Course: **System Analysis (CSE314)**

Date: **22/12/2020** ***Midterm Exam 2*** ***Total:*** **10 marks** ***Time:*** **30 min.**

Name: .....

Attempt the following questions. The answers must be in this paper.

1. A LTI system with input signal x and output signal y is described by the differential equation:

$$\forall t \in \mathbb{R}, \quad \frac{dy}{dt} + 0.5y(t) = x(t)$$

   a. Determine output signal y if the input signal is $\forall t, x(t) = e^{i\omega t}$, where ω is fixed. *(2 marks)*

   b. Obtain the frequency response $H(\omega)$. *(2 marks)*

   c. What is the magnitude and phase of the frequency response for $\omega = 0.5$ rad/sec ? *(2 marks)*

2. What is the exponential Fourier series for the signal: *(4 marks)*

$$x(t) = \cos(2\pi t) + \sin(3\pi t)$$