THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

UNIVERSITY EXAMINATIONS FOR BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2403 : TRAFFIC ENGINEERING I

END OF SEMESTER EXAMINATION

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*

This paper consists of **FIVE** questions in **TWO** sections **A & B**
Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

SECTION A (*COMPULSORY – 30 MARKS***)**

Question 1

a) Describe the following terms used in traffic engineering
   (i) Spacing (2 marks)
   (ii) Headway (2 marks)
   (iii) Flow rate (2 marks)
   (iv) Volume (2 marks)

b) (i) Briefly explain "level of service" as applied in traffic analysis (3 marks)

   (ii) Briefly describe the conditions that affect capacity of a roadway (12 marks)

c) (i) What is a traffic impact study and what warrants such a study (3 marks)

   (ii) Briefly explain the **THREE** methods used to determine the number of trips generated by a specific development and outline the basic steps used in determination of appropriate trip generation rates (14 marks)

SECTION B (*Answer any TWO questions from this section. Each question carries 20 marks***)**

Question 2

a) Differentiate between 'uninterrupted' and 'interrupted' flows as used in traffic studies (5 marks)

b) What is 'queuing' in a signalized intersection and what are the three main parameters required to predict the characteristics of a queuing system mathematically (4 marks)

c) (i) With aid of a sketch, briefly describe the traffic flow characteristics in a signalized intersection (6 marks)

(ii) Briefly explain **TWO** types of traffic signals (5 marks)

Question 3

a) (i) Briefly describe the role played by policy measures in management of transportation (3 marks)

(ii) List any **FOUR** policy documents used to manage transportation (2 marks)

b) Explain **FOUR** main problems encountered in traffic engineering (12 marks)

c) Explain the following:

(i) Induced traffic (1 mark)
(ii) Converted traffic (1 mark)
(iii) Shifted traffic (1 mark)

Question 4

a) The following traffic counts were observed in an intersection

06:00	-	06:15	250 vehicles
06:15	-	06.30	266 vehicles
06:30	-	06:45	302 vehicles
06:45	-	07:00	286 vehicles

(i) Draw the time flow graph (2 marks)
(ii) Calculate the hourly volume (2 marks)
(iii) Calculate peak flow rate for 15 minute period (1 mark)
(iv) Calculate the peak hour factor (1 mark)

b) (i) Briefly explain 'tidol flow' as used in traffic analysis (4 marks)

(ii) Outline **TWO** methods used to allocate surplus space in tidal flow (2 marks)

c) (i) Briefly describe **FOUR** categories of roads in Kenya (4 marks)

(ii) Outline **FOUR** requirements for traffic control devices (4 marks)

Question 5

a) Briefly describe the **THREE** methods used to distribute trips generated by a proposed development (12 marks)

b) Explain the following as used in traffic engineering

(i) Design years (2 marks)
(ii) Average daily traffic (2 marks)
(iii) Possible capacity (2 marks)
(iv) Practical capacity (2 marks)