

IV B.Tech. II Semester Regular Examinations, April/May -2006
TRANSPORTATION PLANNING AND DESIGN
(Civil Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What do you understand by Travel Demand? On what independent variables it depends? Explain. [8]
(b) Explain the relationship between Land Use and transportation. Also explain the assumptions made in travel demand forecasting. [8]
2. (a) What is a trip? Explain. Also explain the guidelines for dividing an urban area into number of zones for transportation planning. [8]
(b) What are the objectives of O.D. surveys? Explain clearly the methodology of home interview survey. [8]
3. (a) Differentiate between aggregate and disaggregate models for trip generation by explaining the variables considered in each case. [8]
(b) Giving a typical desire line diagram, explain the use of desire line diagram in planning transportation facilities. [8]
4. (a) What are the factors affecting trip generation? Explain. Also explain the use of multiple linear regression for Trip generation. [8]
(b) Clearly explain the category analysis method for estimating the number of trips generated from a zone. [8]
5. (a) Explain the method of average growth factor for estimating trip distribution between two given zones. [8]
(b) Explain the Fratar method of Trip distribution. [8]
6. (a) What is the purpose of traffic assignment onto the networks? Explain. Also explain the method of all-or-nothing assignment with a simple example. [8]
(b) Explain the use of diversion curves in traffic assignment. [8]
7. (a) What are the adverse effects of traffic on environment? Explain. [8]
(b) Discuss about the measures that can be taken to air pollution and noise pollution due to traffic. [8]
8. (a) What are the various approaches available for quantifying accident costs. Explain them in brief. [8]
(b) A single lane road 50 km long is to be widened to two lanes at a cost of Rs.8.0 lakhs per km including all improvements. The cost of operation of vehicles on a single road is Rs.1.20 per veh-km, whereas it is Rs.1.00 per veh-km on

improved road. The average traffic may be assumed as 2500 vehicles/day over a design period of 20 years. The interest rate is 10 percent per annum. The cost of maintenance is Rs.5000 per km on existing road and Rs.10,000 per km on the improved road. Comment whether the investment is economically justifiable based on B/C ratio. [8]

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1. (a) Explain the interrelationship between land use and transport with the help of a diagram. [8]
 (b) What independent variables affect the travel demand in an urban area? Discuss. [8]
2. (a) Differentiate between sequential models and sequential recursive models used in travel demand analysis. Give the flow charts in each case. [8]
 (b) Explain the principles used in defining a study area for Transportation planning process. [8]
3. (a) What are the various types of surveys to be conducted for data collection needed for transportation planning. Briefly describe. [8]
 (b) Explain the use of expansion factors and accuracy checks in transportation planning surveys. [8]
4. (a) What is trip generation? What factors affect the trip generation process? Explain. [8]
 (b) Explain the concept of multiple linear regression and its use in Trip generation modelling. How do you evaluate a multiple linear regression equation? [8]
5. The following is the present O-D matrix for 3 zones:

$\downarrow O \quad \xrightarrow{D}$	1	2	3	Total Productions
1	100	50	150	300
2	200	100	100	400
3	150	300	150	600
Total attractions	450	450	400	

The expected future productions from zones 1,2 and 3 are 600, 1000 and 1800 respectively. Similarly future attractions are 1000, 900 and 1600 respectively. Obtain the future trip distribution based on average growth factor method. Perform three iterations. [16]

6. (a) What are the factors affecting mode split in an urban area? Explain. [8]
 (b) Explain the use of probit, logit and discriminant analysis in mode split models. [8]
7. (a) What are the basic principles of economic evaluation? Explain. [8]

(b) What are the approaches available for evaluating travel time savings? Discuss.
[8]

8. Write short notes on the following;

(a) Four step process of transportation planning

(b) Desire line diagram

(c) Diversion curves

(d) Environmental impact of traffic.

[4×4=16]

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1. (a) What are the characteristics associated with travel in urban areas? Explain. [8]
(b) Explain the various steps involved in the comprehensive transportation planning. [8]
2. (a) Describe the different types of surveys required for transportation planning and the data to be collected in each survey. [8]
(b) What are the differences between aggregate models and disaggregate models? Explain by indicating the variables considered at each level. [8]
3. (a) Explain the method of category analysis used in Trip generation and the assumptions made. [8]
(b) Discuss the factors that influence the trip generation in urban areas. [8]
4. (a) Briefly explain the various growth factor models used in Trip distribution and their limitations. [8]
(b) Explain the concept of gravity model used in Trip distribution. Why gravity model is considered to be superior to the growth factor models? [8]
5. (a) Briefly explain the different methods of assignment used in transportation planning. [8]
(b) With neat diagrams, explain the use of diversion curves in traffic assignment. [8]
6. (a) What do you understand by mode split? What factors influence mode choice behaviour of people in urban areas? Explain. [8]
(b) With clear explanation, differentiate between trip end modal split and trip interchange modal split. [8]
7. (a) What are the possible effects of noise pollution by road traffic? How the noise pollution can be controlled? Explain. [8]
(b) Explain the costs and benefits associated with highway projects. Also describe briefly the Benefit-Cost ratio method used in economic analysis of highway projects. [8]
8. Write short notes on the following:
(a) Expansion factors and accuracy checks

- (b) Definition of study area
- (c) Logit and probit models
- (d) Net Present Value method.

[4×4=16]

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1. (a) Why travel generates in urban areas? Explain the concept of travel demand giving the factors on which it depends. [8]
(b) What are the steps involved in comprehensive transportation planning process for an urban area. [8]
2. (a) Based on what principles a study area can be defined for transportation planning? Explain. [8]
(b) Explain the importance of origin and Destination studies in Transportation planning process. Briefly describe the various methods used for O-D study. [8]
3. (a) Discuss about the factors influencing the trip generation or travel behaviour in urban areas. [8]
(b) What is category analysis? What are the assumptions in category analysis? Explain. [8]
4. (a) Explain the average growth factor method and uniform growth factor method used for trip distribution. What are their drawbacks or limitations? [8]
(b) Explain the Fratar method used for trip distribution clearly in a step by step manner. [8]
5. (a) Giving the purpose of traffic assignment, explain the all-or-nothing assignment technique with a simple example. What are its drawbacks? [8]
(b) What is a minimum path? Explain Moore's algorithm for finding the minimum path in a network. [8]
6. (a) What factors influence a person's mode choice behaviour in urban areas? Explain. [8]
(b) Explain the use of logit model, probit model and discriminant analysis in modal split modelling. [8]
7. (a) Explain how the traffic adversely affects the environment. And also suggest measures to reduce environmental pollution due to traffic. [8]
(b) What are the various costs considered in the economic evaluation of highway projects? Explain. [8]
8. Write short notes on the following:
(a) Desire line diagram

(b) Accident studies and analysis

(c) Gravity model

(d) Net present Value Method.

[4×4=16]

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