GCSE 2004
June Series

ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark Scheme

Electronics
3432 (Higher Tier)

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Higher Tier

1

(a) diode✓

(b) thermistor✓

(c) loudspeaker✓

(d) relay✓

(e) three terminal regulator/zener diode✓ (5marks)

2

(a) demodulator✓

(b) rf tuned circuit✓

(c) loudspeaker✓

(d) (audio)amplifier✓

(e) aerial/antenna✓ (5 marks)

3

(a)

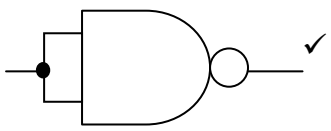
A	B	C	D	Q
0	0	0	1	1✓
0	1	0	0	0✓
1	0	0	1	1✓
1	1	1	0	1✓

(b) (i) LDR✓

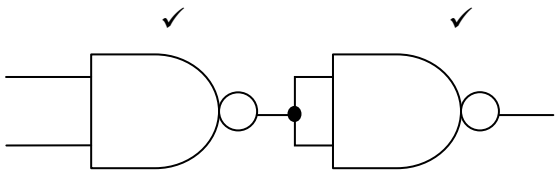
(ii) microswitch✓

(iii) door open✓ dark✓

(c) (i) NOR gate ✓

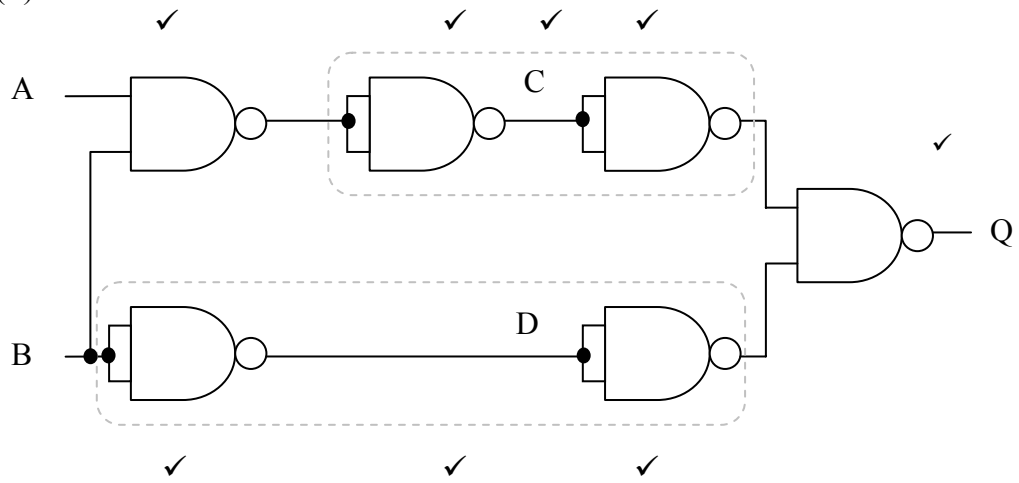


NOT gate

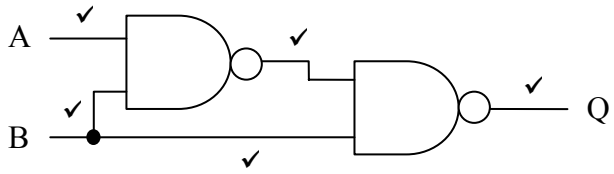


AND gate

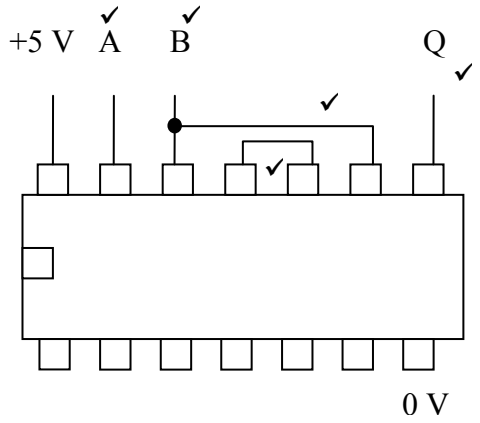
(d)(i)
& (ii)



(iii)



