



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme June 2002

GCE

Electronics

Unit ELE1

ELE1 – Foundation Electronics

1 (a) $X = \overline{A.B}$ ✓
 $Y = \overline{C}$ ✓
 $Q = \overline{A.B + C}$ ✓

(b)

A	B	C	X	Y	Q
0	0	0	1	1	0
0	0	1	1	0	0
0	1	0	1	1	0
0	1	1	1	0	0
1	0	0	1	1	0
1	0	1	1	0	0
1	1	0	0	1	0
1	1	1	0	0	1

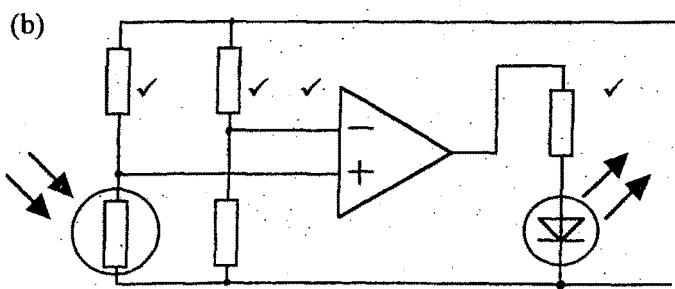
(c) 3 input AND gate ✓ (total 10)

2 (a) LED ✓

- (b) (i) $9 - 2 = 7V$ ✓
 (ii) 20 mA ✓
 (iii) $R = 7 / 0.02 = 350 \Omega$ ✓
 (iv) 360 Ω ✓
 (v) orange ✓ blue ✓ brown ✓ gold ✓
 (vi) $W = 7 \times 0.02 = 0.14 W$ ✓
 0.25 W ✓

(total 13)

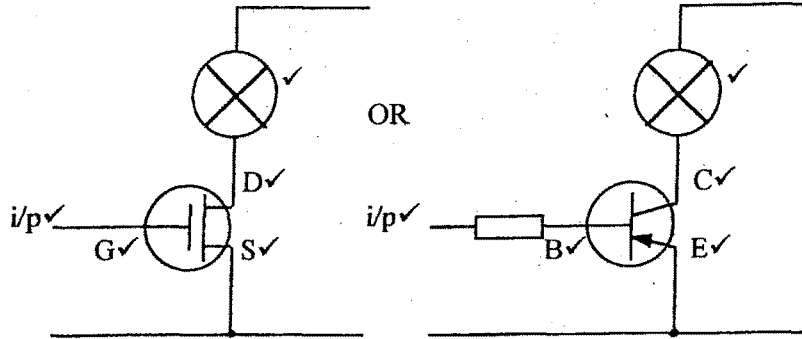
- 3 (a) (i) 20 k Ω ✓
 (ii) $R = 12 / 0.001 = 12 k\Omega$ ✓
 (iii) $20 / (12 + 20) \times 12 = 7.5 V$ ✓



(total 10)

- 4 (a) 1 bipolar transistor ✓
 2 MOSFET ✓

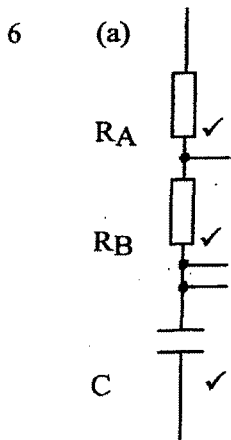
(b)



(follower circuits will be given credit)

- (c) (i) relay ✓
 (ii) diode ✓ (total 9)

- 5 (a) (i) $1/C = 1/10 + 1/10 = 1/5$ ✓
 $C = 5\mu\text{F}$ ✓
 (ii) $T = 10^4 \times 5 \times 10^{-6} = 5 \times 10^{-2}\text{s}$ ✓ (or ecf)
 (b) (i) $0.69 \times 5 \times 10^{-2}$ ✓ $= 3.45 \times 10^{-2}\text{s}$ ✓ (or ecf)
 (ii) $5 \times 5 \times 10^{-2}$ ✓ $= 2.5 \times 10^{-1}\text{s}$ ✓ (or ecf) (total 7)



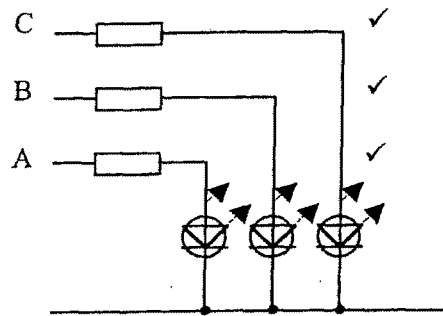
- (b) $1.44 / (21 \times 10^3 \times 10^{-6})$ ✓ $= 69 \text{ Hz}$ ✓ (total 5)

- 7 (a) (i) $5\text{ k}\Omega$ ✓
 (ii) $5/5 = 1\text{ mA}$ ✓
 (iii) $X = 1\text{ V}$ ✓
 $Y = 2\text{ V}$ ✓
 $Z = 3\text{ V}$ ✓

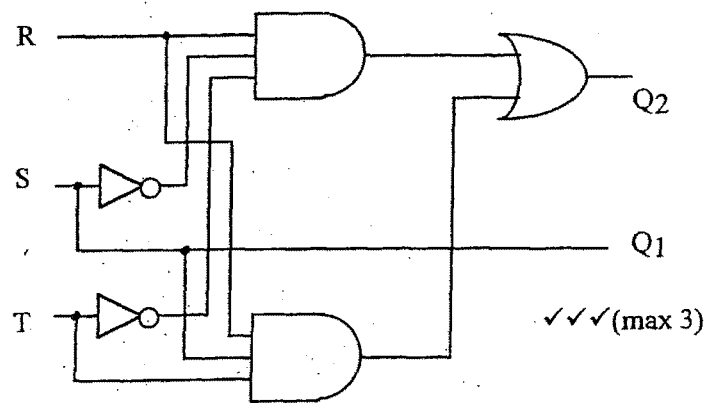
(b)

A	B	C
0	0	0 ✓
1	0	0 ✓
1	1	0 ✓
1	1	1 ✓

(c)



- (d) (i) S ✓
 (ii) $R \cdot \overline{S} \cdot \overline{T}$ ✓ + $R \cdot S \cdot T$ ✓
 (iii) eg.



(total 18)

Paper Total 72