Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3164017   **Date:17-12-2022**
Subject Name:Urban Transport System Planning
Time:02:30 PM TO 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

		MARKS
Q.1	**(a)** Describe the main features of Metro Railway.	**03**
	(b) Discuss various problems in Urban Transport System Planning Process.	**04**
	(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 models is more reliable and why?	**07**

No. of persons in household	Trips per day	Vehicle ownership
3	8	2
4	10	3
3	7	1
2	5	2
5	12	3
6	14	3
8	16	4
9	17	4
10	22	5
2	4	2

Q.2	**(a)** Differentiate between 'Carpooling' and 'Vanpooling'.	**03**
	(b) Discuss: How will you achieve the coordination for the intra-carrier transport modes?	**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 Furness method. Do iterative process up to convergence of +/- 5% of future trips.	**07**

O - D	1	2	3	4	Total present production	Total future production
1	100	130	200	200	630	1300
2	180	100	270	150	700	1380
3	220	160	150	240	770	1600
4	150	170	230	110	660	1400
Total present attraction	650	560	850	700	2760	-
Total future attraction	1350	1280	1720	1330	-	5680

(c) Solve above example of Q. 2 (c) by Fratar method. Do iteration process up to 1 stage. **07**

Q.3 **(a)** What is "Land Use Planning"? **03**

(b) Explain with flow chart 'Lowry's Derivative Model'. **04**

(c) Using a gravity model, with an impedance term of the form $C^{-\alpha}$, estimate the number of trips from zone– 3 to all other zones. Take $\alpha = 1.9$ **07**

Zone	Travel time to zone-3 (min)	production	Attractions
1	14	20000	10000
2	22	15000	30000
3	-	30000	18000
4	16	25000	10000
5	30	18000	40000

OR

Q.3 **(a)** Draw the typical sketch of Diversion curves for modal split analysis. **03**

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

(c) A market segment consists of 1000 individuals. A multinomial logit mode choice model is calibrated for this market segment, resulting in the following utility function. **07**

$$u = \beta_m – 0.40\,C – 0.03\,T$$

where, C = out of-pocket cost (Rs.) and T = travel time (min). Values of β_m for Bus transit: 0.2, Rail transit: 0.6 and Auto: 2.00. For a particular O-D pair, the cost & travel time for these three modes are as follows.

Mode	Travel Time (min)	Cost (Rs.)
Bus	30	8.80
Rail	20	5.50
Auto	15	14.50

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

Q.4 **(a)** What is "All-Or-Nothing" assignment? **03**

(b) Discuss about Boarding-Alighting survey in transit operation. **04**

(c) The total trip volumes from zone 1 to 2 are 4200. Find the volumes on each route connecting two zones, using the particulars given in table below. Use TRC trip assignment. **07**

RouteNo.	Length (Km)	Speed (kmph)
1	2.4	32
2	1.5	22
3	1.2	10
4	3.2	20

OR

Q.4 **(a)** What do you mean by 'TSM Techniques'? **03**

(b) Discuss the scheduling problem in transit. How will you obtain the efficient schedule of transit? **04**

(c) Explain with sketches (i) Rectangular, (ii) Concentric and radial street systems. State their advantages and limitations. Which transit systems will be suitable for them **07**

Q.5 **(a)** What are the general problems in Urban Goods Movement? **03**

(b) Define: Corridor, Segment capacity, Screen line, Freeway. **04**

(c) On an urban corridor, regular bus transit is operated with headway of 10 minutes during peak hour. The reliability of transit arrival at a stop is **07**

observed 80%. If the seating capacity of a bus is 52 and load factor 1.4. Calculate vehicle capacity and passenger capacity of transit. If 50% schedule operated during peak hour with double decker bus having seating capacity of 75, and load factor is 1.3. What will be the change in passenger capacity?

OR

Q.5	**(a)**	What is transit routing?	**03**
	(b)	Briefly explain the "Transit System Efficiency Indicators".	**04**
	(c)	If the corridor is converted into BRT corridor, then the reliability is 0.9. The buses are of articulated with 100 seat capacity and permissible stands are 50%, headway is 10 minutes. Calculate the vehicle capacity and passenger capacity.	**07**

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