Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3164017 Date:14-07-2023

Subject Name:Urban Transport System Planning

Time:10:30 AM TO 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

MARKS

Q.1 **(a)** Compare in detail LRT with BRTS. **03**

(b) Define and show followings in the sketch of study area: **04**
Zonal centroid, Intra zonal trips, Screen line, Cordon line.

(c) From the data given in following table, develop trip generation equations for each independent variable separately and find R^2 values. Show which of the two variables is more reliable and why? **07**

HH Size	2	1	3	2	4	6	7	5	4	3
Trips/day	6	2	8	4	12	18	20	16	14	10
Vehicle Ownership	2	0	1	1	2	3	4	3	3	2

Q.2 **(a)** Differentiate between ‘Public Transit’ and ‘Para Transit’. **03**

(b) Discuss with flow chart, various steps involved in Travel Demand Modelling. **04**

(c) A study area has been divided in four zones 1, 2, 3, 4. the present trip distribution matrix is given with future total trip productions and trip attractions. Develop the future trip distribution matrix using Detroit method. Do iterative process up to one stage. **07**

O - D	1	2	3	4	Total present production	Total future production
1	380	410	260	170	1220	2500
2	520	540	370	430	1860	3500
3	220	480	530	390	1620	3100
4	200	350	230	510	1290	2700
Total present attraction	1320	1780	1390	1500	5990	-
Total future attraction	2700	3500	2500	3100	-	11800

OR

(c) Find the trip interchange for the given data using Intervening Opportunity Model. Take l (zone factor) = 0.00055 for all zones. **07**

Zone	1	2	3
Trip Produced	1000	1500	800
Trip attracted	2000	1600	2700

The order of closeness

O \ D	1	2	3
1	1	3	2
2	3	1	2
3	2	3	1

Q.3 **(a)** Briefly discuss with flow chart 'Land Use and Transportation Interaction'. **03**

(b) Describe features of Lowry's land use model. **04**

(c) Using gravity model find the no. of trips between zones, as per following data. **07**
Do iterations up to 2 stages. Assume initially Kij = 1 & α = 2.0. Calibrate the value of α.

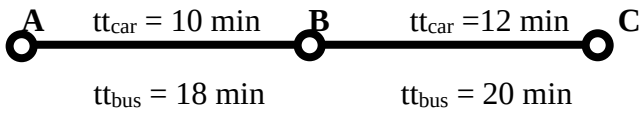
Trips between zones	No. of trips	Travel time in Minute
1 to 3	150	7
1 to 4	350	10
2 to 3	250	10
2 to 4	450	7

OR

Q.3 **(a)** What are the factors affecting in mode choice? **03**

(b) Explain the 'Home Interview Survey' with its format. **04**

(c) Three zones A, B and C are connected by two lane roads as shown in figure below. The probability of choosing the car mode (P_c) is found to be given by $P_c = 1 / (1+e^{-u(x)})$. Where, $u(x) = 0.70-0.04(tt_{car} - tt_{bus})$ **07**



The total trip exchanges between zones are as follows. Determine the two-way volume in cars per day on the roads AB and BC, if the average car occupancy is 2.5.

From	To	Person trips per day
A	B	1000
B	A	1100
A	C	1800
C	A	1700
B	C	1200
C	B	1300

Q.4 **(a)** Briefly explain 'Floyd-Warshall' shortest path algorithm. **03**

(b) Discuss about necessity and method of conducting Passenger Occupancy survey in transport planning. **04**

(c) The characteristics of two routes between two zones are given in table below. The total number of trips between these two zones is 2000 trips/hour. Assign the trips using iterative TRC trip assignment procedure. **07**

Route No.	No. of lanes	Speed Limit (kmph)	Length (km)	Critical Volume (vph/lane)	Critical travel time (min/km)	Ideal travel time with no volume (min/km)
1	One	50	5	1200	4	3
2	One	70	6	1800	3	2

OR

Q.4 **(a)** Suggest TSM techniques to solve the Transit Management problems. **03**

(b) Describe Transit Bus Routing problem. **04**

(c) A bus route on a city street is scheduled for 2 min headways. On the average 10 pass/bus board at a particular stop and 8 passengers alight. All boarding passengers use the front door, and all alighting passengers use the back door. Fare collection is exact fare and fare-box, but not single coin. Assume clearance time is 16 sec, reductive factor 0.4 and that the maximum allowable probability of bus queuing is 1%. The stop is near side stop at an intersection with a g/C ratio of 0.5. How many berths are required? **07**

Q.5 **(a)** Define for the transit vehicle and labor scheduling: Dead heading, Run cutting, Trippers. **03**

(b) State performance indicators of transit route evaluation and suggest corrective actions to improve them. **04**

(c) Explain with sketch spatial arrangement of land use and goods movement. How would you predict urban goods vehicle trips? **07**

OR

Q.5 **(a)** Suggest suitable mass transit systems with reason, for the following types of urban structures: Centripetal, Grid, Linear. **03**

(b) What is transit vehicle bunching problem? How would you prevent it? **04**

(c) Suggest TSM strategies for Transportation Demand Management, and Transportation Control Management. Also, discuss about the ITS applications in TSM. **07**

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