



**TECHNICAL UNIVERSITY OF MOMBASA**

---

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**UNIVERSITY EXAMINATION FOR:**

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

**ECE 2521 : TRANSPORTATION & LAND USE, URBAN AND REGIONAL PLANNING**

SPECIAL/SUPPLEMENTARY EXAMINATION

**SERIES: SEPTEMBER 2018**

**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) 30MARKS**

- a) Give an outline of how information technology is playing a bigger role in public transport  
(10marks)
- b) Discuss sprawl as an emerging land use concern (6marks)
- c) Enumerate the factors that the transportation impacts on land use depends on  
(6marks)
- d) Give an outline of the characteristics of the Time Oriented Metropolitan Model  
(8marks)

**ANSWER ANY TWO QUESTIONS**

**Question Two (20 Marks)**

- a) i) Define the term 'region'.  
 ii) Outline the THREE types of regions (11marks)
- b) Outline the role of transport infrastructure to regional development (6marks)
- c) State the theories that explore the relationship between infrastructure and development(3marks)

**Question Three (20 Marks)**

- a) Explain how the following technologies have the potential to improve the efficiency of existing assets;  
 i) Smart infrastructure  
 ii) Real- time information (6marks)
- b) i) Explain what is meant by intelligent transport systems(ITS) technology  
 iii) Outline the THREE broad areas that ITS technologies can be broken into(8marks)
- c) Explain how transport infrastructure has helped in shaping cities (6marks)

**Question Four (20 Marks)**

- a) i) Give an outline of the Lowry model  
 ii) Outline the salient features of the Lowry model (12marks)
- b) Given the following data, determine the service employment vector( $e^s$ );
- Total employment vector( $e$ ) = [126,177,64,216]

- Journey to home function [ $a'_{ij}$ ] = 
$$\begin{bmatrix} 0.35 & 0.30 & 0.20 & 0.15 \\ 0.25 & 0.35 & 0.20 & 0.20 \\ 0.15 & 0.10 & 0.35 & 0.40 \\ 0.10 & 0.25 & 0.20 & 0.45 \end{bmatrix}$$

- Journey to shop function [ $b'_{ij}$ ] = 
$$\begin{bmatrix} 0.50 & 0.25 & 0.10 & 0.15 \\ 0.30 & 0.45 & 0.15 & 0.10 \\ 0.15 & 0.20 & 0.40 & 0.25 \\ 0.20 & 0.25 & 0.35 & 0.20 \end{bmatrix}$$

- Labour participation rate [ $a_j$ ] = 
$$\begin{bmatrix} 0.80 & 0 & 0 & 0 \\ 0 & 0.80 & 0 & 0 \\ 0 & 0 & 0.8 & 0 \\ 0 & 0 & 0 & 0.8 \end{bmatrix}$$

- Service employment ratio  $[b_i] = \begin{bmatrix} 0.2 & 0 & 0 & 0 \\ 0 & 0.2 & 0 & 0 \\ 0 & 0 & 0.2 & 0 \\ 0 & 0 & 0 & 0.2 \end{bmatrix}$

**Question Five (20 Marks)**

- Outline the major characteristics normally used when evaluating the attractiveness of a residential location.  
(6marks)
- Give an outline of the following models;
  - The location model proposed by Von Thünen
  - The filtering down theory by Burgess  
(6marks)
- Outline the FOUR postulates that the Tiebout model describes the relationship between local government programs, taxes and housing prices  
(6marks)
- Distinguish centralization from decentralization  
(2marks)