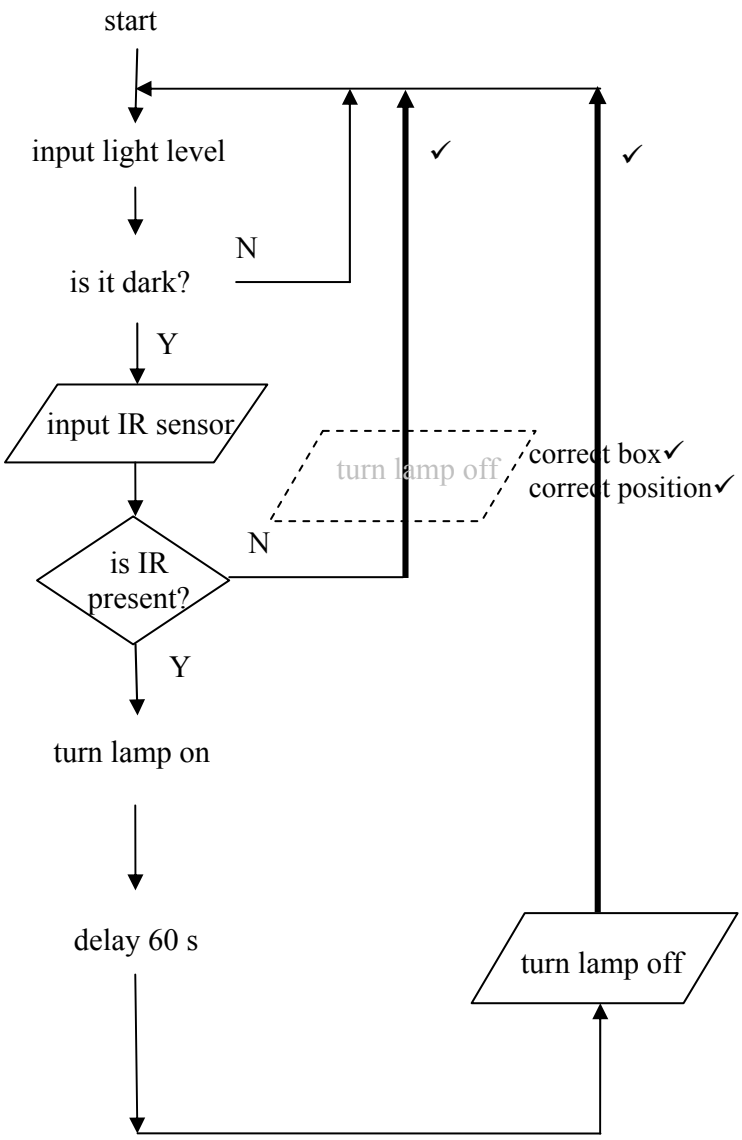
input box  ✓

a loop is any line that returns to a point earlier in the flow chart✓

output box  ✓

process box  ✓

(b) (ii) & (iii)



(c) light level is inputted, is dark detected? ✓
if yes, is IR detected? ✓
if yes turn on lamp✓
wait 60s before repeat✓

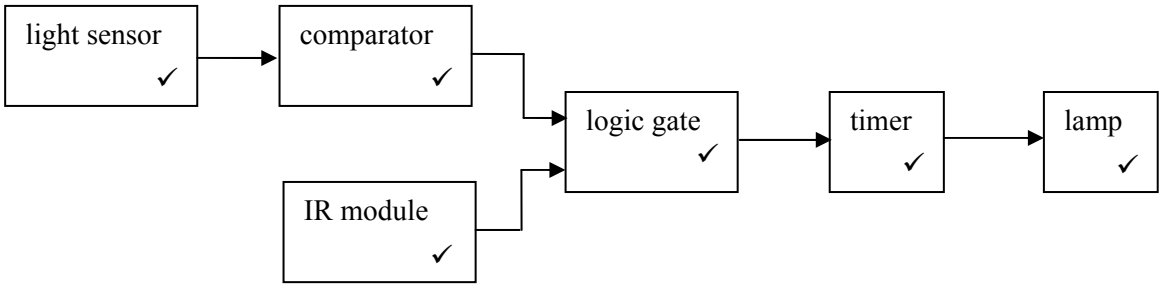
(d) (i) turn off lamp occurs after 60s delay, then switches on again✓

