THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

EXAMINATION QUESTION PAPER MASTER

PROFORMA

Semester: 2 Academic Year: 2021

A. DEPARTMENT SECTION

I ACCEPT THAT THIS EXAMINATION PAPER SATISFACTORILY EXAMINES

Subject Code: CE441 Title: TRAFFIC ENGINEERING

Number of Questions: 3 Number of Pages: 5

1. Subject Examiner: MR. MURRAY KONZANG
   Signature: _____ Date: 17/6/21
2. Subject Co-Examiner: J. KASADIMI / DR. BETABOLO ✓
   Signature: _____ Date: 17/06/21
3. Departmental Examinations Co-ordinator: Checked: YES ✓ NO ____ (Please tick)
   Signature: _____ Date: 17/06/21
4. Head of Department and Chief Examiner: Checked: YES ✓ NO ____ (Please tick)
   Comments:
   - NIL -
   Signature: _____ Date: 17/06/21

B. EXAMINATIONS OFFICE SECTION

Examination Masters Received: YES ____ NO ____

5. Examinations Officer Signature: _____ Date: _____
6. Witness Signature: _____ Date: _____

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

FIRST SEMESTER EXAMINATION

FOURTH YEAR - BACHELOR OF CIVIL ENGINEERING

CE441 – TRAFFIC ENGINEERING

Friday 18 June, 2021 – 8:20 am at SLT

TIME ALLOWED: 3 HOURS

INFORMATION FOR STUDENTS

1. **You have 10 minutes to read the paper. You must NOT begin writing during this time.**

2. **There are THREE questions in this paper. Answer all THREE questions.**

3. **All answers must be written on the answer book provided unless otherwise stated. No other written material will be accepted.**

   WRITE YOUR NAME CLEARLY ON THE FRONT PAGE.

4. **You may consult your assignments, lecture notes and books.**

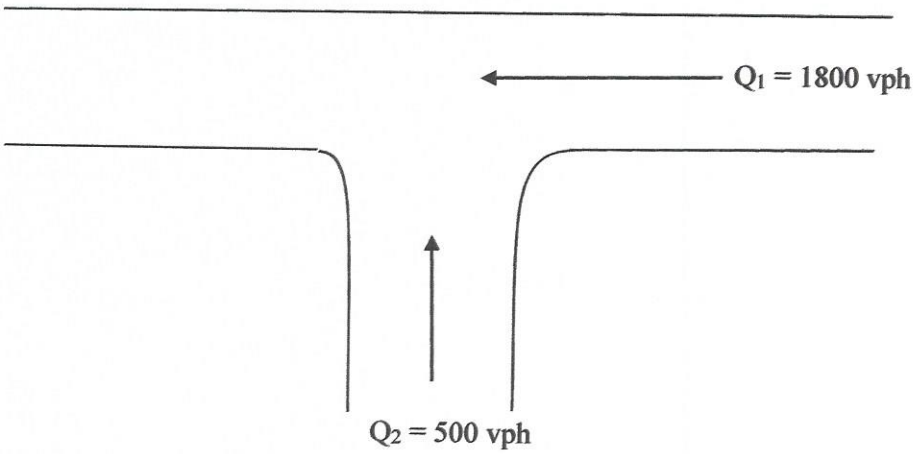
5. **NO MOBILE PHONE IS ALLOWED IN THE EXAMINATION ROOM.**

MARKING SCHEME

The total mark for this examination is 100 and it is worth 60% out of 100% of the total assessment.

QUESTION ONE – PRIORITY JUNCTION

(a) Examine the operation of an unsignalised junction on a two-lane one-way street.



(i) Determine Practical Absorption Capacity of Stream. Q1. (3 marks)

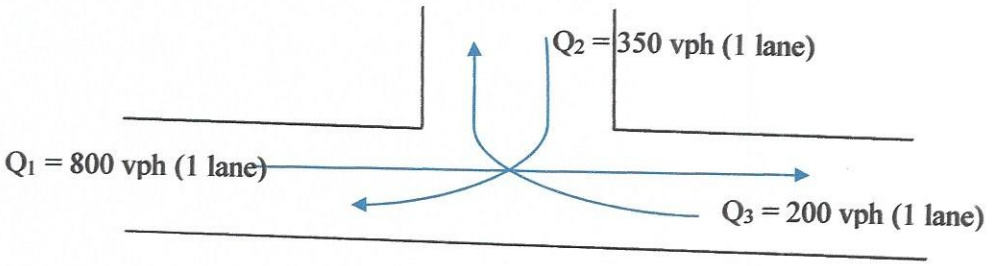
(ii) Determine Number of Lanes required for Minor Stream. (2 marks)

(iii) Determine Average Delay to Minor Road Vehicles. (3 marks)

(vi) Determine Average Minor Queue Length. (2 marks)

(iv) Determine the Queue Length with a Probability of 95% of Not Being Exceeded. (5 marks)

(b) Determine the storage length for an unsignalised right turning movement.



Operating Procedure;

Q_3 must wait for acceptance gaps in Q_1

Q_2 must also wait for acceptance gaps in Q_1

Q_2 takes precedence over Q_3 in accepting Q_1 gaps.

(i) Determine Practical Absorption Capacity of Q_1 (5 marks)

(ii) Determine Service Rate for Q_3 (5 marks)

(iii) Determine Queue Length. (5marks)

Total marks for Q1 = 30

QUESTION TWO – ROUNDABOUT

A classified count survey of vehicles was conducted at Bumbu Road / Huon Road Roundabout at Eric-Woo (Eriku) and the following hourly traffic volume were taken.

Peak	North Approach			South Approach			East Approach			West Approach		
	RT	St	LT	RT	St	LT	RT	St	LT	RT	St	LT
Morning (am)	150	300	150	0	750	40	400	360	30	20	250	50
Evening (pm)	150	500	20	0	150	20	20	250	60	10	400	20

RT = Right Turning vehicles
St = Straight or thru vehicles
LT = Left turning vehicles
There are no U-Turns.

Ten percent of the vehicles are Single Unit Trucks. There are no articulated vehicles at present.

You should state clearly any assumptions you made in your calculations.

(a) Covert the flows to p.c.u.'s and determine volume in each section of the roundabout. (10 marks)

(b) Determine the saturation volume and compare with actual volume. (10 marks)

(c) Determine the delays on each approach and total delay in the intersection. (10 marks)

(d) Calculate functional life if traffic composition and turning proportion remain unchanged. Total entering traffic in the peak hour is assumed to be increased by 8 percent per annum (compound). (10 marks)

(e) What is the total delays of the intersection at saturation? (10 marks)

Total marks for Q2 = 50

QUESTION THREE – TRAFFIC SIGNAL

The roundabout in Question Two has 2% upgrade on the West Approach and 2% downgrade on the East Approach. The widths of the inner lane and outer lane of each approaches are 3.0 m and 3.5 m respectively. If you proposed to install traffic signals, then compute saturation flows for each lane.

Do a neat sketch to show the dimensions and parameters of the intersection.

(20 marks)

Total marks for the examination = 100

END OF EXAMINATION