



TECHNICAL UNIVERSITY OF MOMBASA
**Faculty of Engineering &
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING
(BSCE Y3 S2)

ECE 2403: TRAFFIC ENGINEERING I

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: JUNE 2015

TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- Answer booklet
- Pocket Calculator

This paper consists of **FOUR** questions.

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

All questions carry equal marks

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

Question One (COMPULSORY)

- a) What is 'Traffic Engineering'? What roles does traffic engineering play as a discipline. **(3 marks)**
- b) Discuss the concept of 'shock waves' and clearly explain how 'positive' and 'negative' shock waves do occur. **(8 marks)**
- c) Differentiate between the following:
(i) Spacing and clearance
(ii) Volume and flow rate
(iii) Headway and gap **(9 marks)**
- d) What is a 'time-space' diagram? Draw a clearly labeled time-space diagram. **(5 marks)**
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- e) What is a queue? Give FOUR examples of queues as observed in day-to-day interactions. **(5 marks)**

Question Two

- a) Describe the 'stationary flow' phenomenon in a traffic stream' **(8 marks)**
- b) Draw a clearly labeled fundamental diagram of traffic flow ($u - q$) **(4 marks)**
- c) Outline FOUR improvements achieved by the use of one-way streets and FOUR disadvantages of the system. **(8 marks)**

Question Three

- a) Tidal-flow operation is a terminology used in traffic engineering. Briefly explain this operation. **(5 marks)**
- b) Five vehicle speeds at mid-point of 0.5km section of road were observed as 44, 42, 51, 49 and 46km/h respectively. Calculate the time mean speed and space mean speed of the vehicles. **(5 marks)**
- c) Describe the THREE methods used to drain and control the reversible lanes in order to enable tidal, flow operations to be carried out safely and efficiently. **(10 marks)**

Question Four

- a) The terms "uninterrupted" and "interrupted" flows are used in traffic engineering studies. Clearly distinguish the two. **(6 marks)**
- b) Briefly describe the FIVE classes of roads in Kenya. **(6 marks)**
- c) List FOUR advantages and FOUR disadvantages of one-way traffic systems. **(8 marks)**