

Names:

1. \_\_\_\_\_ 2. \_\_\_\_\_

**CE 3201  
Spring 2008**

**Recitation Lab #5  
Traffic Assignment**

Consider a simple two-route network, connecting a single origin zone to a single destination zone. Route 1 is a highway route with travel time (in hours) given by

$$t_1 = .33(1 + x_1/c_1), c_1=4400 \text{ vehicles/hour}$$

where  $x_1$  is the peak-hour demand flow (in vph) on route 1. Route 2 is a rail transit route which, because it is separated from road traffic, has a constant travel time of

$$t_2 = .75 \text{ hours,}$$

All highway travel is by single-occupant vehicle. Currently, the peak-hour demand for travel between the origin zone and the destination zone is 10,000 trips/hour.

(a) Determine the user-optimized assignment of trips to these routes and resulting total travel time.

(b) A legislative initiative to "Let People Drive" has sold bonds (to be repaid from future tax revenues), to raise enough money to expand the capacity of the highway route to 6600 vehicles/hour. Predict the user-optimized assignment (UOA) of trips to these two routes, the resulting total travel time, and the percent improvement of travel time on the highway route.

(c) Unfortunately, now air quality has deteriorated in the region, and the results of air quality modeling indicate the highway travel should be limited to 4000 vehicle-hours during the peak hour in order to attain air quality standards. If travelers value their time at \$12.00/hour, determine a highway congestion toll which causes the resulting UOA to meet this constraint.

(a)  $x_1 =$  \_\_\_\_\_  $x_2 =$  \_\_\_\_\_  $TT =$  \_\_\_\_\_

(b)  $x_1 =$  \_\_\_\_\_  $x_2 =$  \_\_\_\_\_  $TT =$  \_\_\_\_\_

Percent improvement in highway travel time = \_\_\_\_\_

(c) Toll = \_\_\_\_\_