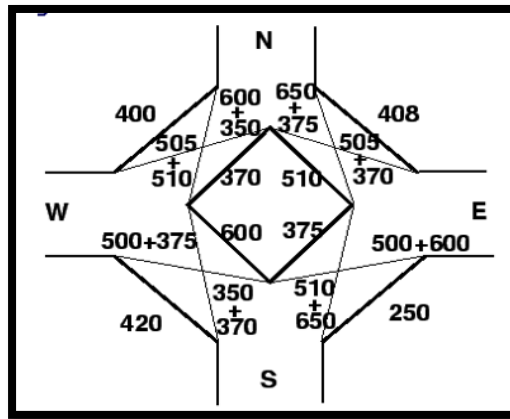


- Note: i. **Q. No. 1** is compulsory  
 ii. Attempt **any 3** out of **remaining 5**  
 iii. Support all **theory and numerical** with **neat sketch**

1. Solve any four (20 M)
- A. Compare the following
    - i. Running speed and Journey speed
    - ii. Space mean speed and time mean speed.
  - B. Discuss on purpose of OD study and enlist methods for the same.
  - C. Discuss various traffic system management
  - D. Compare various road signs on basis of purpose, shape and colour
  - E. Derive relation between  $Q_{max}$ ,  $K_j$  and  $V_{sf}$
2. A. Design a rotary intersection for 2 highways meeting at right angle. Also draw neat sketch of all the elements of rotary. Assume suitable data as per requirement. (10 M)



- B. Define Lux, Lumen and Illumination. Also design street lighting system for western express highway near Dahisar. Assume suitable data and list the same. (10 M)
3. A. Table gives result of the survey of vehicles in parking lot. Find accumulation, total parking lot, average occupancy and efficiency of parking lot of 30 capacity. Assume initially 15 cars were parked. (10 M)
- |            |   |    |    |    |    |    |
|------------|---|----|----|----|----|----|
| Time (min) | 5 | 10 | 15 | 20 | 25 | 30 |
| In         | 3 | 2  | 4  | 5  | 7  | 8  |
| Out        | 2 | 4  | 2  | 4  | 3  | 2  |
- B. Assuming linear relationship if mean free speed is observed to be 60 kmph near zero density and jam density is 45 veh/km. Assume average length of vehicle to be 4 m. Write speed density and flow density relation. Draw Q-K-V curves with their values and compute speed and density for flow of 400 veh/hr. (10 M)

4. A. There is a single booth at operation. The booth can handle 600 V/Hr and service time may be considered exponentially. The peak flow is 540 V/Hr with vehicle arrival being random. Calculate: (10 M)
- Average number of vehicle in system
  - Average time vehicle is in queue
  - Chance of there being 4 vehicles in the system.
  - Probability that there is no vehicle in the system.
- B. Explain the use of statistics in Traffic Engineering if an uncontrolled T-Junction passed experience indicates probability of vehicles arriving on the side found during 15 sec intervals and turning right into the main road is  $1/5$ . Find probability that in a period of 1 minute, there will be 0, 1, 2, 3, 4 vehicles arriving and turning right. (10 M)

- 5 A A 2-lane traffic system for 1800 veh/hr capacity is taken up for repair. If traffic flow is 1300 veh/hr on free section, find mean speed at the bottleneck. Assume headway of 7.2 m at jam condition. The maximum capacity at bottleneck is 1000 veh/hr. Also find the length of queue formed in 15 minutes. And also find time required for queue of 100 meters (10 M)
- B. Explain various methods to find PCU and find PCU value for 2W and LCV for a midblock. (10 M)

Vehicle	Speed (kmph)		Length
2W	56		1.15
Car	58		2.50
LCV	39		4.25

6. **Solve any four** (20 M)
- If the spot speeds at a particular location are normally distributed with mean of 48.6 kmph and standard deviation of 8.5 kmph. What is the probability that speed lies between 35 and 70 kmph? Also find 50<sup>th</sup> percentile speed.
  - Explain Q-K-V curve
  - Explain Basic, possible and practical capacity
  - Intelligent Traffic System and its application.
  - Explain Co-ordinated signal system

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