(ii) "turn off lamp" ✓

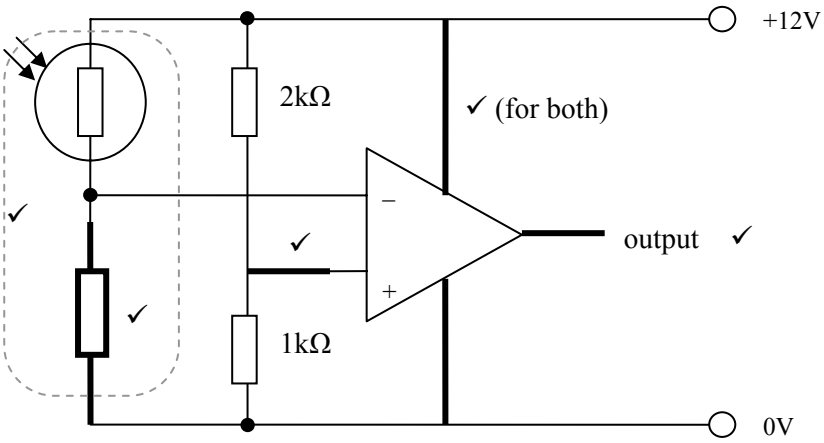
(iii) on diagram above

Total – 20

3 (a)



(b) (i) & (iii)



(ii) 4V✓

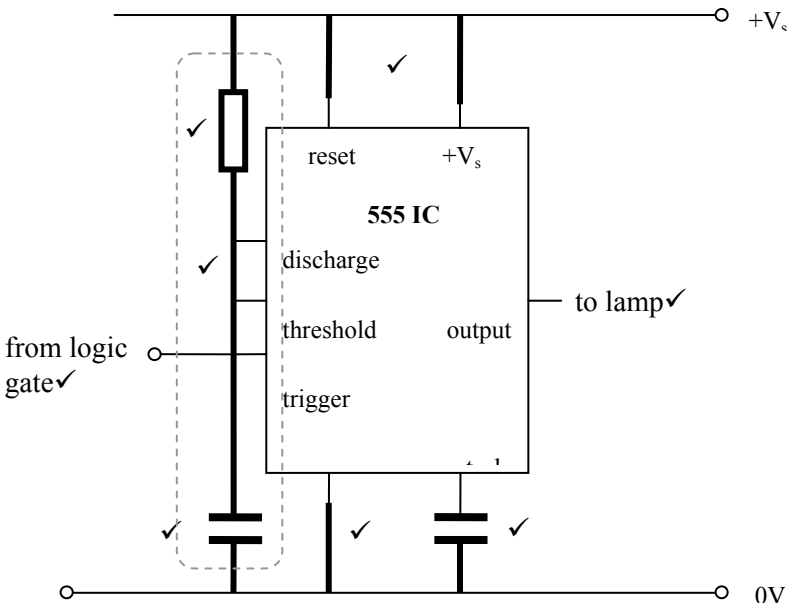
(iv) 100kΩ✓

(c) (i)

light sensor	IR module	output
0	0	**1**✓
0	1	**1**✓
1	0	**1**✓
1	1	**0**✓

(ii) NAND✓

(d) (i) & (ii)
1 mark for each correct component in ring✓✓



(e) (i) relay✓

(ii) diode✓

Total – 30

4 (a) (i) aerial/antenna✓
generates/induces/converts em waves✓
(small) electrical signal✓

