**Subject:** Linear Control System (EE-321)  **Assignment No:** 01

**Title:** Introduction and preliminary concepts  **Semester:** 3rd

**Date:** 28 Jan. 2020**Due Date:** 04 Feb. 2020

**Teacher:**  Dr. Imran Khan

**Note:**

* Answer the following questions.
* Be neat and precise.
* This assignment covers CLO: 01 of the course.

**Question No. 1:** Write with minor details, the steps for designing a control system?

**Question No. 2:** Analyze the qualitative and quantitative differences between an open loop

and a closed loop (feedback) control system via the help of an example?

**Question No. 3:** Write the Laplace Transform of the following functions?

1. $f\left(t\right)= \left\{\begin{matrix}0 if t<0\\Sin\left(ωt\right) if t\geq 0\end{matrix}\right.$
2. $f\left(t\right)= \left\{\begin{matrix}0 if t<0\\te^{-3t} if t\geq 0\end{matrix}\right.$
3. $f\left(t\right)= \left\{\begin{matrix}0 if t<0\\Sin(ωt+θ) if t\geq 0\end{matrix}\right.$
4. $f\left(t\right)= \left\{\begin{matrix}0 if t<0\\t^{2}Sin(ωt) if t\geq 0\end{matrix}\right.$
5. $f\left(t\right)= \left\{\begin{matrix}0 if t<0\\t if t\geq 0\end{matrix}\right.$

**Question No. 4:** Solve problems from “Feedback Control of Dynamic Systems” 5th Edition by G. F. Franklin

1. Problem 2.1 (In addition to differential equations also find the transfer functions in each case)
2. Problem 3.14, 3.15, 3.16 (d) and 3.17