



DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY
UNIVERSITY EXAMINATIONS 2020/2021 ACADEMIC YEAR
FOURTH YEAR SECOND SEMESTER EXAMINATION FOR THE
DEGREE OF BACHELOR OF EDUCATION IN TECHNOLOGY (CIVIL
ENGINEERING) AND BACHELOR OF SCIENCE IN CIVIL
ENGINEERING

COURSE CODE: ECE 3211

COURSE TITLE: TRANSPORTATION MODELLING

DATE: 20TH SEPTEMBER, 2021

TIME: 8:30-10:30AM

INSTRUCTIONS TO CANDIDATES

- *THIS QUESTION PAPER HAS FOUR QUESTIONS*
- *ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS*
- *SHOW ALL YOUR WORKINGS CLEARLY ON ANSWER BOOKLET*

THIS PAPER CONSISTS OF THREE PRINTED PAGES

QUESTION ONE (30 MARKS)

- a) Describe any three major roles of transportation studies. **(3marks)**
- b) Using conceptual framework, highlight the process of carrying out transportation survey. **(5 marks)**
- c) Briefly explain the Four-Step travel demand models in transportation planning. **(8 marks)**
- d) Describe the following Origin – Destination survey methods:
- House hold survey **(3 marks)**
 - Road side interview survey **(3 marks)**
- e) You have been appointed by The County Government as a transportation modelling expert. You are expected to advice on two alternative modal split; to introduce a train or a bus on a route where total number of trips from *zone i* to *zone j* made by car is 4200. The travel characteristics and respective coefficients are given in the table below. **Using binary logit model**, advice the best alternative in terms of trips carried. **(8 marks)**

	t^{vij}	t^{wij}	t^{tij}	F_{ij}	ϕ_{ij}
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	-

t^{vij} – is vehicle travel time between *i* and *j* t^{wij} - is the walking time to and from stops
 t^{tij} - is the waiting time at stops F_{ij} – is the fare charged to travel between *i* and *j*
 ϕ_{ij} – is the parking cost

QUESTION TWO (20 MARKS)

- a) Define transportation forecasting and identify five major traffic data needed during forecasting. **(6 marks)**
- b) By giving a mathematical expression, briefly describe two approaches for determining the traffic growth rates in a transportation facility. **(6 marks)**
- c) You have been provided with the following data for a particular transportation survey;
- Margin of error, 5%
 - Confidence level of 95% (Z-score of 1.96)
 - Standard deviation of 0.5

From the above, calculate the sample size required for conducting the survey. **(5 marks)**

- d) State any three factors considered during data collection for transportation modelling. **(3 marks)**

QUESTION THREE (20 MARKS)

- a) By giving two examples on each, briefly highlight four major personal travel demand data requirements. **(8marks)**
- b) Describe the two broad methods of data collection applicable in transportation studies. **(6marks)**
- c) Differentiate between longitudinal and cross-sectional surveys. **(4 marks)**
- d) In relation to **Origin – Destination** (O-D) survey, define the following terms:
- Origin **(1 mark)**
 - Modal share **(1 mark)**

QUESTION FOUR (20 MARKS)

- a) With aid of a flow chart, illustrate the stages of conducting sampling from a target population. **(6 marks)**
- b) State two reasons as to why sampling is conducted in transportation studies. **(2 marks)**
- c) Describe two types of sampling techniques applied in transportation surveys. **(4 marks)**
- d) Highlight any two examples of each technique listed in iii above. **(8 marks)**

THE END