



University of Technology, Sydney

THIS PAPER MAY BE REMOVED FROM THE EXAM CENTRE

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**AUTUMN SEMESTER, 2011**

**SUBJECT NAME : TRAFFIC & TRANSPORTATION**  
**SUBJECT NO. : 49102**  
**DAY/DATE : Tuesday, 14 June 2011**  
**TIME ALLOWED : 3 Hours plus 10 Minutes reading time**  
**START/END TIME : 6.00 – 9.10PM**

**NOTES/INSTRUCTIONS TO CANDIDATES**

All Questions are to be attempted.

This is a **closed book** examination.

Drawing instruments are permitted.

Non-programmable calculators **ONLY** permitted.

Rough work can be done on the blank pages at the end of each answer booklet.

## QUESTION 1

(8 Marks)

(a) (4 Marks)

Traffic Management may be defined as the application of specific traffic control practices over a length of road or over an area, to achieve specific objectives, which may be set by State Governments (on arterial roads) or by municipalities (on local streets). Traffic management objectives and practices differ greatly between arterial roads and local streets.

What do you consider is the primary tool necessary in the development of objectives, techniques and practices applicable to specific elements of the road network?

(b) (4 Marks)

In determining traffic management proposals or actions applicable to the road network a number of specific issues will need to be addressed.

List four specific issues that need to be addressed.

## QUESTION 2

(12 Marks)

(a) (3 Marks)

Explain, with the use of a diagram, the relationship between mean speed and volume.

(b) (3 Marks)

Describe separately the terminologies “bunching” and “platoons”.

In each condition what Traffic Engineering principles would you apply to improve the traffic flow?

(c) (3 Marks)

List five roadway conditions that can effect capacity, level of service and degree of saturation.

(c) (3 Marks)

Development of new arterial roads should be seen as the opportunity to plan for the desired balance between traffic and other activities beside and across the road.

What should be considered in the planning of that balance?

### **QUESTION 3**

**(12 Marks)**

(a) (4 Marks)

Intersection design requires a balance to be made between providing the driver, cyclist and pedestrian with mobility and safety at an affordable price

List and describe four methods of resolving traffic conflicts at intersections.

(b) (4 Marks)

Capacity calculations at unsignalised intersections have most meaning when applied to a traffic movement or to an intersection approach. However, it is desirable to express the operational efficiency of a unsignalised intersection in terms of various measures of performance.

What are the three major measures of performance that need to be determined for an unsignalised intersection capacity analysis?

(c) (4 Marks)

While it is important that operational characteristics of an intersection be satisfied, safety is a prime consideration in intersection design,

List four basic principles that must be applied in achieving a safe intersection design.

### **QUESTION 4**

**(12 Marks)**

(a) (4 Marks)

Multi-lane roads have two or more lanes for use by traffic in each direction. Ideal conditions occur when there are no restrictive roadway or traffic conditions.

List the road environment under which “ideal” operating conditions may apply.

(b) (8 Marks)

Level of Service of an urban/suburban road can be defined as the average travel speed of all through vehicles. There are certain traffic conditions associated with the various levels of service for urban and suburban arterial roads with interrupted flow conditions.

List the various Levels of Service and fully describe each condition.

## **QUESTION 5**

**(12 Marks)**

(a) (4 Marks)

Road crash data can be obtained from many sources.

List the most common areas where crash data can be obtained.

(b) (4 Marks)

There are a number of countermeasures that can be applied to reduce pedestrian/vehicle collisions.

List four (4) countermeasures and give reasons why you would employ these measures.

(c) (4 Marks)

In rural arterial roads with high traffic volumes or where road crash black areas have been identified there are a number of road safety measures that can be employed.

List and describe four (4) of these measures.

## **QUESTION 6**

**(12 Marks)**

(a) (4 Marks)

For roadway capacity and related analysis, road traffic may be classified into three categories.

List and describe the three categories

(b) (4 Marks)

The capacity of a single traffic lane will be affected by a number of factors.

List four factors that affect single lane capacity.

(c) (4 Marks)

Many traffic manoeuvres involve an individual road user (e.g. driver, rider or pedestrian) selecting a break or gaps in a traffic stream of suitable size for the safe accomplishment of the manoeuvre.

Describe the terminology "Gap Acceptance Mechanisms"

## QUESTION 7

(12 Marks)

(a) (4 Marks)

Several transportation problems plague contemporary urban areas, the most prevalent of which is traffic congestion. Other transportation problems, some of which are of primary concern in certain locations, must also be considered.

List four issues you would consider of primary concern for the overall planning of a transportation network.

(b) (4 Marks)

Traffic congestion occurs on fixed capacity road networks when traffic grows beyond about 90% of the road capacity. As a result, the level of service, which is usually a measure of speed or delay, deteriorates to unacceptable levels.

List four major factors that impact on the growth of traffic on a fixed capacity road network.

(c) (4 Marks)

The effects of traffic congestion on the community and economy of an urban area are multiple.

List four issues where traffic congestion impacts the general wellbeing of the community.

## QUESTION 8

(8 Marks)

(a) (4 Marks)

In Transportation Modelling there are four fundamental elements of the “sequential” demand forecasting process.

List and give a brief description and purpose of these four elements .

(b) (4 Marks)

You are required to prepare a “Traffic Impact Study” for a proposed development.

What should you provide in the study report for assessment?

## **QUESTION 9**

**(12 Marks)**

(a) (4 Marks)

In your own words briefly describe your understanding of a Road Safety Audit.

(b) (4 Marks)

List the 5 stages that a Road Safety Audit can be conducted giving a brief description of each stage.

(c) (4 Marks)

What are the key steps in a Road Safety Audit?