



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
Department of BUILDING & Civil engineering
UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECV 4503: TRANSPORT ENGINEERING II

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: JULY 2025

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **five** questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (COMPULSORY) 30 Marks

- a) Intra-zonal trips, External trips and accessibility are terms used in transportation planning. Define these three terms (6 marks)
- b) In relation to land use and transportation explain why urban areas grow or decline in time. (3 marks)
- c) Explain the following terminologies used in transportation:
 - (i) Supply
 - (ii) Demand
 - (iii) Equilibrium (3 marks)
- d) With the aid of a flow chart, describe transportation within the urban system. (7 marks)



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- e) Briefly explain how transportation affect economic development of an area (6 marks)
- f) Discuss the following State Roles in Land Use Activities (5 marks)
- i) Education/technical assistance
 - ii) Access management

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO (20 marks)

- a) Explain the following terms used in transportation and land-use in urban areas:
- (i) Accessibility
 - (ii) Mobility
 - (iii) Zoning
 - (iv) Urban spatial structure
 - (v) Urban form (10 marks)
- b) Explain the relationship between transportation and land development. (7 marks)
- c) State the basic assumptions made in the Von Thunen's Regional Land Use Model (3 marks)

QUESTION THREE (20 Marks)

- a) Discuss in detail the Burgess Concentric Model of land use (10 marks)
- b) Briefly describe the 'location theory' as used in urban planning. (10 marks)

QUESTION FOUR (20 Marks)

- a) Describe the urbanization process and how it affects other urban structures such as infrastructure and urban service. (12 marks)
- b) Explain briefly the Sector and multiple nuclei land use Models (8 marks)



QUESTION FIVE (20 Marks)

- a) The description of a transportation network in a model can be undertaken at different levels of details and requires **THREE** main specifications of the network. Give the **THREE** specifications. (3 marks)
- b) Clearly explain zoning design mentioning the **TWO** main dimensions of zoning systems (4 marks)
- c) In the quantification of transport demands explain the criteria that can be used to delineate zones (3 marks)
- d) A market segment of 900 individuals served by route from town A to town B. A multinomial logit choice model is calibrated for this market segment resulting in the following utility function:

$$U = \beta_m - 0.50C - 0.01T$$

Where:

C = out of pocket cost in Kenya pounds

T = travel time in minutes, and the values of the mode specific parameter β_m are given as:

Bus transit = 0.00

Rail transit = 0.20

Auto/Car transit = 2.40

For a particular O-D pair, the cost of car trip which takes 12min is k£3.00

Rail trips which take 20 minutes cost 2.00 k£

Bus transit which takes 40 minutes cost 1.25 k£

Predict the number of trips from this segment that use each mode (10 marks)



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