CIVL 4162/6162 Traffic Engineering Assignment-1 Due: September 3, 2019

Question-1: Traffic count data taken from detector on a freeway is shown below. Determine

- i. AADT
- ii. AWDT
- iii. ADT
- iv. AWT

v. From this data comment on the character of the facility and the demand it serves

Month	No. of Weekdays in months (days)	Total Days in Month (days)	Total Monthly Volume (vehs)	Total Weekday Volume (vehs)
January	22	31	193,100	162,500
February	20	28	205,000	161,200
March	22	31	225,000	185,000
April	22	30	205,000	180,000
May	21	31	195,000	172,000
June	22	30	193,000	168,000
July	23	31	180,000	161,000
August	21	30	175,000	150,000
September	22	31	189,000	175,000
October	22	31	198,000	178,000
November	21	30	205,000	182,000
December	22	31	198,000	165,000

Question-2: On a major arterial traffic count study was conducted and the following data was gathered. Determine the following

- i. Peak hour
- ii. Peak hour volume
- iii. Peak hour flow rate within the peak hour
- iv. Peak hour factor

Time	Volume (vehicles)
6:00-6:15AM	435
6:15-6:30AM	450
6:30-6:45AM	475
6:45-7:00AM	500
7:00-7:15AM	525
7:15-7:30AM	550
7:30-7:45AM	510
7:45-8:00AM	490

Vehicle	Travel Time (sec)
1	19.8
2	21.7
3	19.7
4	20.3
5	22.5
6	18.5
7	20.2
8	21.4

Question-3: On a 1000 feet segment on an arterial the following travel times were measured for individual vehicles. Determine the TMS and SMS.

Question-4: Speed-flow-density relationships of a particular site has resulted in the model

$$U = 68.3 \left(1 - \frac{K}{130} \right)$$

Where U is the speed (mi/hr), and K is the density (veh/hr/lane) Find the following

- i. Free flow speed and jam density
- ii. Derive the equation depicting relationship between flow and density
- iii. Derive the equation depicting relationship between speed and flow
- iv. Show the values of free-flow speed, jam density and capacity graphically

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Question-5: The following speed-density relationship is found for a highway segment

$$U = 0.001 * (K - 200)^2 - 1.5$$

U is the speed in km/hr and K is the density in veh/kim. Estimate the following

- i. Free-flow speed,
- ii. Jam density,
- iii. Speed and density at maximum flow
- iv. Lane capacity

Question-6: The following flow-density relationship was assumed for a highway segment

$$Q + 60S(lnU) = 250U$$

U is the speed in km/hr and Q is the flow in veh/hr. Estimate the following

- i. Free-flow speed
- ii. Speed at maximum flow
- iii. Maximum flow
- iv. Density at maximum flow