

CVG4150

Tutorial 4



Question 1



While taking measurements by the moving-observer method, a test vehicle covered a 1-mi section in 1.5 min going against traffic and 2.5 min going with traffic. Given that the traffic flow was 800 veh/h and that the test vehicle passed 10 more vehicles than passed it when going with traffic, find:

- a) The number of vehicles encountered by the test vehicle while moving against traffic.
- b) The speed of the traffic being measured.
- c) The concentration of the traffic stream.
- d) Whether on its run with traffic the test vehicle was travelling faster or slower than the traffic stream.

Question 2



A line of traffic moving at a speed of 30 mi/h and a concentration of 50 veh/mi is stopped for 30 s at a red light. Calculate:

- a) The velocity and direction of the stopping wave
- b) The length of the line of cars stopped during the 30 s of red
- c) The number of cars stopped during the 30 s of red

Assume a jam concentration of 250 veh/mi.





Question 3

A vehicular stream at $q_a = 1200$ veh/h and $k_a = 100$ veh/mi is interrupted by a flag-person for 5 min beginning at time $t = t_0$. At time $t = t_0 + 5$ min vehicles at the front of the stationary platoon begin to be released at $q_b = 1600$ veh/h and $u_b = 20$ mi/h. Assuming that $k_j = 240$ veh/mi:

- a) Plot the location of the front of the platoon versus time and the location of the rear of the platoon versus time
- b) Plot the length of the growing platoon versus time





Question 4

A 15 mi/h school zone is in effect from 7:30 to 9:00 am. Traffic measurements taken on October 10, showed that at precisely 9:00 am, the conditions presented in the figure below prevailed. How long did it take for the 3-mi platoon to disappear, and what was the speed of the shock wave that commenced at the moment when the platoon dissipated completely?

