



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme June 2002

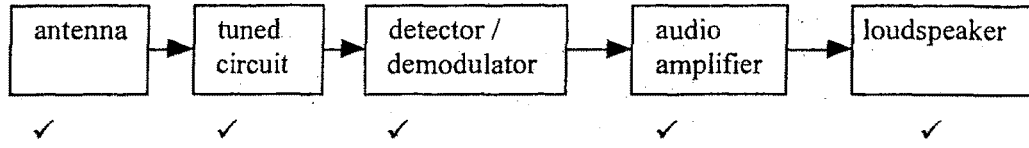
GCE

Electronics

Unit ELE5

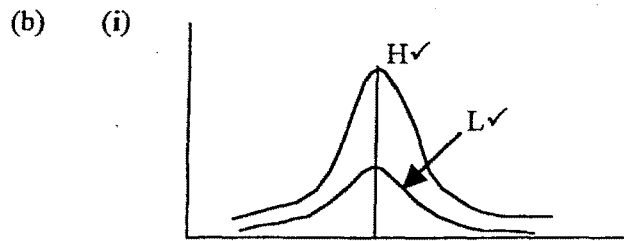
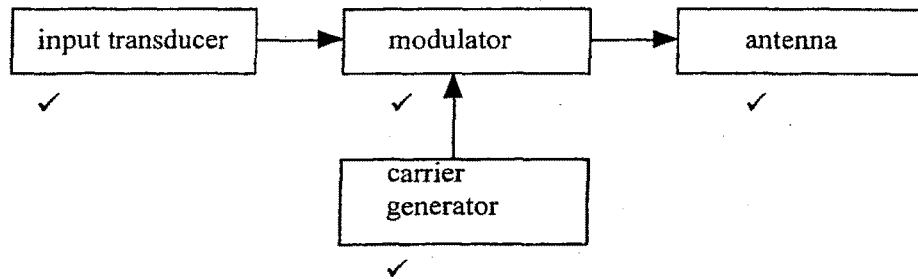
ELE5 – Communications Systems

1 (a)



- (b) (i) $3 \times 10^8 / 1.5 \times 10^6 \checkmark = 200\text{m} \checkmark$
- (ii) $100\text{m} \checkmark$
- (c) $50\Omega \checkmark$ (total 9)

2 (a)

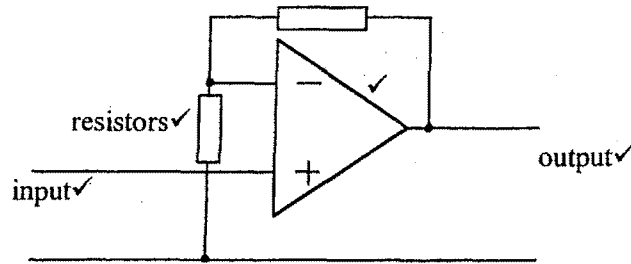


- (ii) $f = 1 / (2 \times 3.14 (5 \times 10^{-6} \times 2 \times 10^{-11})^{0.5}) \checkmark \checkmark$
 $= 15.92 \text{ MHz} \checkmark$ (total 9)

- 3 (a) lower sideband \checkmark carrier \checkmark upper sideband \checkmark
- (b) $607.5 - 603 \checkmark = 4.5 \text{ kHz} \checkmark$
- (c) medium wave \checkmark
- (d) (i) long wave or short wave \checkmark
- (ii) VHF \checkmark (total 8)

4 (a) non - inverting amplifier✓

(b)



(c) values at least in $k\Omega$ range✓
eg $1k$ ✓ and $39k$ ✓

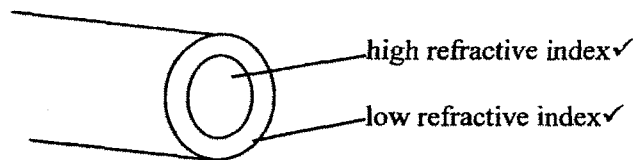
(d) (i) gain - bandwidth product✓

(ii) at least $25MHz$ ✓

(total 10)

5

(a)



(b) total internal reflection✓
light hits boundary at an angle greater than critical angle✓
and reflects from boundary travelling further along fibre✓

(c) (i) LED or laser diode✓

(ii) photo diode or avalanche diode✓

(d) more information carrying capacity✓
more secure✓
less attenuation✓
less interference✓ (any two points)

(total 9)

6

(a) radio wave✓

(b) $16\text{ MHz} / 16\text{ kHz}$ ✓ = 1000 calls✓

(c) $8\text{ kHz} / 2$ ✓ = 4 kHz✓

(d) (i) as logic signals, 1 and 0✓

(ii) PWM✓ PCM✓
PPM✓

(total 9)

7 (a)

rf amplifier✓ mixer✓ if amplifier✓

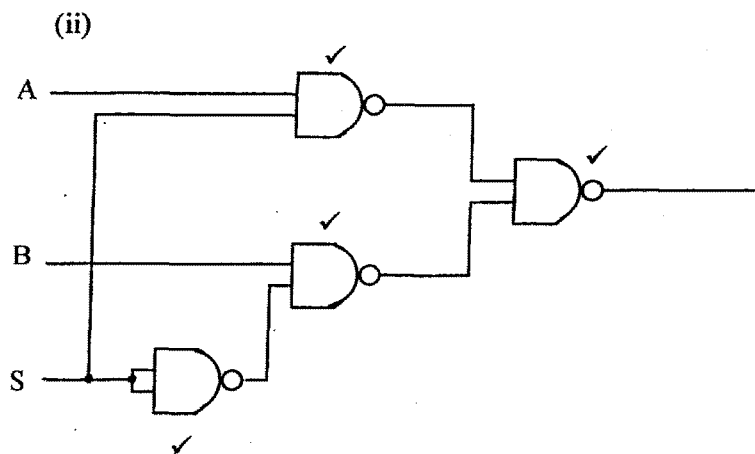
local oscillator✓ agc✓

(b) (i) two devices, one for positive half wave,
the other for the negative half wave✓

(ii) crossover distortion✓
biassing devices and / or negative feedback✓

(iii) $(12 - 2)^2 / 2 \times 4 = 100 / 8 = 12.5 \text{ W}$ ✓

(c) (i) 0
0✓
1
1✓
0
1✓
0
1✓



(total 18)

Paper Total 72