

King Mongkut's University of Technology Thonburi



Midterm Examination
Semester 1 Academic Year 2012

CVE 474 Sustainable Transportation

4th Year International
Program in Civil Engineering

Date : October 10th, 2012

Time : 13.00 – 16.00

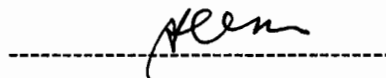
Instructions

1. Midterm Examination consists of 5 questions (total 150 points = 40%). All of questions should be answered in this exam papers.
 2. A calculator and dictionary are allowed.
 3. Lecture notes are not allowed in the examination room.
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This examination paper has been approved by the Department of Civil Engineering.

A handwritten signature in black ink, appearing to read "Chai", is written over a horizontal dashed line.

Professor Dr.Chai Jaturapitakkul
Head of the Civil Engineering Department

1. Please answer the following ten questions:

1.1. Please define a sustainable urban transport and land use system according to Black, Paez and Suthanaya (2002)? (5 points)

1.2. The performance of travel patterns can be measured in terms of trip length, vehicle kilometer traveled and public transportation share. Please indicate the direction (i.e. increasing or decreasing) of these three measures that reflect the worsening performance of travel patterns. (5 points)

1.3. Please describe the terms "strong unsustainability" and "weak unsustainability" (5 points)

1.4. How does urban sprawl impact the mobility and accessibility? (5 points)

1.5. What are the "city of tomorrow" policies and the "city of today" policies? (5 points)

1.6. Please describe how the monocentric strategy and polycentric strategy should be applied for smaller cities and larger cities in order to achieve the sustainability. (5 points)

1.7. What are the differences between the push strategies and the pull strategies? (5 points)

1.8. What is bus bunching? (5 points)

1.9. Consider a bus with 50 seats and loading standard of 200%. What is the target maximum load? (5 points)

1.10. Calculate the required number of buses when cycle time is 120 minutes and desired headway is 5 minutes. (5 points)

2. For the trip generation step for bus scheduling, the running time file and specified headway are shown below.

Route 99 has two terminals (KMUTT and Bangpakok1 Hospital); KM9 is a major intermediate timepoint.

Running Time File for Route 99

Service Day: Weekday

Direction: Inbound

Time Point	6:00-6:59	7:00-7:59	8:00-8:59	9:00-9:59	10:00-10:59	11:00-12:00
KMUTT	-					
KM9	15	20	25	25	20	20
Bangpakok1 Hospital (B1H)	20	30	30	25	25	30

Specified Headway

Time	Headway (Minutes)
6:00-7:59	45
8:00-9:59	50
10:00-12:00	40

Create the bus timetable for the inbound direction by filling in the below table: (20 Points)

Trip No.	KMUTT	KM9	B1H
1	6:00		
2			
3			
4			
5			
6			
7			
8			

3. For the blocking step of bus scheduling, the departure and arrival times at two terminals for the inbound and outbound directions of route 99 are given below:

Inbound			Outbound	
KMUTT	B1H		B1H	KMUTT
13:00	13:30		13:30	13:50
13:15	13:45		13:45	14:15
14:00	14:30		14:30	14:48
14:30	15:00		15:00	15:20
15:00	15:30		15:30	15:49
15:30	16:00		16:00	16:17
16:00	16:30		16:30	16:46
16:30	17:00		17:00	17:30
17:00	17:15		17:30	18:00

Use the below blocking sheet to do vehicle assignment and fill in the blocking summary recap form (30 Points).

Blocking Sheet

Special instructions for blocking are:

10 minutes is available for layover and/or recovery at KMUTT; Layover and/or recovery are not allowed at B1H

Pull-out time = 10 minutes; Pull-in time = 10 minutes

Block No.	Inbound					Outbound				
	Pull-out	Trip #	Depart KMUTT	Arrive B1H	Available for next trip	Trip #	Depart B1H	Arrive KMUTT	Available for next trip	Pull-in
9901			13:00							

Block Summary Recap

Block #	Pull-Out Time (Time Out)	Pull-On Location	First Revenue Time	Last Revenue Time	Pull-Off Location	Pull-In Time (Time In)	Platform Hour
Total Platform Hour							

4. For the runcutting step of bus scheduling, the summary of work rules and the chronological block listing of Route 99 are given below:

Summary of Route 99 Work Rules

Work Rule	Stipulation
Min Platform Time	5 hours
Max Platform Time	10 hours
Report Allowance	10 minutes per pull-out
Turn-in Allowance	5 minutes per turn-in
Spread Time	13 hours
Spread Penalty	½ of the minutes over 12:00
Make-up Time	Up to 8 daily pay hours
Overtime	½ of the minutes over 8:00 hours daily

Chronological Block Listing – Route 99

AM Blocks		PM Blocks	
9901	4:55	9906	3:40
6:00	10:55	13:45	17:25
9903	3:15	9905	4:05
6:15	9:30	13:30	17:35
9902	4:15	9904	6:00
6:30	10:45	13:15	19:15

Note: The numbers in the Chronological Block Listing table are described below:

Block #	Platform Time
Pull-out Time	Pull-in Time

Please perform runcutting using the below table: (30 Points)

Run No.	1 st Piece Block	Route	Time On	Pull-Out	Pull-In	Time Off	2 nd Piece Block	Route	Time On	Pull-Out	Pull-In	Time Off	Platform	Total Spread	Allowance Report	Turn-in	Make-up	Work Hours	Overtime	Spread Penalty	Pay Hour

5. Please answer the following two questions:

5.1. Briefly describe the topic that your group presented in class. Indicate what the takeaway message is. (10 points)

5.2. Please describe a topic presented by other groups and indicate the key findings. (10 points)