DYNAMICAL SYSTEMS, MATH 117, HW#3

Exercises 6.6, 6.7, 6.8, 7.10, 7.11, 7.15, and the following problem:

Problem 1.

Which of the following sets are Cantor sets?

a) The set of all real numbers on $[0, 1]$ that admit a decimal representation that does not use the digit 5;

b) The set of all irrational numbers on $[0, 1]$;

c) The set of all real numbers on $[0, 1]$ that admit a decimal representation without odd digits;

d) The set of all real numbers on $[0, 1]$ that admit a binary representation without three zeros in a row;

e) The set of all real numbers on $[0, 1]$ that admit a binary representation without zeros;

f) The set of all real numbers on $[0, 1]$ that can be represented as

$$\left(1 - \frac{1}{\sqrt{10}}\right) \sum_{n=0}^{\infty} \omega_n \left(\frac{1}{\sqrt{10}}\right)^n$$

for some sequence $\{\omega_i\}_{i=0,1,2,\ldots}$, $\omega_i \in \{0, 1\}$.