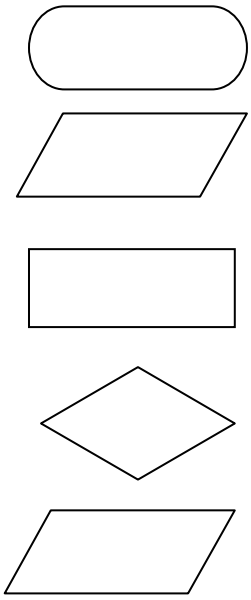
(e)



(30 marks)

4

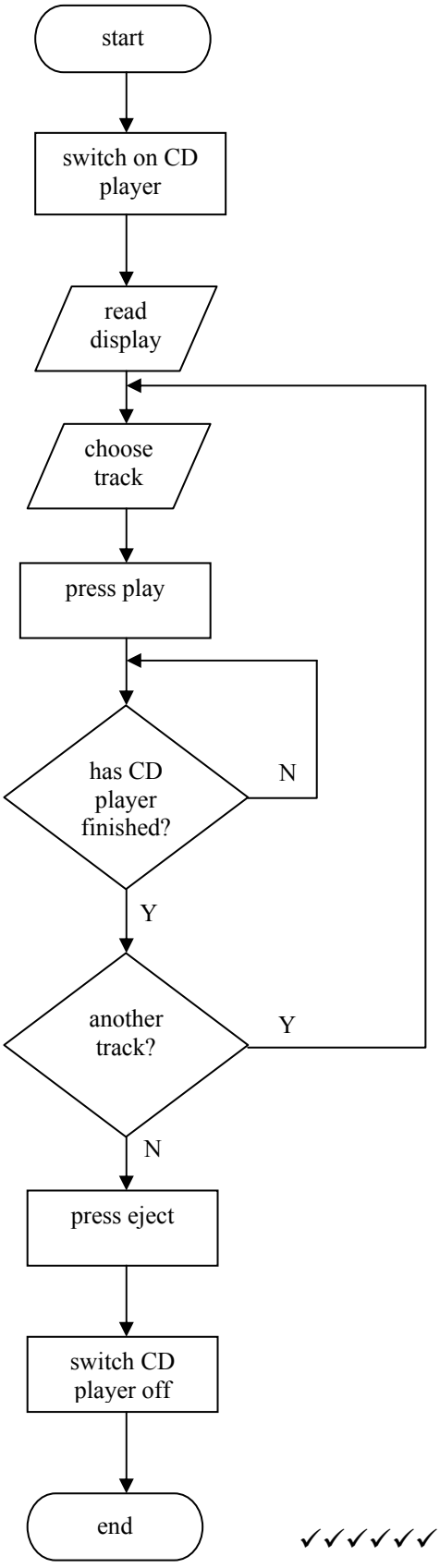
(a)



✓
✓
✓
✓
✓

(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)

5

(a) $V_Y = 9\ R_1 /(R_1 + R_2)$✓ = 4.5✓V✓

(b) (i) 3 kΩ✓

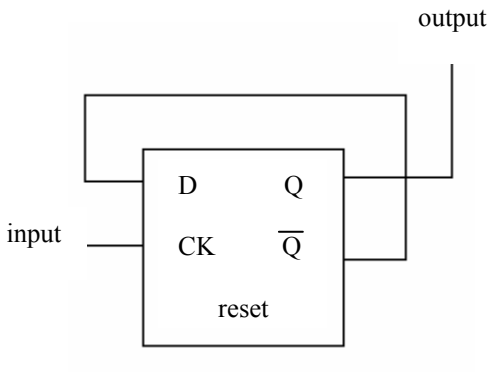
(ii) 1.1 to 1.2 kΩ✓

(iii) $V_X > V_Y$✓

(iv) R_{th} = 2 kΩ✓, R_3 = 2✓ kΩ✓(2 max)

(v) can vary ✓the light level at which switching occurs✓
if light level varies in the room✓(2max)

(c) (i)



input labelled✓ to clock✓

D to bar $\overline{Q}$✓
output labelled✓

(ii) Q (or $\overline{Q}$) of first ✓ to CK input of second ✓

(d) (i) 0111✓

(ii) 10✓

(iii) 15/1111✓ (19 marks)

