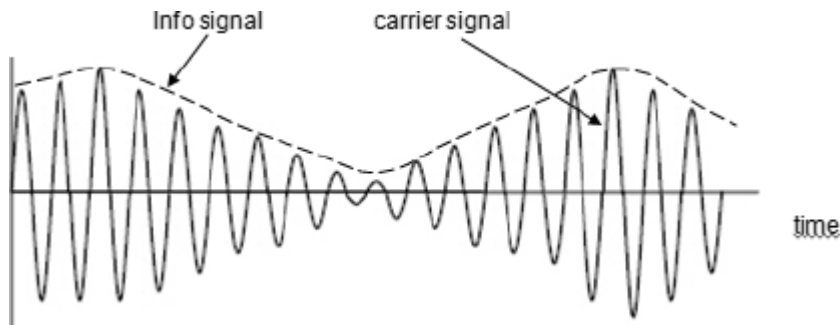


M1.(a) amplitude of carrier varies in phase with information / audio signal ✓
accept labelled diagram in support



1

(b) $2 \times 2.2 \text{ kHz} = 4.4 \text{ kHz}$ ✓

1

(c) requires a large bandwidth so would limit the number of channels / stations if low frequency carriers were used ✓

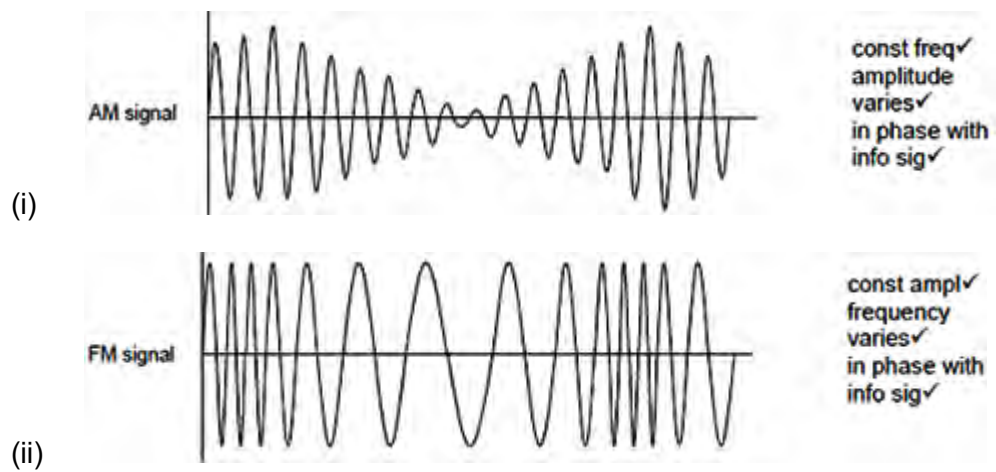
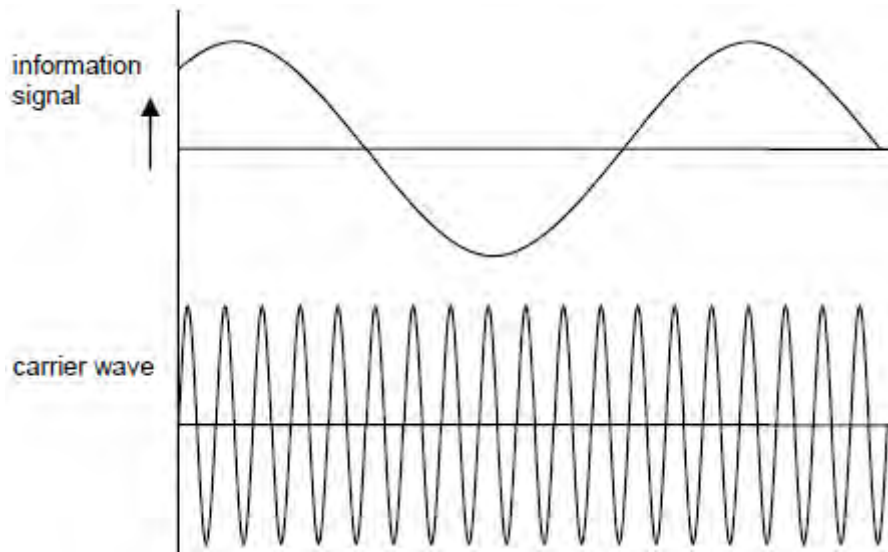
1

(d) Noise distorts the amplitude of signals which is difficult to reduce in am ✓
In fm the original signal can be recovered as long as the frequencies in the BW are detectable since no information in the amplitude. ✓
In AM receivers signals and noise are amplified equally.
ANY TWO

2

[5]

M2.(a)



6

(b) (i) $2 \times 3 \text{ kHz} = 6\text{kHz} \checkmark$

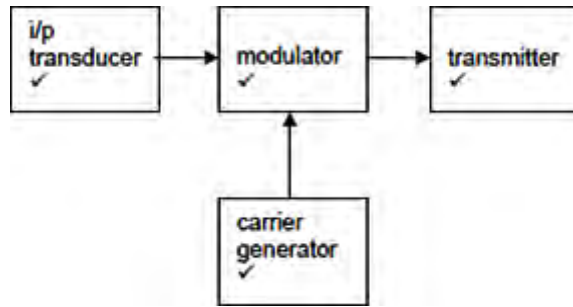
1

(ii) $2(3 + 5) \checkmark = 16\text{kHz} \checkmark$

2

[9]

M3.(a)



4

(b) (i) carrier generator ✓

1

(ii) use of $f = \frac{1}{2\pi\sqrt{LC}}$ ✓
 $\frac{1}{2\pi\sqrt{10^{-7} \times 5 \times 10^{-12}}}$ ✓
 225 MHz ✓

3

(c) calc leading to $\lambda = 1.32\text{m}$ ✓
 $1.33 \div 2 = 0.66\text{m}$ ✓

2

[10]