GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 2711301   **Date: 09-01-2015**
Subject Name: Urban Transportation System Planning
Time: 02:30 pm - 05:00 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)** Explain with flow chart ‑Urban Transportation System Planning Processø   **07**
       (b) Compare following mass transportation systems for different aspects: BRTS,   **07**
       LRT and Metro Railway.

Q.2 **(a)** Develop the trip generation equation using linear regression for the following   **07**
       data. What would be the coefficient of determination?

House Hold size	2	3	1	4	2	5	6	8	4	3
Trips per day	5	8	3	10	4	12	14	18	9	7

       (b) Briefly discuss about various factors affecting trip production and trip attraction.   **07**
       What are the merits and limitations of ‑Category Analysisø?

OR

       (b) What is coordination in transportation? What is its significance? Explain with   **07**
       example different types of coordination.

Q.3 **(a)** What do you understand about Friction factor and Adjustment factor in Gravity   **07**
       model for trip distribution analysis? How will you calibrate these in Gravity
       model?

       (b) Using a gravity model, with an impedance term of the form $C^{-\beta}$, estimate the   **07**
       number of trips from zone – 3 to all other zones. Take $\beta = 2.2$

Zone	Travel time to zone-3 (min)	production	Attractions
1	14	22000	12000
2	22	15000	30000
3	-	30000	18000
4	16	25000	10000
5	30	18000	40000

OR

Q.3 **(a)** Compare Trip-end-type model with Trip-interchange-type model for modal split   **07**
       analysis.

(b) A study area has been divided in three zones 1, 2, 3. The present trip distribution **07** matrix is given with future total trip productions and trip attractions. Develop the future trip distribution matrix using Detroit method.
Do iteration process up to 1 stage.

O\D	1	2	3	Total present production	Total future production
1	220	250	180	650	950
2	240	200	160	600	800
3	210	160	280	650	950
Total present attraction	670	610	620	1900	-
Total future attraction	1000	750	950	-	2700

Q.4 **(a)** Distinguish between: (i) Probit model óvs- Logit model, (ii) SP (Stated **07** Preference) survey óvs- RP (Revealed Preference) survey, for modal split analysis.

(b) A market segment consists of 1000 individuals. A multinomial logit mode choice **07** model is calibrated for this market segment, resulting in the following utility function. $u = {}_m$ ó 0.40 C ó 0.03 T

Where, C = out of-pocket cost (Rs.) and T = travel time (min). For a particular O-D pair, values of ${}_m$, the cost & travel time for these three modes are as follows.

Mode	${}_m$	Travel Time (min)	Cost (Rs.)
Bus	0.10	30	2.50
Rail	0.60	20	3.00
Auto	2.20	15	4.50

Predict the number of trips by each mode from this market segment.

OR

Q.4 **(a)** Distinguish between: (i) User equilibrium óvs- System optimum, (ii) Static óvs- **07** Dynamic, traffic assignment.

(b) The total trip volumes from zone 1 to 2 are 4000. Find the volumes on each route **07** connecting two zones, using the particulars given in table below. Use TRC trip assignment.

Route No.	Length (Km)	Speed (kmph)
1	2.4	32
2	1.5	22
3	1.2	10
4	3.2	20

Q.5 **(a)** Explain Garin-Lowryós Land-use model with its merits over Lowryós model. **07**

(b) A small 3 zone city has following data: **07**

Zone	Total existing population	Holding capacity (acres)
1	3000	200
2	2000	300
3	4000	300

The travel times (minutes) are given in following table

O \ D	1	2	3
1	2	6	8
2	6	2	5
3	8	5	3

Assume travel time exponent = 2. If the population of the city is expected to rise to 12000 in future, how will the population be distributed by zone? Assume that the total employment in each zone is proportional to the total existing population in that zone.

OR

Q.5 (a) Explain briefly about ‑Urban Goods Movementø **07**

(b) Explain with sketches different types of urban street networks and urban forms. How do they affect selection of urban mass transportation system? **07**

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