MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

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MANIPAL INSTITUTE OF TECHNOLOGY

SIXTH SEMESTER B.TECH (CIVIL ENGINEERING)

END SEMESTER EXAMINATION, MAY 2023

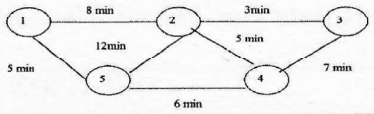
URBAN TRANSPORT PLANNING (CIE 4068)

(– 05 - 2023)

TIME: 3 HRS. **MAX. MARKS: 50**

Note: 1. Answer all questions.
2. Any missing data may be suitably assumed.

<table>
<tr><th>Q. NO</th><th>QUESTION</th><th>MARKS</th><th>CO</th><th>BL</th></tr>
<tr><td>1A</td><td>The target year productions and relative attractiveness of a four-zone city have been estimated as follows:
<table>
<tr><td>Zone</td><td>Productions</td><td>Attractiveness</td></tr>
<tr><td>1</td><td>1500</td><td>0</td></tr>
<tr><td>2</td><td>0</td><td>3</td></tr>
<tr><td>3</td><td>2600</td><td>2</td></tr>
<tr><td>4</td><td>0</td><td>5</td></tr>
</table>
The calibration of the gravity model estimated the parameter c to be 2.0 and all socioeconomic adjustment factors to be equal to unity. Apply the gravity model to estimate all target interchanges Q_{ij} and total target-year attractions for each zone. W_{ij} is given in the skim table below.
<table>
<tr><td>i\j</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>1</td><td>5</td><td>10</td><td>15</td><td>20</td></tr>
<tr><td>2</td><td>10</td><td>5</td><td>10</td><td>15</td></tr>
<tr><td>3</td><td>15</td><td>10</td><td>5</td><td>10</td></tr>
<tr><td>4</td><td>20</td><td>15</td><td>10</td><td>5</td></tr>
</table>
Decide the final trip table for the target year.</td><td>5</td><td>3</td><td>5</td></tr>
<tr><td>1B</td><td>With the help of a neat figure, explain the BPR diversion curve method for network assignment.</td><td>3</td><td>5</td><td>2</td></tr>
<tr><td>1C</td><td>Do the following characteristics influence mode choice? If yes, analyze the reasons.
i) Type of trip
ii) Zonal characteristics</td><td>2</td><td>4</td><td>4</td></tr>
<tr><td>2A</td><td>A small study area represented by six traffic zones has the following characteristics.</td><td>5</td><td>2</td><td>4</td></tr>
</table>

	Zone 1 2 3 4 5 6 Trip production 600 450 900 850 750 290 Cars owned 250 200 710 615 280 130 Examine the mathematical relationship between trip production and car ownership details.			
2B	Explain capacity restraint method for traffic assignment.	**3**	**5**	**2**
2C	Define Drew's technique for network assignment.	**2**	**5**	**1**
3A	Solve the traffic assignments of vehicle trips shown in the following O-D trip table to the network using the all-or-nothing assignment technique. To summarize your results, list all of the links in the network and their corresponding traffic volume after loading. Origin-Destination Trip Table: Trips between Zones From/to 1 2 3 4 5 1 - 100 100 200 150 2 400 - 200 100 500 3 200 100 - 100 150 4 250 150 300 - 400 5 200 100 50 350 - Highway Network: 	**5**	**5**	**3**
3B	The total number of trips in a TAZ is found to be 4200. Currently all trips are made by car. The government plans to bring in two alternatives; to introduce a train or a bus. The travel characteristics and respective coefficients are given in table below. Decide the best alternative in terms of trips carried. X_1 X_2 X_3 X_4 X_5 Coefficient 0.05 0.04 0.07 0.2 0.2 Car 25 - - 22 6 Bus 35 8 6 8 - Train 17 14 5 6 - The degree of satisfaction of each mode choice is expressed as a function and is given as: $a_1X_1+a_2X_2+a_3X_3+a_4X_4+a_5X_5$ where a_1, a_2 etc. are coefficients of the respective predictor variables.	**3**	**4**	**5**
3C	Cross classification technique is a tool for computing trips generated in a zone. What are the limitations of this technique?	**2**	**2**	**1**
4A	Illustrate the Lowry Model of land use transport modelling with the help of a flow chart.	**5**	**4**	**2**
4B	Explain the internal form and function of an urban structure.	**3**	**4**	**4**
4C	Regression analysis is a powerful tool to predict the trips generated from a zone. List out the drawbacks of this method.	**2**	**2**	**1**
5A	Compare multiple linear regression analysis and category analysis for predicting trip generation.	**5**	**2**	**2**
5B	Illustrate the general principles of traffic assignment with the help of a figure.	**3**	**5**	**2**
5C	Compare pre and post distribution modal split.	**2**	**4**	**2**