Bangladesh University of Engineering and Technology
Department of Computer Science and Engineering

Course: CSE 206
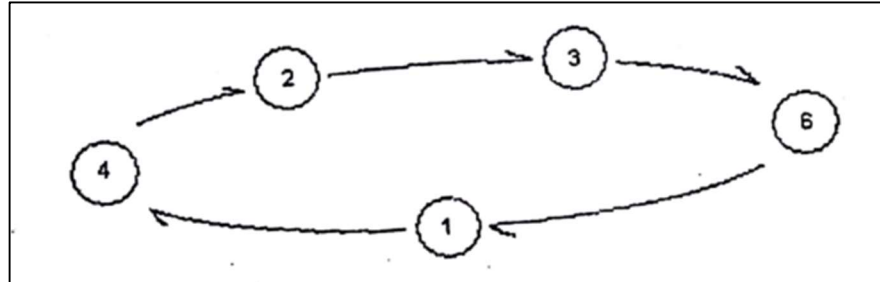
Digital Logic Design Sessional

Experiment No. 8

Topic: Counters

Design and implement the following problems:

1. Design a 3-bit **synchronous** counter using **T flip-flops and basic gates that** counts as follows:

First, determine the state diagram and state table. From the state transition table, determine the required Boolean expressions for the inputs of three T flip-flops and implement the circuit accordingly. You can use IC 7476 (JK flip-flop) as the T flip-flop for this problem (by keeping J=K). Initialize the counter using asynchronous clear pins.

2. Design a 2-bit **asynchronous mod-3** up counter using **D flip-flops.** You can use IC 7474 (D flip-flop) for this problem.

Questions:

1. Design a synchronous BCD counter using JK flip-flops (Do not convert JK to T).

2. Design a mod-3 synchronous counter using any type of Flip-Flop.

Report:

1. Design showing all steps. For synchronous counters, you have to show the state diagram, state transition table, and next state equations.
2. Circuit diagram with PIN number.
3. Answer to the questions.