Arab Academy for Science and Technology & Maritime Transport
College of Engineering & Technology
Electronics and Communications Dep. 5th term Electronics & Communications
EC321- Communication Theory
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Sheet # 5

1. **In a FM system, the baseband frequency is 500 Hz and the baseband amplitude is 2.4 volt, the deviation was 4.8 kHz. If the baseband amplitude is increased to 7.2 volt, what is the new deviation? If the baseband is raised to 10 volt while the maximum frequency is dropped to 200 Hz. What is the new deviation? Find the modulation index in each case.**

2. **A FM wave is represented by the voltage equation:**

$$S(t) = 12\sin(\pi\, 4 * 10^5 t + 5\sin(\pi\, 2 * 10^3 t))$$

Find

   a) **Carrier and Baseband frequencies**
   b) **Modulation Index**
   c) **Maximum deviation**

3. **Consider a narrow-band FM signal approximately defined by**

$$\phi_{FM}(t) \cong A_c \cos(2\pi f_c t) - \beta A_c \sin(2\pi f_m t)\sin(2\pi f_c t)$$

Sketch its spectrum.