

Advanced Traffic Engineering (CE- 918)

Time: 3 Hours

Full Marks: 70

Answer any Five questions

Assume data reasonably, if required

1. Discuss briefly on [any FOUR] [4 x 3½]
 - i) Drivers' visual acuity; ii) Task of a driver and road safety ; iii) Moving car technique; iv) Time mean speed and Space mean speed; v) Traffic volume survey at intersection

2. a) Define capacity for an uninterrupted flow facility. Discuss the conditions on which highway capacity depends. Define the level of service on the basis of measure of effectiveness. [3+3+3]
b) State with example about the mandatory/regulatory traffic signs. Differentiate between cautionary traffic signs and informatory traffic signs. [2+3]

3. a) A four- lane multilane highway section with a full median and two -way traffic carries a peak-hour volume of 2,600 vehicle / hour in the heaviest direction. There are 12% trucks and 2% recreational vehicles in the traffic stream. Motorists are primarily regular user of the facility. The section under the study is on a level gradient, 1.6km in length. The PHF is 0.88. If the LOS is estimated as D (density 19pc/km/lane) then determine the free-speed of the highway section. Consider ET = 1.5, ER = 3.0. Assume other data suitably if required. [9]
b) Explain basic free-way segment. State different methods of analysis of basic freeway segment for determination of LOS as per Highway Capacity manual. [2+3]

4. a) What are the microscopic and macroscopic parameters of traffic stream? Discuss briefly stating the interrelationships of these parameters. [2+4]
b) A 2.0m long loop detector recorded a flow rate of 1200 vehicles per hour. It is also observed that average speed of traffic is 60 km/hr and average length of vehicles is 6m. Determine the time during one hour the detector has registered the presence of vehicles and also determine the density of traffic flow. Deduce the expressions required for solving the problem. [8]

5. a) What do you mean by shockwave in traffic flow? Explain the phenomenon with the help of flow-density curve. Develop the expression for the velocity of shockwave when a two lane road is narrowed due to laying of new bituminous course in one lane in terms. [2+3+3]
b) For the following data, determine i) hourly volume; ii) peak rate of flow within the hour; iii) peak hour factor. [6]

Time period	Number of vehicles observed
10.00 – 10.15	300
10.15 – 10.30	310
10.30 – 10.45	330
10.45 – 11.00	320

6. a) What is Road Safety Audit? What is its importance in improvement of safety condition of a roadway? How Safety Audit is conducted? [2+2+1]
- b) What is Collision diagram? What are the important features of Collision diagram? [2+2]
- c) State the basic strategies could be adopted for reduction of accidents in urban streets. [5]
7. a) Why is gap acceptance important in traffic stream design? What is meant by critical gap? Determine critical gap from following data. [2+2+4]

Length of gap, t (sec)	Number of rejected gap (greater than t sec)	Number of accepted gap (less than t sec)
1.5	90	3
2.5	50	18
3.5	30	35
4.5	12	65
5.5	4	100

- b) Explain Greenshield's model and Greenberg's model in respect of traffic flow. [6]