TECHNICAL UNIVERSITY

OF MOMBASA

UNIVERSITY SUPPLEMENTARY EXAMINATIONS

2015/2016 ACADEMIC YEAR

FOUTH YEAR EXAMINATIONS

FOR THE DEGREE OF

BACHELOR OF SCIENCE

IN

CIVIL ENGINEERING

COURSE CODE: ECE 2403

COURSE TITLE: TRAFFIC ENGINEERING I

TIME: 2 HRS

INSTRUCTIONS TO CANDIDATES

- *THIS PAPER CONTAINS FIVE QUESTIONS*
- *ANSWER QUESTIONS ONE ANY OTHER TWO QUESTIONS*
- *MARKS TO QUESTIONS ARE AS SHOWN*
- *DO NOT USE A PROGRAMMABLE CALCULATOR*
- *NO MOBILE PHONES ALLOWED IN THE EXAMINATION ROOM*

THIS PAPER CONSISTS OF (4) PRINTED PAGES

Question One

Table Q1 shows data collected on a rural highway during a speed and density study. Determine the maximum flow using both Greensberg and Greenshields model. **(30 Marks)**

Table Q1

Speed (mi/h)	Density(veh/mi)
53.2	20
48.1	27
44.8	35
40.1	44
37.3	52
35.2	58
34.1	60
27.2	64
20.4	70
17.5	75
14.6	82
13.1	90
11.2	100
8.0	115

Question Two

a) Outline the following types of road signs;

   i)   Warning signs

   ii)   Regulatory signs

   iii)   Information signs   **(15marks)**

b) Explain how variable message signs differ from conventional traffic signs

(5marks)

Question Three

a) Enumerate FOUR benefits of a properly designed and timed traffic signal   **(4marks)**

b) Distinguish between local controller and master controller as hardware components of a signal system   **(4marks)**

c) Using the Webster's delay model determine the average intersection delay per vehicle (d) given the following data;

Flow = 600 vehicles per hour

Green time = 28 sec

Cycle length = 60sec

Yellow time = 60 sec

Saturation flow = 1800 vehicles per hour

Starting delay = 2 sec   **(12 Marks)**

Question Four

a) State THREE primary objectives of street lighting   **(3Marks)**

b)   (i) Distinguish between photometric and lighting installation terms

(ii) define the following terms as used in street lighting installations:

    (a) Luminous flux

    (b) Luminous intensity

    (c) Illuminance

    (d) Luminance

(iii) with the aid of a sketch show the components of a street lighting lamp post

(12 marks)

c) State five characteristics of a bright street lighting patch   **(5 marks)**

Question Five

a) State key elements affecting intersection performance for motor vehicle   (**5 marks**)

b) A non-nearside lane of a traffic signal approach has a width at entry of 3.0 m and downhill gradient of 3%. 40 % of vehicles turned right with a turning radius of 25 m. The cycle time is 60 seconds and the effective green time is 40 seconds. The right turning vehicles are opposed by a straight-ahead lane with a degree of saturation of 0.85. If two right turning vehicles may wait within the intersection without obstruction to following straight away vehicles and the ratio of passenger car units per vehicle is 1.5, calculate the saturation flow for this lane.

(**15 marks**)