

Prince of Songkla University

Faculty of Engineering

Final Examination: Semester II

Academic Year: 2007

Date: February 27, 2008

Time: 09.00-12.00 hr.

Subject: 220-570 Transportation Planning and Land Use

Room: A401

คำสั่งในการทำข้อสอบ

1. ข้อสอบชุดนี้มีคำถาม 4 ข้อ ทุกข้อมีคะแนนเท่ากัน ให้ทำทุกข้อ
2. ตอบคำถามในกระดาษที่กำหนดให้
3. อนุญาตให้นำเอกสาร ตำรา และอุปกรณ์การคำนวณเข้าห้องสอบได้

1. An urban area consisting of four zones has the base-year trip matrix shown. The growth rates for the origin and destination trips have been projected for a 25-year period. Using Fratar's techniques, calculate the numbers of trip interchanges in the horizon year. Do just two iterations.

Origin	Destination			Total	Origin growth factors
	1	2	3		
1	3	5	8	16	2
2	4	1	9	14	4
3	2	4	2	8	1
Total	9	10	19	38	
Destination growth factors	0.5	3	4		

2. A three-zone city has the following productions and attractions:

Zone	Production	Attraction
1	1000	3000
2	2000	1500
3	3000	1500

The travel time matrix is

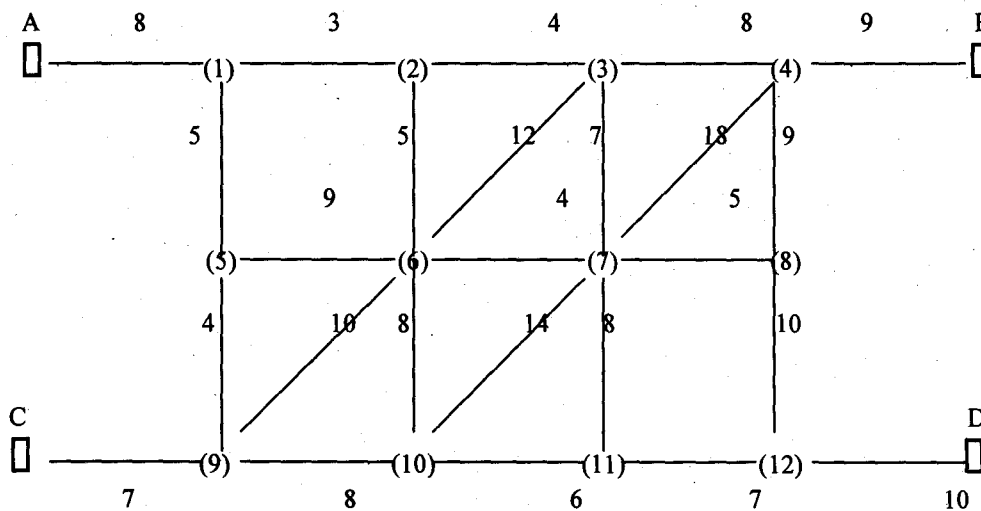
Zone	Travel Time (min.)		
	1	2	3
1	2	8	7
2	8	3	5
3	7	5	2

Travel Time (min)	F_{ij}
2	3.0
3	2.5
5	2.3
7	1.5
8	1.2
11	0.95
12	0.90

Apply the gravity model to distribute the trip ($K_{ij} = 1$)

3. A network connected to four centroids is loaded with trips, as shown in the trip table. Assign the trips (using the all-or-nothing technique) and calculate the total cost, assuming the following:
- (1) figures on links indicate travel cost;
 - (2) a left turn, a right turn, and going straight through an intersection carries a penalty of 1, 3 and 2 units, respectively; and
 - (3) all links are two ways.

From	To			
	A	B	C	D
A	-	700	400	900
B	200	-	900	300
C	600	800	-	400
D	100	200	500	-



4. A city has a utility function for use in a logit model of the form

$$U = -0.075A - 0.6W - 0.04R - 0.02C$$

Where A is the access time in minutes, W is the waiting time in minutes, R is the riding time in minutes, C is the out-of-pocket cost in cents.

- (a) What modal distribution would you expect, using the following values for A, W, R and C for the four modes used in the city.

MODE	A	W	R	C
Auto	6	1	25	300
Rail	7	10	15	75
Bus	10	15	35	60
Bike	1	0	45	10

- (b) The city is serious thinking of subsidizing rail and bus by 40%, encouraging biking by constructing bike paths and thus reducing biking time by 25%, and increasing auto costs (through higher parking charges) by 10%. What is likely to be the new modal distribution with those changes?