MANIPAL INSTITUTE OF TECHNOLOGY
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MANIPAL INSTITUTE OF TECHNOLOGY

SIXTH SEMESTER B.TECH (CIVIL ENGINEERING)

END SEMESTER REGULAR EXAMINATION, MAY 2024

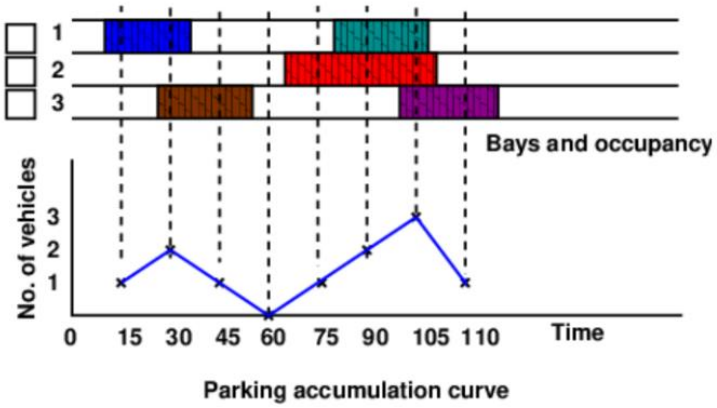
URBAN TRANSPORT PLANNING (CIE 4068)

(08 – 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>Given the utility expression,
$U_k = a_k - 0.05T_a - 0.04T_w - 0.02T_r - 0.01C$, where T_a is the access time, T_w is the waiting time, T_r is the riding time and C is the out of pocket cost
a) Apply the logit model to calculate the market shares of different modes of transport available.
<table>
<tr><td>Mode</td><td>a_k</td><td>T_a</td><td>T_w</td><td>T_r</td><td>C</td></tr>
<tr><td>Auto</td><td>-0.005</td><td>5</td><td>0</td><td>30</td><td>100</td></tr>
<tr><td>Transit</td><td>-0.05</td><td>10</td><td>10</td><td>45</td><td>50</td></tr>
</table>
b) Discuss the patronage shift in the mode choice after doubling the bus out of pocket cost.</td><td>5</td><td>4</td><td>3</td></tr>
<tr><td>1B</td><td>With the help of a neat flowchart, illustrate and explain the Lowry model for land-use transport model.</td><td>3</td><td>4</td><td>3</td></tr>
<tr><td>1C</td><td>“Furness method is the best growth factor model.” Do you agree with this statement? Explain with proper reason.</td><td>2</td><td>3</td><td>2</td></tr>
<tr><td>2A</td><td>A surveyor wants to study the pattern of shopper’s visit to malls in a city. The data collected is consolidated and presented in the table given below. If the locations of malls act as centroids of trip generation, determine the relationship between the size of the mall and shopping visits.
<table>
<tr><th>Floor area of the mall (in 1000 sq.ft)</th><th>Shoppers visiting (in thousands)</th></tr>
<tr><td>30</td><td>15</td></tr>
<tr><td>50</td><td>20</td></tr>
<tr><td>80</td><td>37</td></tr>
<tr><td>100</td><td>45</td></tr>
<tr><td>120</td><td>80</td></tr>
</table></td><td>5</td><td>2</td><td>3</td></tr>
</table>

	130	96			
	150	100			
2B	Discuss the assumptions made in multiple linear regression analysis.		**3**	**2**	**2**
2C	With the help of a neat figure, illustrate the working principle of an enoscope.		**2**	**1**	**3**
3A	Calculate the following with the help of the parking accumulation curve given below. The survey is conducted for 110 minutes.  Parking accumulation curve a. Parking volume b. Parking load c. Average parking duration d. Parking turnover e. Parking index		**5**	**1**	**3**
3B	Discuss intervening opportunities model and compare it with gravity model.		**3**	**3**	**2**
3C	Discuss the limitations of Fratar model.		**2**	**3**	**2**
4A	"Diversion curves method is one of the frequently used assignment techniques." Justify the statement. Analyze the different diversion curves with the help of neat figures.		**5**	**5**	**4**
4B	A freeway section 10 miles long has a free-flow speed of 60 mph. The following data is given: Q_{max} = 2000 veh/hr, Q = 1000 veh/hr, τ = 0.1, α = 0.474, and β = 4, and T_0 = 10min. Apply the (a) Davidson's and (b) BPR's method to find travel time at traffic flow Q (T_Q).		**3**	**5**	**3**
4C	With the help of an example, illustrate the average growth factor model for trip distribution.		**2**	**3**	**3**
5A	Estimate the future trips using Furness method.		**5**	**3**	**5**

O\D	**1**	**2**	**3**	**4**	**Total Present trips**	**Estimated future trips (total)**
1	8	3	16	15	42	147

		2	6	9	8	5	28	42				
		3	10	8	3	8	29	32				
		4	2	4	7	12	25	30				
		Total Present trips	**26**	**24**	**34**	**40**	124					
		Estimated future trips (total)	**39**	**24**	**68**	**120**		251				
5B	"Selection of transport model for a landuse is a major decision." Discuss the different factors to be considered while selecting a land-use transport model.									**3**	**5**	**2**
5C	Discuss license plate method of surveying highlighting its merits over other parking survey methods.									**2**	**1**	**2**