School of Electrical Engineering and Computer Science
National University of Sciences & Technology (NUST)

Home Assignment No-1 [CLO1]

Subject:	**Communication Systems**	Marks:	**40**
Course:	**BEE-12C**	Issue:	**12 Mar 2023**
Teacher:	**Huma Ghafoor**	Due on:	**20 Mar 2023**
Note:			*(in class)*

- ✓ *No late submissions will be accepted unless a prior approval from the instructor is obtained with extremely genuine reasons. The assignments submitted after the due date/time will be graded **zero**.*
- ✓ *University has zero tolerance for plagiarism and serious penalties apply. All assignments found mutually copied will be marked **zero**.*
- ✓ ***Five** marks are reserved for neat and clean work.*

Problem No. 1:

Using the message signal

$$m(t) = \frac{t}{1 + t^2}$$

determine and sketch the modulated wave for amplitude modulation whose percentage modulation equals the following values:

(a) 50 percent
(b) 100 percent
(c) 125 percent

Plot the signals in MATLAB.

(15 marks)

Problem No. 2:

An angle modulated signal with carrier frequency $2\pi \times 10^5$ is described by the equation:

$$s(t) = 20\cos\left[\omega_c t + 10\sin 2\pi 3000t + 20\cos 2\pi\, 2000t\right]$$

1. Calculate frequency deviation? Show all steps. [12 marks]
2. Modulation index? (2 marks)
3. Phase deviation? (2 marks)
4. Power of the modulated signal? (2 marks)
5. Carrier swing? (2 marks)

(20 marks)