6

(a)

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

Max 6 (6 minus one for any row incorrect)

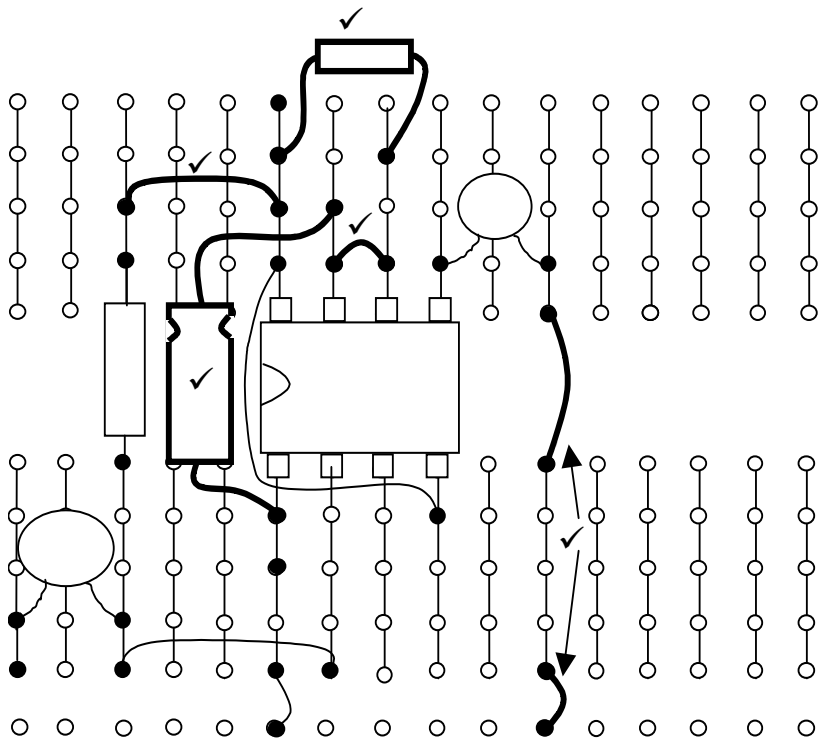
(b) (i)

discharge ✓

trigger ✓

(ii) the voltage rises/goes high✓ for a definite/set time✓ which depends on the values of R and C✓ (2 max)

(iii)



(or equivalent) (15 marks)

7

(a) (i) 8✓

(ii) 2,6✓

(iii) 14, 7✓

(b) (i) 4×2✓ = 8✓ ms✓

(ii) f=1/T✓ = 125✓ Hz✓

(iii) 3×0.1✓ = 0.3✓ (V)

(iv) $V_{out} = 20 \times 0.3$✓ = 6✓(V)

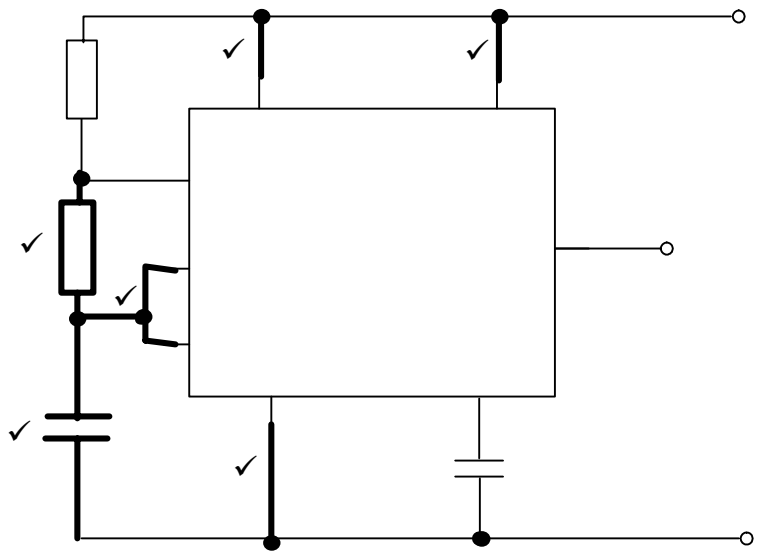
(v) correct amplitude (3 squares)✓
correct period (4 squares)✓
sinusoidal ✓

