
1- If the ideal headway for the northbound traffic on an intersection was found to be 1.89 seconds, what is the capacity of the 3-lane NB approach? [Cycle length = 90 seconds with 35 seconds green for the NB approach]

2-For the NB traffic described in problem 1, if the average hourly volume is 1800 vph, draw a queue forming polygon for one cycle. Estimate the maximum number of vehicles in the queue and the amount of unused green during each green phase. Assume a start-up lost time of 3 seconds.

3-On an intersection approach with a left turn volume of 300 vph (Poisson). The length of the left turn bay for this approach is 100 ft. What is the probability of a spill back at that approach? (Left turn vehicles blocking the through lane) The intersection is controlled by a fixed-time signal with a 60 seconds cycle. Assume an average vehicle length of 20 ft.

4-Arrivals at an intersection approach can be represented by a normal distribution with an average headway of 2.6 seconds. What is probability of having headway greater than or equal 3 seconds. Use minimum headway of 1.2 seconds

5-Vehicles arrive at an automated highway toll facility with a rate of 360 vph (Poisson). It takes on average 6 seconds (Negative Exponential) to pay the toll and proceed through the toll facility. What is the average waiting time at the toll facility? What is the total delay resulting?

6-The characteristics of a three-phased signalized intersection is listed in the following table:

	Traffic Volume (vph)			Number of Lanes	Lane Width	Saturation Flow
	Left Turn	Through	Right Turn			
NB	130	600	70	2	12	1940
SB	200	450	100	2	12	1940
EB	90	300	50	1	12	1780
WB	110	210	90	1	12	1780

The phasing sequence for the signal is as follow:

Phase A: Northbound traffic (Through, Left and Right) moves. SB, EB, and WB stop.

Phase B: Southbound Traffic (Through, Left and Right) moves. NB, EB and WB stop.

Phase C: Eastbound and Westbound traffic (Through, Left, and Right) move. NB and SB stop.

Assuming a start-up loss time of 3.5 seconds per phase and an Amber time of 4 seconds for all phases, using a cycle length of 90 seconds, determine:

1. The green time allocated for each phase
2. The volume/capacity (v/c) ratio for all approaches
3. The average delay and LOS for each movement

