

Try all questions & Assume reasonably any missing data & Max. Grade = 100 pts.

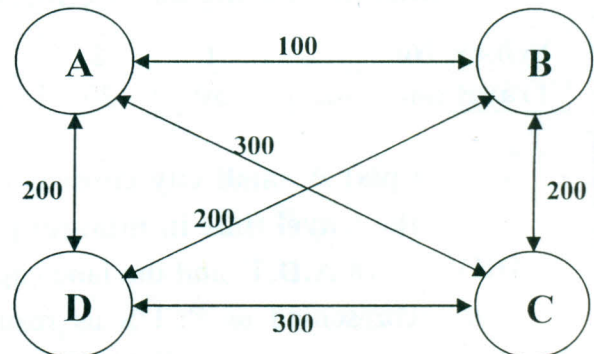
↳ **Problem (1): (10 Points)**

a) [10 pts] State True or False and Correct the Wrong Sentences:

- Cordon line is an imaginary line enclosing the study area.
- The evaluation stage is the last phase in the comprehensive urban transport process.
- The design volume of a road is based on a daily basis.
- Screen line is an imaginary line dividing the study area into two parts.
- The trip production equations depend on employment and accessibility.
- The free flow condition can be observed on roads at very low volume early in the morning.
- Surveys and data collection is the second phase of the design process.
- A trip with neither origin nor destination at home is said to be non-home based trip.
- For a signalized intersection, right turners effect is less than left turners effect on the stop line saturation flow.
- In design of traffic signals, the inter-green time should be given a minimum value of 4 seconds.

↳ **Problem (2): (20 Points)**

b) Consider the four-zone system shown in the Figure. Use growth factors of 2, 4, 2.5 and 1.5 for zones A, B, C and D respectively. If the Growth factors are identical for both attractions and



It is required to:

- (4 pts) Determine the future interchanges between zones A & C for the design year 2025. Use the average growth factor method (One iteration only is required).
- (3 pts) Determine the future interchange T_{D-C} for the design year 2025. Use Fratar method (One iteration only is required).
- (3 pts) Determine the future interchange T_{B-C} for the design year 2025. Use Furness method (One iteration only is required).

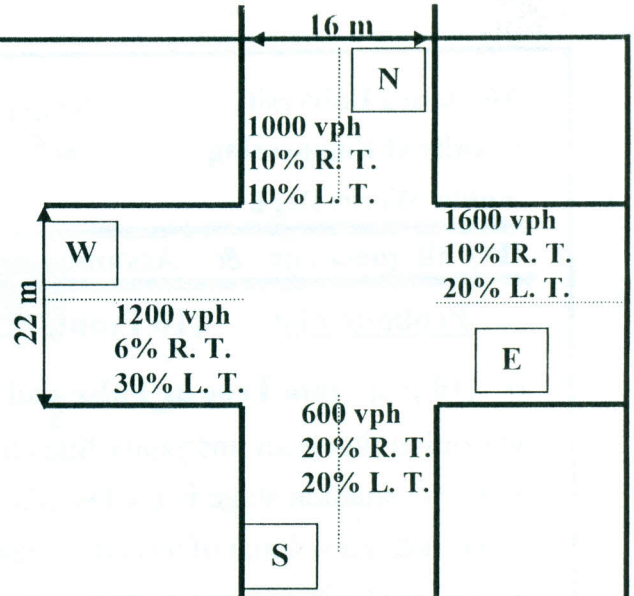
↳ **Problem (3): (20 points)**

a) (7 pts) Write short notes about the following:

- All red period - Types of intersections - Factors affecting the stop line saturation flow.
- Parking Turn-Over - Off Street Parking - Weaving action - Highway capacity.

b) (3 pts) Draw and count the different conflict points in a four leg at-grade intersection.

c) (10 pts) A two phase traffic signal is to be designed for peak hour condition. Design hourly volumes are given below. Assume starting delay of two second per phase. Also assume 10% truck (3.0 pcus) in each approach volume. It is required to make a full design for the traffic signal in this intersection.