(ii) audio amplifier✓
to increase✓ signal/voltage/current/power✓

(b) (i) ability to detect✓ small signals✓

(ii) ability to select✓ one signal✓ (from all the others)

(c) (i) frequency modulation✓

(ii) amplitude modulation✓

(d) (i) varying amplitude constant frequency✓
phase consistent with given graphs✓

(ii) varying frequency constant amplitude✓
phase consistent with given graphs✓

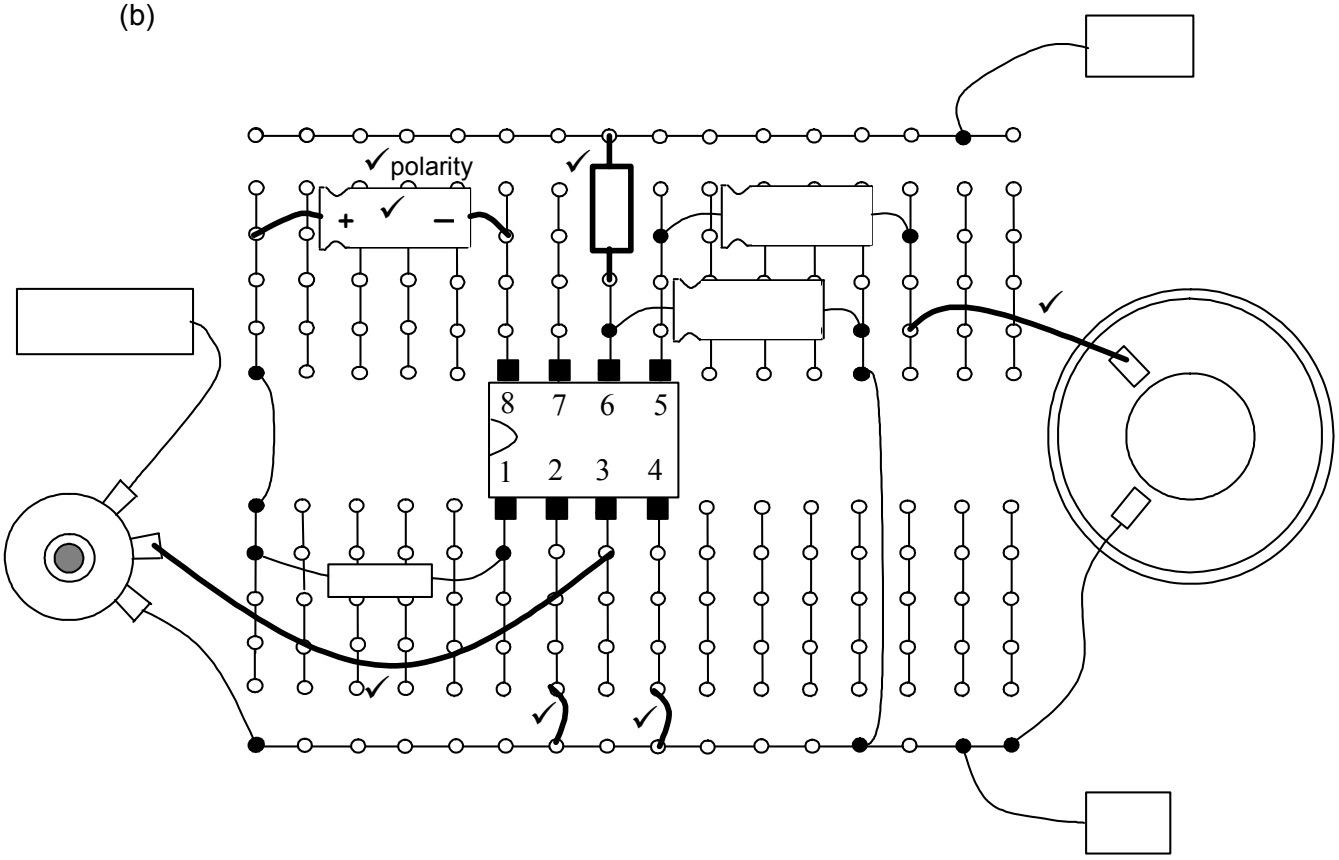
Total – 16

5 (a) (i) potentiometer (accept variable resistor/rheostat) ✓

(ii) volume control✓

(iii) brown✓ black✓ black✓ gold✓

(b)



