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1. (10 points)

(a) **Answer:**

$\mathcal{C} = \{01, 010, 101\}$ is **not UD** since, for example, suppose we have that

$$a_1 \to 10$$
$$a_2 \to 010$$
$$a_3 \to 101.$$

Then
$$101010$$

can be decoded into codewords $\underbrace{10}_{a_1}, \underbrace{10}_{a_1}, \underbrace{10}_{a_1}$ or codewords $\underbrace{101}_{a_3}, \underbrace{010}_{a_2}$.

(b) **Answer:**

$\mathcal{C} = \{0, 01, 011, 0111\}$ is **UD** since it is a suffix code.

(c) **Answer:**

$\mathcal{C} = \{21, 20, 201, 202, 212\}$ is **UD** since it is a suffix code.

(d) **Answer:**

$\mathcal{C} = \{1, 21, 221, 002, 021, 001\}$ is **UD** since it is a prefix code.

(e) **Answer:**

$\mathcal{C} = \{10, 12, 13, 22, 121, 133, 220, 221, 223\}$ is **UD** since it is a suffix code.