**Problem 1:** Consider a traffic analysis zone (TAZ) that is located in a suburban area of a city. The population and income data for the zone are as follows:

 Number of dwelling units: 60 (20% have 1 car, rest have 2+)

 Average income per dwelling unit: $44,000

$Trips per HH=0.5+0.35\*\frac{HHIncome}{1000}$ for 1 car

$Trips per HH=0.9+0.8\*\frac{HHIncome}{1000}$ for 2+ cars

Determine the number of trips per day generated in this zone.

**Problem 2:** A multiple regression analysis shows the following relationship for the number of trips per household:

$T=0.82+1.3P+2.1A$;

Where $P and A$ are the persons per household and autos per household respectively?

 If a particular TAZ contains 250 households with an average of 4 persons and 2 autos for each household, determine the average number of trips per day in that zone.

**Problem 3:** Consider a roadway segment highlighted in red box in the following figure. Traffic counts (AADT) can be seen as 41,500 in 2018. Estimate AADT of the segment in 2040 considering traffic growth 2%.



**Problem 4:** In TAZ 235, you have following socioeconomic data;

 Households (HH): 23,000

 Average Annual Income per HH: $30,000

 Average cars per HH: 1.4

 Size (Average number of people per HH): 2.1

 Average number of workers per HH: 1.4

 Total Office Space: 2,000,000 ft^2

 Total Retail Space: 5,000,000 ft^2

Estimate zone productions?

$$TripProductions= 0.3 + 0.82\*Workers+0.0024\*size+0.041Cars+0.0000047\*Income$$

**Problem 5:**

Number of trips per household size by auto ownership obtained from regional study can be seen below:

|  |  |  |
| --- | --- | --- |
|  |  | **Auto ownership** |
|  |  | **0** | **1** | **2+** |
|  |  | **HH** | **Trips** | **HH** | **Trips** | **HH** | **Trips** |
| **Household size** | 1 | 1200 | 2520 | 2560 | 6144 | 54 | 130 |
| 2 | 874 | 2098 | 3456 | 9676 | 5921 | 20165 |
| 3+ | 421 | 1137 | 2589 | 8026 | 8642 | 33704 |

Forecasted number of households in the same study zone by auto ownership and size can also be seen below.

|  |  |  |
| --- | --- | --- |
|  |  | **Auto ownership** |
|  |  | 0 | 1 | 2+ |
| **Household size** | 1 | 25 | 125 | 3 |
| 2 | 32 | 175 | 254 |
| 3+ | 10 | 89 | 512 |

Estimate total trip generated from that zone?

**Problem 6:** Balance trip production and attractions for the following scenario.

|  |  |
| --- | --- |
|  | **Unbalanced NHB Trips** |
|  | **NHB Productions** | **NHB Attractions** |
| 1 | 100 | 240 |
| 2 | 200 | 400 |
| 3 | 300 | 160 |
| **Total** | **600** | **800** |

**Problem 7:** Travel characteristics between two zones can be seen in following table.

|  |  |  |
| --- | --- | --- |
| **Variable** | **Auto** | **Transit** |
| $$A\_{k}$$ | -0.46 | -0.07 |
| $$t\_{1}$$ | 20 | 30 |
| $$t\_{2}$$ | 8 | 6 |
| C | 320 | 100 |

$$U = a\_{k}– 0.35\*t\_{1} – 0.08\*t\_{2} – 0.005c$$

Trip distribution: total of 12,450 trips going from A to B