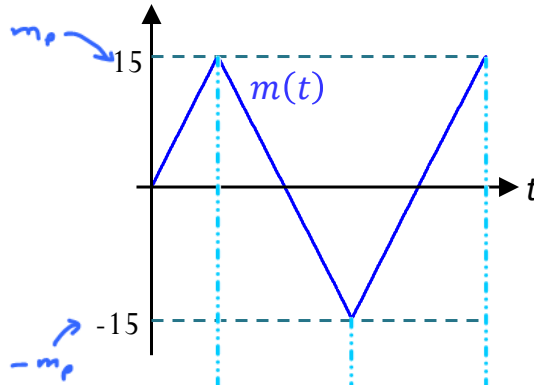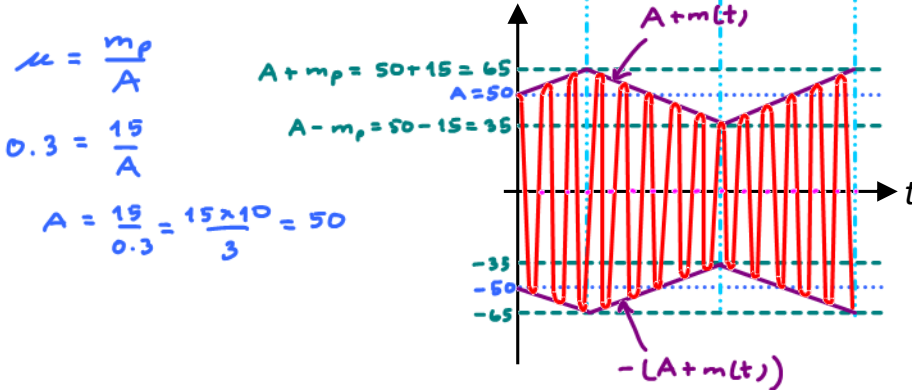# ECS 332: In-Class Exercise # 12

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups after the midterm.**
2. Write down all the steps that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

Date: **24** / **10** / 2018

Name: **Prapun**

ID (last 3 digits): **5 5 5**

Consider an AM transmission of the message $m(t)$ shown below:

1. Assume that the carrier frequency f_c is large (enough). Plot the corresponding AM signal $x_{AM}(t)$ when the modulation index is 30%

$$\mu = \frac{m_p}{A}$$

$$0.3 = \frac{15}{A}$$

$$A = \frac{15}{0.3} = \frac{15 \times 10}{3} = 50$$

$$A + m_p = 50 + 15 = 65$$
$$A = 50$$
$$A - m_p = 50 - 15 = 35$$

2. In each part below, the AM signal is plotted. Determine the modulation index used in each case.

(a)

$A + m_p = 40$

$A + m(t)$, $x_1(t)$

$$A = 40 - m_p = 40 - 15 = 25$$

$$\mu = \frac{m_p}{A} = \frac{15}{25} = \frac{3}{5} = 0.6 = 60\%.$$

(b)

$A + m(t)$, $x_2(t)$

$A - m_p = -9$

$$A = -9 + m_p = -9 + 15 = 6$$

$$\mu = \frac{m_p}{A} = \frac{15}{6} = \frac{5}{2} = 2.5 = 250\%.$$