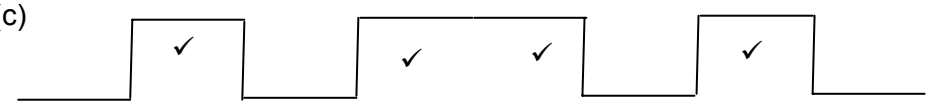
(c) $P = I^2R = 0.2^2 \times 8 = 0.32$ W✓✓

Total – 15

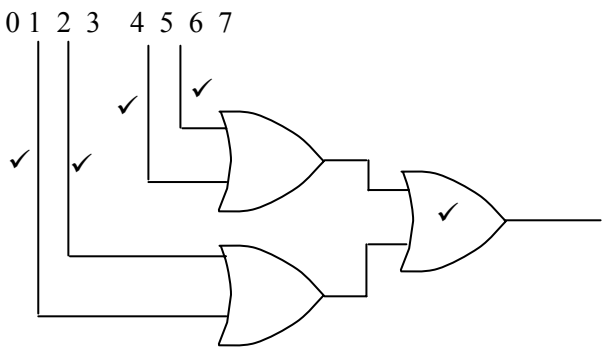
6 (a) flip-flop/4013 ✓

(b) AND ✓

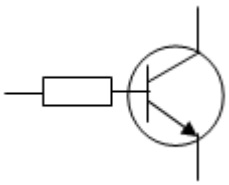
(c)

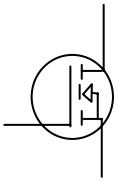


(d)



(e) MOSFET - orientation ✓ recognisable symbol✓ accurate symbol✓
Junction transistor - orientation + resistor ✓ recognisable symbol✓
accurate symbol ✓





Total – 14

7 (a)

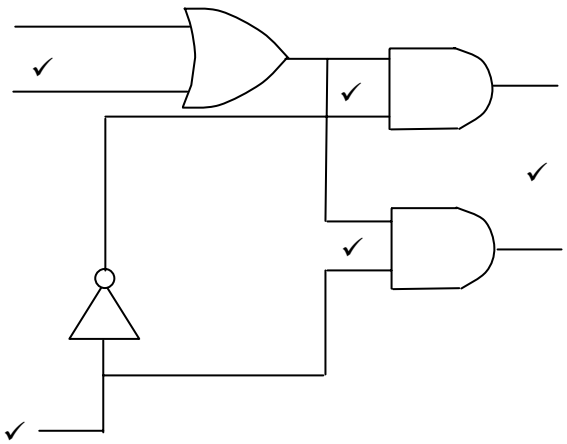
			0
			0
			1
			0
			1
			0
			1
			0

✓ ✓

			0
			0
			0
			1
			0
			1
			0
			1

✓ ✓

(b)



(c) (i)

		1
		0
		0
		0

✓

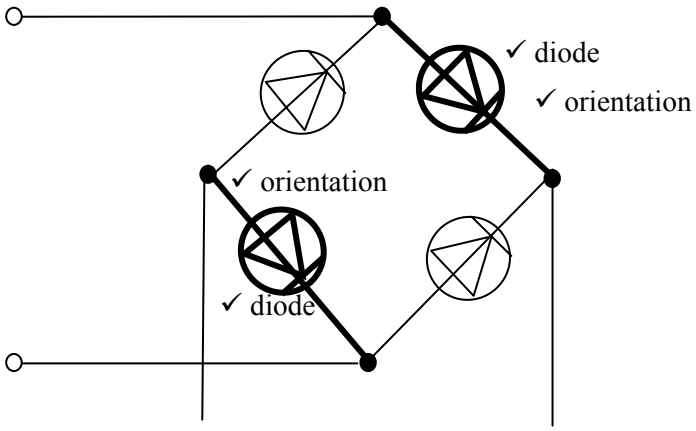
(ii)

