Name & Std No.:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Lab Section:\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PRELAB:**

### *Refer to Chapter 5 in your textbook and the lab instructions to complete your pre-lab. Please read all the material and complete the circuit diagrams before you come to the lab.*

**Q1.** Draw the circuit diagram for the 4-bit **Shift Register** using D flip-flops in the space below.

**Q2.** Draw the circuit diagram for the 4-bit **Synchronous Up-Counter with Enable** using **D flip-flops** in the space below.

**Q3.** Draw the circuit diagram for a **5-bit** Synchronous Up-Counter with Enableusing **T flip-flops** in the space below.

**Q4.** Draw the circuit diagram for the 4-bit **Asynchronous Up-Counter** using JK flip-flops in the space below.

**Q5.** Draw the circuit diagram for the 4-bit **Asynchronous Down-Counter** using JK flip-flops in the space below.

**LAB:**

**2.0**  Fill in the sequence table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Time | Q1 | Q2 | Q3 | Q4 | Set IN |
| T = 0 | n/a | n/a | n/a | n/a | 1 |
| T = 1 |  | n/a | n/a | n/a | 0 |
| T = 2 |  |  | n/a | n/a | 1 |
| T = 3 |  |  |  | n/a | 1 |
| T = 4 |  |  |  |  | 0 |
| T = 5 |  |  |  |  | 1 |
| T = 6 |  |  |  |  | 1 |
| T = 7 |  |  |  |  | n/a |

ModelSim results demonstrate a good circuit. TA Initials: \_\_\_\_­\_\_\_

**3.1**  ModelSim results demonstrate a good circuit using **DFFs**. TA Initials: \_\_\_\_­\_\_\_

ModelSim results demonstrate a good circuit using **TFFs**. TA Initials: \_\_\_\_­\_\_\_

**3.2**  Seven segment shows 0 to F while counting up. TA Initials: \_\_\_\_­\_\_\_

Seven-segment display shows F to 0 while counting down. TA Initials: \_\_\_\_­\_\_\_