



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING AND CIVIL ENGINEERING
FIFTH YEAR SECOND SEMESTER EXAMINATION
BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECV 510: LOGISTICS AND SYSTEM ANALYSIS IN TRANSPORTATION

DATE: 22/5/2019

TIME: 11.00-1.00 PM

INSTRUCTIONS

- a) This paper contains FIVE (5) questions.
- b) You are required to answer THREE (3) questions only.
- c) Question ONE is compulsory.
- d) Attempt any other TWO questions.
- e) Question ONE carries 30 marks and the others carry 20 marks each.

QUESTION ONE (30 MARKS)

- a) State three ways in which vehicles may be classified in traffic management (3 marks)
- b) State three types of trip assignment used in transportation planning (3 marks)
- c) State the four categories of transportation models (4 marks)
- d) Table I below shows guide values used as conversion factors applicable to different vehicle types and different types of terrain

Vehicle type	Level terrain	Rolling terrain	Mountainous terrain
Passenger car	1.0 pcu	1.5 pcu	1.5 pcu
Light Goods Vehicle (LGV)	1.0 pcu	1.5 pcu	3.0 pcu
Medium Goods Vehicle (MGV)	2.5 pcu	5.0 pcu	10.0 pcu
Heavy Goods Vehicle (HGV)	3.5 pcu	8.0 pcu	20.0 pcu
Buses	2.0 pcu	4.0 pcu	6.0 pcu
Motor cycle scoops	1.0 pcu	1.0 pcu	1.5 pcu
Pedal cycles	0.5 pcu	0.5 pcu	N/A

- i. Define the term PCU as used in transportation planning (2 marks)
- ii. Calculate the pcu/hr for an hourly traffic vol. of 100 pedal cycles, 35 buses, 50 Motor cycle scoops, 50 LGV and 15 HGV in a Rolling terrain (3 marks)
- iii. Calculate the pcu/hr for an hourly traffic vol. of 60 passenger cars, 30 LGV, 40 MG, 25 HGV and 15 buses in a Mountainous terrain (3 marks)
- e) Discuss four road maintenance cost saving benefits (12 marks)

QUESTION TWO (20 MARKS)

- a) Discuss the following Logistics service providers in need to help develop transportation solutions.
 - i. Maritime Logistics
 - ii. Air Freight Logistics
 - iii. Land Logistics (12 marks)
- b) Briefly Discuss Logistics and Freight Distribution (8 marks)

QUESTION THREE (20 MARKS)

- a) Discuss the HDM III model as used in highway development plan and programme in transportation network planning (12 marks)
- b) Briefly discuss two traffic forecasting methods for individual highways commonly used in traffic management (8 marks)

QUESTION FOUR (20 MARKS)

Briefly discuss the following costs related to transportation technologies

- a) Construction costs
- b) Design cost
- c) Maintenance cost
- d) Travel cost

QUESTION FIVE (20 MARKS)

In transportation engineering, problem solving can be defined as satisfying given boundary condition. Briefly discuss the five of these conditions or factors.