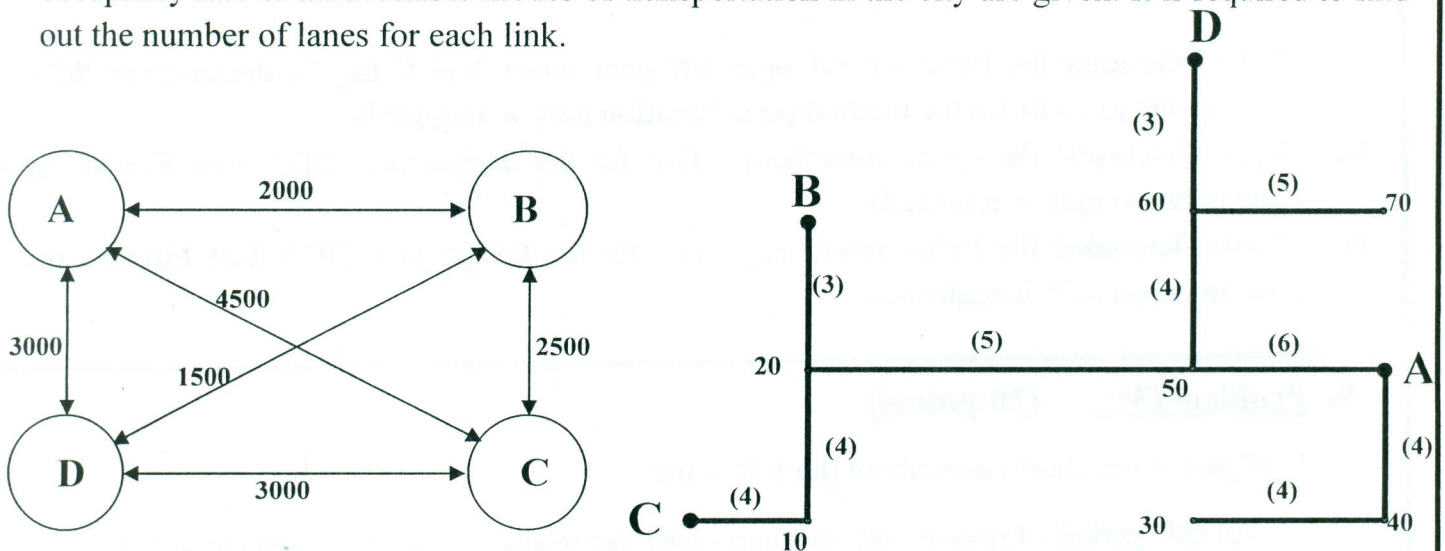
↪ **Problem (4):** (20 points)

a) (5 pts) Draw a neat sketch showing the different configurations of on street parking (curb parking) for a 100 meter length of local road using the standard passenger car space (5 × 2.5). Which configuration do prefer and why?

b) (5 pts) Ten vehicles are traveling between two points A and B 25 Km apart. The travel time for each vehicle is recorded in the given table. Calculate the time mean speed and space mean speed along this stretch, (Comment on your answer).

Vehicle No.	1	2	3	4	5	6	7	8	9	10
Travel time (min.)	30	20	22	22	32	34	25	28	32	28

c) (10 pts) A small city consists of four zones (A, B, C, D) as given in the shown Figure where, **the travel time in minutes (Number in brackets)** is given over each link. Assume that **DHV = 0.18 A.D.T.** and the lane capacity is 350 PCU/hr./lane. The future interchanges between zones represented as PCUS as resulted from the model split process and after applying the occupancy rate of all available modes of transportation in the city are given. It is required to find out the number of lanes for each link.



With our Best Wishes

Assoc. Prof. Dr. Sayed Shawaly