



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

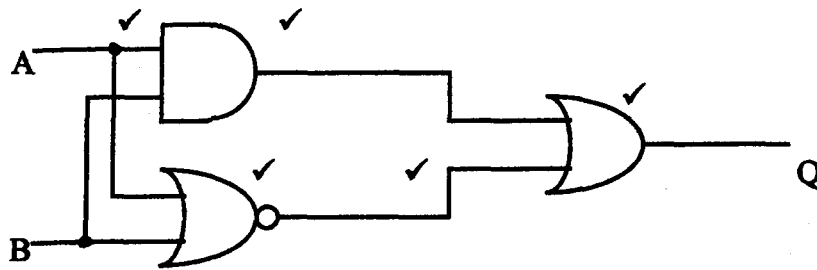
GCE

Electronics

Unit ELE1

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1 (a)



(5 marks)

(b)

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

(4 marks)

(c) EXNOR ✓

(1 mark)

(total 10)

2

- (a) (i) resistor in series ✓
 (ii) $9 - 6 = 3V$ ✓
 (iii) $0.06A$ ✓
 (iv) $3 \div 0.06 = 50\Omega$ ✓
 (v) $3 \times 0.06 = 0.18W$ ✓

(6 marks)

- (b) (i) 100Ω and 100Ω ✓ OR 20Ω and 30Ω ✓
 (ii) in parallel ✓ in series ✓
 (iii) 51Ω ✓
 (iv) green brown ✓ black ✓ gold ✓

(8 marks)

(total 14)

3

(a) $100 \times 10^3 \times 100 \times 10^{-6} = 10s$ ✓

(2 marks)

- (b) (i) $0.69RC = 6.9s$ ✓
 (ii) $5RC = 50s$ ✓
 (iii) $0.63V_s$ in $1RC$, $= 10s$ ✓

(5 marks)

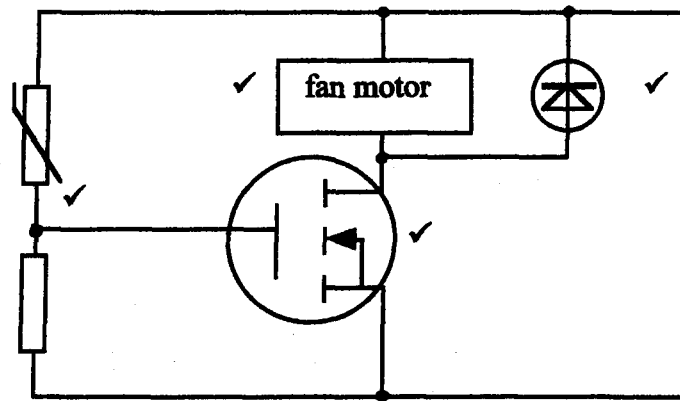
(total 7)

4

- (a) (i) $9 \div 2 = 4.5V$ ✓
 (ii) ohms law calc or ratio ✓ $20k\Omega$ ✓
 (iii) $10^\circ C$ ✓

(5 marks)

(b) (i)



(ii) fan motor is an inductive load which will create a back emf, diode protects MOSFET from this. ✓ (5 marks)

(total 10)

5 (a) comparator ✓ (1 mark)

(b) $(20 / 30) \times 12 = 8V$ ✓ (2 marks)

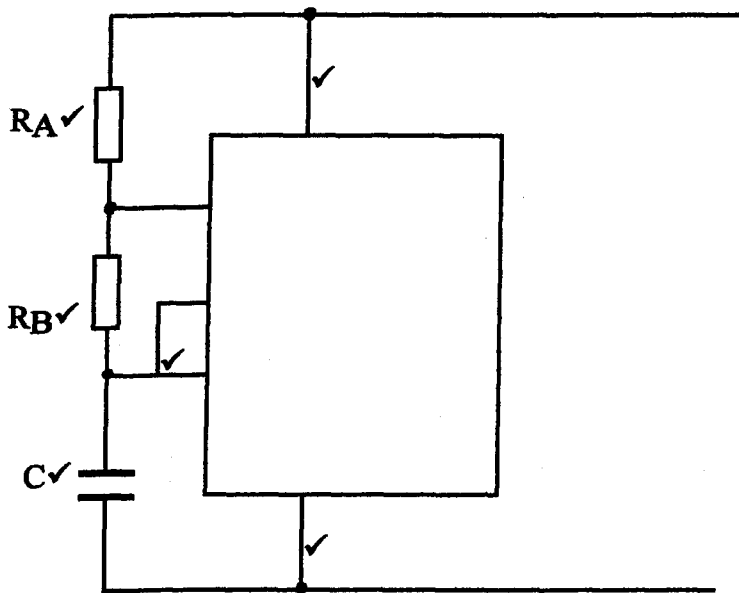
(c) total res = $12V / 0.01A = 1.2k\Omega$ ✓
if LDR goes to 0Ω , $R = 1.2k\Omega$ ✓ (2 marks)