			1	1	0	
			1	0	0	
			0	1	0	✓✓✓
			0	0	1	
			0	1	0	
			0	0	1	✓✓✓
			0	1	0	
			0	0	1	

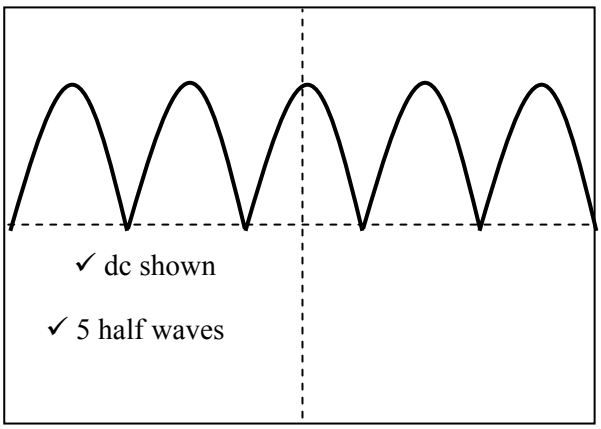
(d) Any sensible reason✓ , any sensible explanation✓
e.g. may forget to operate day/night switch/evening classes (max 3)

Total – 19

8 (a) (i)



(ii)



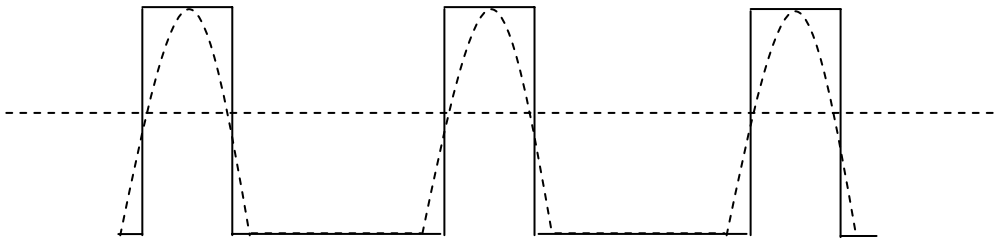
(b) (i) 3 × 2 = 6 V✓✓

(ii) T=1/f = 0.02 s✓✓

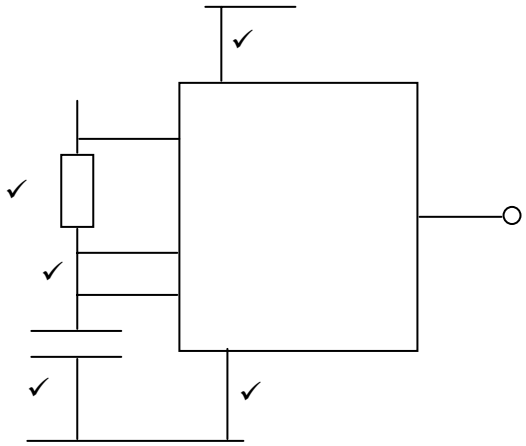
(iii) 0.02 ÷ 4 = 0.005 s/div = 5 ms/div✓✓

(c) (i) 3 V✓

(ii) square wave✓,correctly on top of half waves✓,
cutting half waves at 3V point✓



(d) (i)



(ii) $T = (R_1 + 2R_2)C/1.44 = (5000 + 44000) \times 1\times10^{-6} / 1.44 = 0.034$ s✓✓✓

(iii) f =1/T = 1/0.034 = 29.4✓ Hz✓

Total – 26

Paper Total – 150