

UNIVERSITY EXAMINATIONS

2013/2014 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER EXAMINATION

**FOR THE DEGREE OF
BACHELOR OF SCIENCE
IN CIVIL AND STRUCTURAL ENGINEERING**

COURSE CODE: CSE 242

COURSE TITLE: TRANSPORTATION PLANNING

INSTRUCTIONS TO CANDIDATE

- Answer only **FOUR** questions
- Marks for each question are indicated in the parenthesis

1. a) Explain the singly constrained growth factor methods for trip distribution giving an example. What are the advantages and limitations of these methods, in forecasting trip ends? (10 Marks)
- b) A self contained town has 6 main zones A, B , C ,D, E and F. Zone A is centrally located with respect to all other zones. Populations in each zone, travel times between the zones and zone A and the traffic generated in 2002 are given in the following tables. Use the data to calibrate the gravity model of the type

$$T_{ij} = \alpha \frac{P_i P_j}{d_{ij}^x}$$

Where

T_{ij} are the future trips between zones i and j, P_i and P_j are the populations in the originating and attracting zones respectively, d_{ij} is the travel time between zones i and j, α is the traffic generation coefficient, and x is the travel time exponent

(10 Marks)

Population		Zonal interactions	Travel Time	Daily Traffic Volume
A - 25		A - B	3	500
B - 35		A - C	5	200
C - 15		A - D	4	200
D - 14		A - E	6	50
E - 12		A - F	3	250
F - 20				
Unit: 10 ⁴ persons				

2. a) Name THREE functions catered for in a road system (3 Marks)
- b) What are the factors that determine the implementation of a road system? (5 Marks)
- c) Briefly describe the radial pattern of roads giving its advantages and disadvantages. (12 Marks)
3. a) Give FIVE uses of a transportation data base. (5 Marks)
- b) Explain FOUR practical limitations that have strong influence on the type of transportation data collection methods. (10 Marks)
- c) The total number of trips for one trip type within an urban area is to be estimated. It has been established that 40% are of this type. If the estimate is to be within a confidence limit of 90%, and the estimate is to within $\pm 10\%$, determine the number of samples to be collected to produce an acceptable result. The standard normal statistic $Z=1.65$. (5 Marks)

4. a) Explain the following terms used in transportation planning (5 Marks)
- i. Modal split
 - ii. Trip purpose
 - iii. Zoning
 - iv. Traffic flow impedance function
 - v. Deductive planning
- b) Outline the factors that influence the choice of a transport mode (15 Marks)
5. (a) What environmental impact is likely to be caused as a result of the construction of a highway through an inhabited area? (14 Marks)
- (b) Discuss THREE land uses which are major generators of trips in developing countries (6 Marks)