(d) in dark $V_B < V_A$, ✓ o/p low ✓
in light $V_B > V_A$, ✓ o/p high ✓ (4 marks)

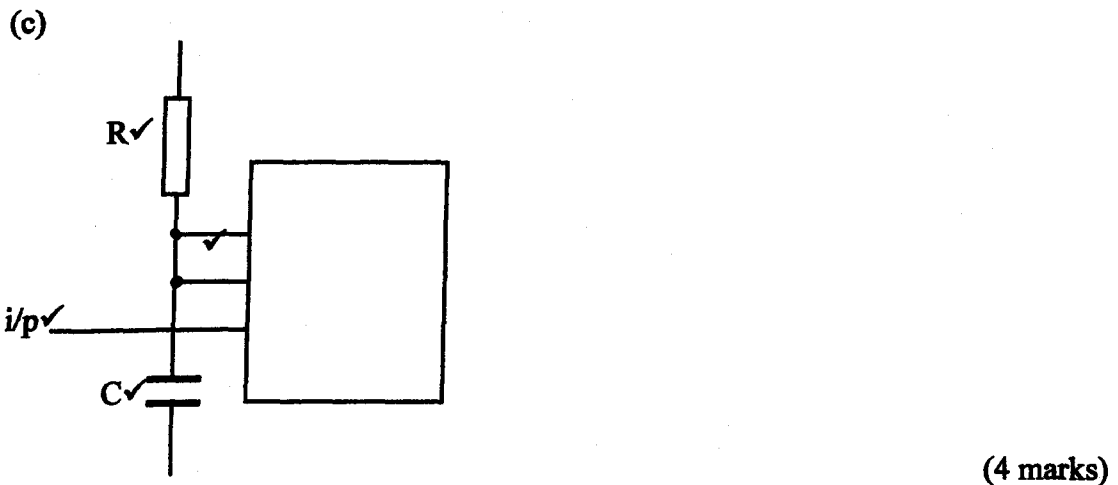
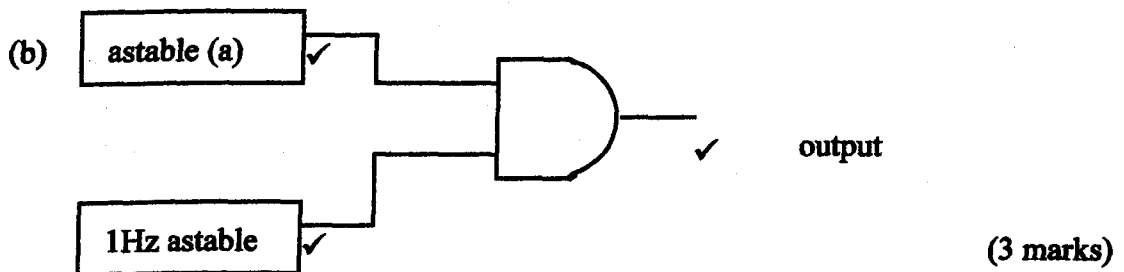
(e) on diagram, resistor plus ✓
either 2 LEDs in series ✓✓ OR 1 LED and 2 Si diodes in series ✓✓
numerical reasoning why $> 3V$ is required ✓ (4 marks)

(total 13)

6 (a) (i)



(ii) $f = \frac{1.44}{201 \times 10^3 \times 10^{-8}} = \frac{1.44}{2.01 \times 10^{-3}} = 716\text{Hz}$ (8 marks)



(d) $\bar{A}.B.C + \bar{A}.\bar{B}.C + A.B.\bar{C}$ (3 marks)
 (total 18)

(Paper total 72 marks)