

ECS 332: In-Class Exercise # 5

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups.**
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: __ / __ / 2018			
Name	ID <small>(last 3 digits)</small>		

In this problem, we have three “devices”.

- $\boxed{(\cdot)^2}$ is a “square” device. As the name suggests, its output is created by squaring its input in the **time** domain.
- $\boxed{H_1(f)}$ is an LTI device whose **frequency response** is $H_1(f) = \begin{cases} 1, & |f| < 200, \\ 0, & \text{otherwise.} \end{cases}$
- $\boxed{H_2(f)}$ is an LTI device whose **frequency response** is $H_2(f) = \begin{cases} 1, & |f| > 200, \\ 0, & \text{otherwise.} \end{cases}$

Find the output $y(t)$ for each of the systems below.

(a) $x(t) = \cos(300\pi t) \longrightarrow \boxed{H_1(f)} \longrightarrow y(t)$

(b) $x(t) = \cos(300\pi t) \longrightarrow \boxed{H_2(f)} \longrightarrow y(t)$

(c) $x(t) = \cos(300\pi t) \longrightarrow \boxed{(\cdot)^2} \longrightarrow \boxed{H_1(f)} \longrightarrow y(t)$

(d) $x(t) = \cos(300\pi t) \longrightarrow \boxed{(\cdot)^2} \longrightarrow \boxed{H_2(f)} \longrightarrow y(t)$

(e) $x(t) = \cos(300\pi t) \longrightarrow \boxed{(\cdot)^2} \longrightarrow \boxed{H_1(f)} \longrightarrow \boxed{H_2(f)} \longrightarrow y(t)$

(f) $x(t) = \cos(300\pi t) \longrightarrow \boxed{H_1(f)} \longrightarrow \boxed{(\cdot)^2} \longrightarrow \boxed{H_2(f)} \longrightarrow y(t)$