(c) I = V/R and P = VI✓, $P=V^2/R$✓=1.13✓W✓ (3 max)

(d) amplitude/height of trace decreases✓
period decreases/waveforms closer together✓ (21 marks)

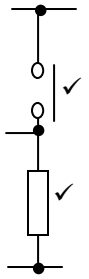
8

(a)



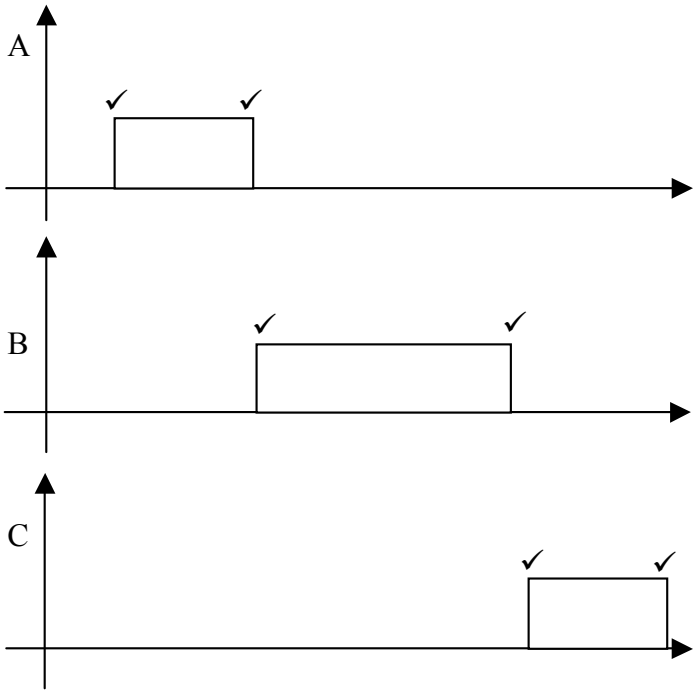
(b) $T = (R_1 + 2R_2)C/1.44$✓ = 31✓ s✓

(c) (i)



(c) (ii) pull down resistor✓, to hold the voltage low✓
when the switch is not pressed✓ (2 max)

(d) (i)



(ii) heater comes on (for half minute)✓
then stirrer comes on (for one minute)✓
pump comes on (for half minute)✓

(e) (i) 5✓

(ii) 30/31 s ✓

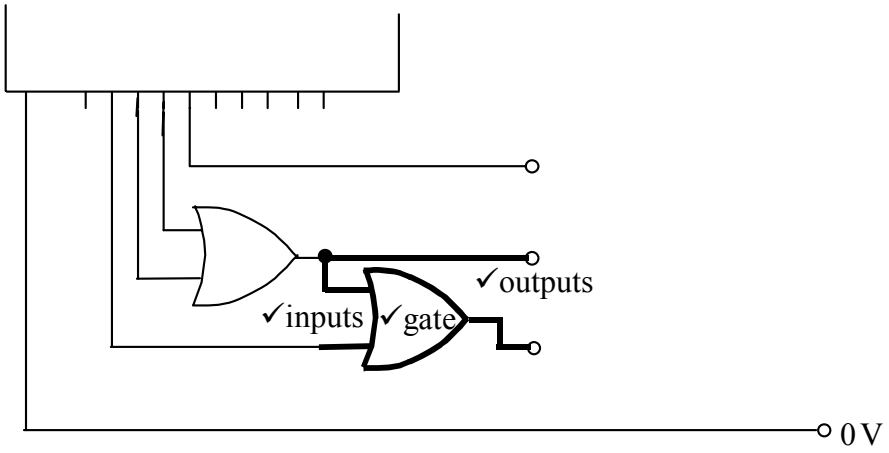
(iii) 7 V ✓

(iv) R = V/I = 7/0.2✓ = 350✓Ω✓ (2 max)

(v) 360 Ω✓

(vi) orange ✓ blue✓ brown✓ gold✓

(f)



(35 marks)

(Paper total 150 marks)