

Name: _____

Section: _____

EE322 Fall 2010 Exam 1: Part 1

	Problem	Possible Points	Score
Part 1	1	25	
	2	25	
	3	25	
	4	25	
Part 2	5	10	
	6	20	
Total		130	

- You will have the first 65 minutes of the lab period to take Part 1 of the exam.
- For this portion of the exam, you are allowed to use 1 page, single-side of notes or whatever you want to write on it, and an FE Exam-approved calculator.

Indicate the manufacturer and model of the calculator you will use for this exam:

Calculator: _____

- You **must show your work** to get full credit for problems. Expect to lose points if you don't.
- Label your sketches (axes and functions) carefully, including units if applicable. Expect to lose points if you don't.
- If you finish Part 1 of the exam before it is called for, turn it in and pick up Part 2 (MATLAB).
- Sign the statement below:

I will not discuss this exam with anyone until after 6th period today. _____
(Signature)

1. (25 pts) Continuous-time.

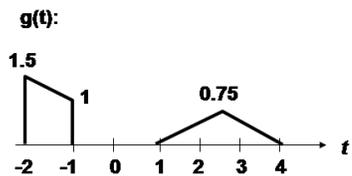
a. Sketch $g(t) = u(2t) \cdot u(-t + 3)$.

b. Sketch the even and odd parts of $x(t) = \text{rect}(t) + \text{tri}(t - 2)$.

c. Determine the fundamental period, if any, of $x(t) = -\cos(10\pi t + \frac{\pi}{15}) - 6\cos(0.7\pi t)$

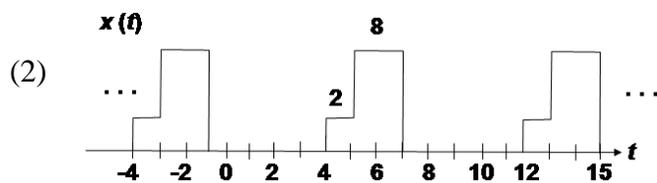
2. (25 pts) Continuous-time.

a. Given the signal below, sketch $2g(-0.2t+2)$.



b. Calculate the energy (if an energy signal) or power (if a power signal) associated with the following:

(1) $y(t) = u(t+3) - u(t-4)$



3. (25 pts) Discrete-time. Suppose you are given the following discrete-time function:

$$g[n] = 4\delta_3[n-4].$$

a. Sketch $g[n]$.

b. What is the energy in this signal? The average power? Is this an energy signal or a power signal? Why?

c. Sketch the even and odd parts of $g[n]$.

d. Sketch $z[n] = g[2n]$.

4. (25 pts) Discrete time. Given the system described by

$$y[n] = \ln(|x[n-1]|) \quad (\text{note: } \ln \equiv \text{natural log function}).$$

a. Is the system BIBO stable? Show why it is or isn't.

b. Is the system causal? Why or why not?

c. Is the system memoryless? Why or why not?

d. Is this system linear? Show why it is or isn't.

e. Is the system time-invariant? Show why or why not.

f. Is the system invertible? Show why or why not.