



EEEN 462 – ANALOGUE COMMUNICATION

ASSIGNMENT 2 – AM & FM MODULATION

Issued: Monday, 8 June 2025

Solutions to be sendd by e-mail to Jkulubi@elimu.com on: Sunday, 15 June 2025 Latest

1. 90KHz bandwidth is required to accommodate six AM broadcast stations simultaneously. What is the maximum modulating frequency for each radio station?
2. How many AM stations can be accommodated in a 6 MHz bandwidth if each station transmits a signal which is modulated by an audio signal having a maximum frequency of 5 KHz?
3. An 1800 Hz signal with an amplitude of 30 V modulates a 50 MHz carrier with amplitude of 65 V.
 - (i) Calculate the modulation factor and percent modulation of the modulated signal.
 - (ii) What frequencies appear in the spectrum of the modulated wave?
4. A signal described by $30 \sin(2\pi f_m t)$ amplitude modulates a carrier signal $65 \sin(2\pi f_c t)$. If $f_m = 2.5$ kHz and $f_c = 250$ kHz, calculate the following:
 - (i) the modulating factor
 - (ii) The frequency that would be displayed on a spectrum analyser when connected to the output of the modulator.
5. 107.6 MHz carrier signal is frequency modulated by a 7 kHz sinewave. If the resulting signal has a frequency deviation of 5 KHz, determine the following:
 - (i) The carrier swing of the FM signal
 - (ii) The modulation index.
- 6 (i) Find the bandwidth of a commercial FM transmission if the frequency deviation is 75 kHz and the maximum modulating frequency is 15 kHz.
 - (ii) The maximum deviation allowed in commercial FM broadcast is 75 kHz. If the modulating audio signal has a bandwidth of 8 kHz, determine the bandwidth of the FM modulated signal.