



THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

Department of Civil Engineering

FIRST SEMESTER EXAMINATION

Final Year Bachelor of Engineering in Civil Engineering

Subject Code: CE412

Subject Name: **TRAFFIC AND TRANSPORTATION ENGINEERING**

Date: **Thursday 2nd June, 2022**

Time: **8:30 am to 11:30 am**

Venue: **Structures Lecture Theatre (SLT)**

Examination Instructions

1. **NO MOBILE PHONE** is allowed in the examination room.
2. You have 10 minutes to read the paper.
3. Fill-in the attendance slip. **DO IT NOW.**
4. There are three questions. **ANSWER ALL THREE QUESTIONS.**
5. Marks are allocated for each question.
6. Write your answer in the answer booklet provided.
7. You can consult your notes but **DO NOT** discuss with someone sitting next to you. Students caught engaging in conversations will be referred to as cheating and will be removed from the examination room. Penalty is zero mark for examination.

QUESTION ONE

(a) Describe in your own words how to conduct the following traffic surveys;

1. Classified Count Survey
2. Pedestrian Count Survey
3. Parking Survey

(5 marks each = 15 marks)

(b) Why is it important to conduct the above-mentioned traffic surveys? State the significances of carrying out each of the traffic survey mentioned above. (5 marks)

(c) Define the following terms;

1. Critical Acceptance Gap
2. Follow-up Headway
3. Pavement Taper
4. Acceleration Lane

(2 marks each = 8 marks)

(d) What is the length of acceleration lane for 60 km/hr design speed of road being entered and where the design speed of exit curve is 40 km/hr? (2 marks)

Total Marks for Q1 = 30

QUESTION TWO

The peak traffic count and turning movement for the design hour flows of vehicles at a FOUR-ARM channelized (unsignalized) intersection with good visibility for all movement are given below.

Morning Peak (AM):

EXIT APPROACH	WEST	EAST	SOUTH	NORTH
WEST		200 (6)	5 (0)	5 (2)
EAST	350 (20)		20 (1)	10 (4)
SOUTH	10 (1)	Nil		650 (100)
NORTH	100 (10)	40 (5)	100 (10)	

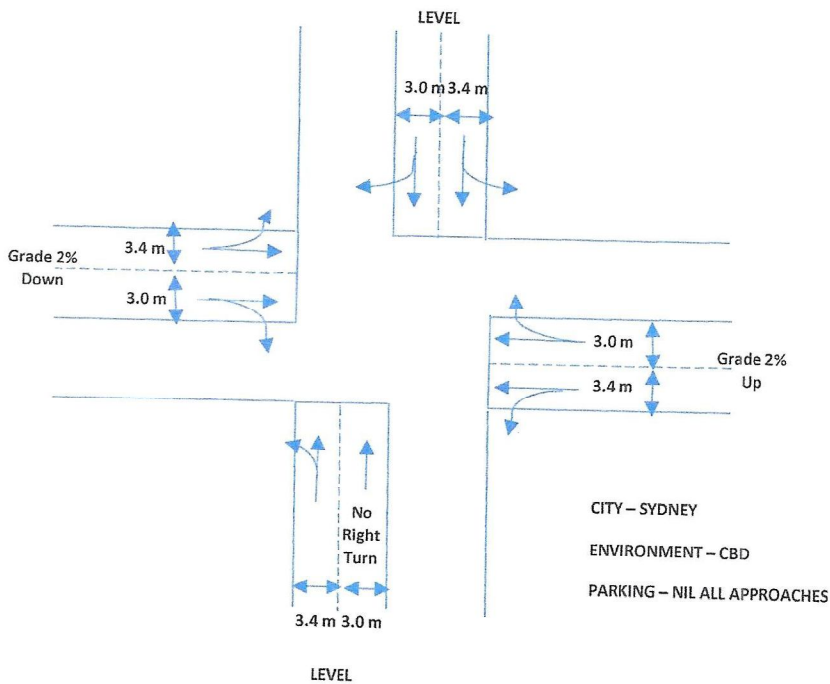
Evening Peak (PM):

EXIT \ APPROACH	WEST	EAST	SOUTH	NORTH
WEST		350 (20)	10 (4)	20 (1)
EAST	200 (6)		50 (2)	5 (0)
SOUTH	10 (1)	Nil		100 (10)
NORTH	100 (10)	10 (2)	400 (40)	

Figures outside the brackets are passenger cars and figures inside the brackets are commercial vehicles.

Calculate the signal settings, delays etc...if this unsignalized intersection was upgraded to a signalised intersection with traffic signals.

Determine the dimensions and other parameters of the intersection, which is already done for you in the diagram below.



- Compute saturation flows for each lane (10 marks)
- Select appropriate Phase Diagram from Figure 3.6 in the Interim Guide to the Design of Intersections at Grade. The simplest phase diagram should be adopted for calculations. (5 marks)
- Assume value for E_{rt} and calculate y values (10 marks)

- (d) Calculate the functional life of the design if the traffic composition and turning proportion remains unchanged. Total entering traffic in the peak hours is assumed to be increasing at 5% per annum (compound). (5 marks)
- (e) Calculate the optimum cycle time, c_o . (5 marks)
- (f) Calculate green split (10 marks)
- (g) Calculate new value for Ert (5 marks)

Total Marks for Q2 = 50

QUESTION THREE

In traffic engineering there are three parameters which we should understand their behaviours. Can you name those three parameters and explain how they randomly fluctuate, which can lead to phase transition?

(15 marks each for explaining the 3 parameters and bonus 5 marks)

Total Marks for Q3 = 20 marks)

Total mark for the examination = 100

End of Examination