

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE SEM-VII Examination-Nov/Dec.-2011**

**Subject code: 170604**

**Date: 29/11/2011**

**Subject Name: Urban Transportation System**

**Time: 10.30 am-01.00 pm**

**Total marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1(a) What is Transportation Planning? Which are the objectives and goals of the transportation planning? 7
- (b) Explain the problems in the urban transportation in the present scenario of high vehicle ownership. 7

- Q.2(a) What is Zoning? Discuss the points to be kept in mind while doing zoning. 7
- (b) Explain the following terms with the help of sketches. 7
1. Study Area
  2. Cordon Line
  3. Centroid of Zone
  4. Trip
  5. Intrazonal, Interzonal and through trips
  6. Screen line
  7. CBD

OR

- (b) Which are the methods of O-D Survey? Describe in detail any one method which provides detailed information. 7
- Q.3(a) What is Trip Generation? Explain in detail the factors governing trip generation & attraction rates. 7
- (b) The following data is collected for a town. 7

| Zone                       | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
|----------------------------|----|----|----|----|----|----|----|
| Population in Zone (000)   | 25 | 19 | 29 | 24 | 17 | 18 | 22 |
| Total Trips Generated (00) | 15 | 12 | 18 | 13 | 12 | 14 | 15 |

Develop a linear regression model for trips generated from a zone. If the population in a particular zone increases to 86500, predict the expected trip generation from that zone.

OR

- Q.3(a) The number of Trips produced in an attracted to the three zones A, B, and C are shown below 7

| Zone           | A  | B  | C  | Total |
|----------------|----|----|----|-------|
| Trips produced | 25 | 40 | 35 | 100   |
| Trips attended | 40 | 35 | 25 | 100   |

The closeness order of the zones is seen as per the following matrix.

| O \ D | A | B | C |
|-------|---|---|---|
| A     | 1 | 2 | 3 |
| B     | 2 | 1 | 3 |
| C     | 3 | 2 | 1 |

The zonal L factor are given below

| Zone | L factor |
|------|----------|
| 1    | 0.035    |
| 2    | 0.025    |
| 3    | 0.04     |

- (b) Distribute the trips between the zones.  
Calculate the interzonal interchanges by competing opportunity model due to 200 production at zone A., with 300 attraction at zone B, 200 attractions at zone C, and 500 attractions at zone D. Assume that A-B is 10 minute, A-C is 15 minute, and A-D is 20 minute. 7

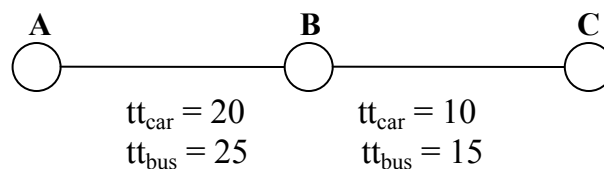
- Q.4(a) Explain Gravity Model. Derive the equation for the trip distribution by gravity model. 7

- (b) Compare Trip End Models & Trip Interchange Models in the Modal Split Analysis. 7

OR

- Q.4(a) Write short note on:  
1. All or Nothing Assignment method.  
2. Diversion Curve method 7

- (b) Three zone A, b and C are connected by two lanes roads as shown in figure below with travel time by bus shown in bracket and travel time by car. 7



The probability ( $P_c$ ) of choosing the car mode is found to be given by

$$P_c = \frac{1}{1 + e^{-u(x)}}, \quad \text{where, } u(x) = 0.86 - 0.08(tt_{car} - tt_{bus}).$$

The total trip exchange between zones are as follows :

| From | To | Person-trip per day |
|------|----|---------------------|
| A    | B  | 1200                |
| B    | A  | 0                   |
| A    | C  | 500                 |
| C    | A  | 1800                |
| B    | C  | 400                 |
| C    | B  | 500                 |

Determine the 2 way volume in car per day on the road AC if the average car occupancy is 2.5.

Q.5(a) Which are the Urban forms? Describe the characteristics of each related to the transportation planning. 7

(b) Compare between the BRT and Metro. Find the maximum capacity per hour of BRT and Metro for the frequency of 60 trips per hour on any corridor. 7

OR

Q.5(a) What are the innovations in the Rapid Transit System? 7

(b) Describe briefly: Corridor identification and corridor screen line analysis. 7