



TECHNICAL UNIVERSITY OF KENYA

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FACULTY OF ENGINEERING SCIENCE & TECHNOLOGY
SCHOOL OF INFRASTRUCTURE & RESOURCE ENGINEERING
DEPARTMENT OF CIVIL & CONSTRUCTION ENGINEERING
DEGREE OF BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING
END OF SEMESTER, YEAR 3 EXAMINATIONS DECEMBER 2018 SERIES
EECI 326I: TRAFFIC ENGINEERING I
TIME: 2 HOURS

This Paper consists of FIVE Questions, Answer THREE Questions. Questions ONE is Compulsory

INSTRUCTIONS TO CANDIDATES

CROSS ONCE TO SHOW ERASING

DO NOT WRITE ON THIS QUESTION PAPER.

QUESTION 1 (30 MKS)

a. Define the following terms as used in traffic engineering (4 mks)

- Transportation
- Traffic volume
- Traffic density
- Peak hour flow
- Spacing
- Gap acceptance
- Total safe stopping distance
- Traffic engineering

b. Highways are classified according to different levels of service. State and explain the characteristics of the different levels of service. (6 mks)

c. Discuss the road hierarchy network for Kenyan roads. (10 mks)

d. Discuss the role of transportation in society both politically and economically. (10 mks)

QUESTION 2 (20 MKS)

a. State and explain the two major driver characteristics. (5 mks)

b. With the aid of a well-illustrated diagram, discuss the various fields of vision of a driver. (10 mks)

c. A driver rounds a curve at a speed of 85 km/hr and sees a truck overturned on the roadway ahead, how far will the driver's vehicle travel before the driver's foot reaches the brake (note : apply the standard reaction time.)

QUESTION 3 (20 MKS)

a. Consider a section of rural freeway with a design speed of 75 km/hr on a section of level terrain, the coefficient of skidding friction is 0.348. What SSD must be provided? (14 mks)

b. What would occur if the SSD provided is 35m less than what is required. (6 mks).

QUESTION 4 (20 MKS)

- a. Discuss the measurement of traffic data over a short section of road using an enoscope. (6 mks)
- b. The length of a road stretch used for conducting the moving observer test is 0.6 km and the speed with which the test vehicle moved is 25 km/hr given that the number of vehicles encountered in the stream while the vehicle was moving against the traffic stream is shown in column 1 and the number of vehicles that had overtaken the test vehicle is as shown in column 2, the number of vehicles overtaken by the test vehicle in column 3. Find the flow, density and average stream speed in each case. Plot the fundamental diagrams of traffic flow. (12 mks)
- c. Give reasons as to why traffic density cannot be obtained through measuring at a point method of traffic data collection. (2 mks)

QUESTION 5 (20 MKS)

Jogoo road section between Rikana supermarket and city stadium measures 1.8 km and has a capacity of 1600 vphpl

- a. What is the LOS "c" capacity of the road section fore mentioned? (2 mks)
- b. If the link's free flow speed is 75 km/hr and the standard values for a and b are used. What is the links travel time for traffic flow rates of $v = 0$, $v = 500$, $v = 1000$, $v = 1500$. Plot these points and the curve through them. (10 mks)
- c. Recent research by the traffic department of the city council of Nairobi has suggested that values of 0.76 and 5.1 be used for a and b respectively for this urban arterial. Repeat part b and explain how the two link performance functions differ. (8 mks)