



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

CIVIL ENGINEERING, URBAN PLANNING

SUBJECT: Traffic Engineering

PAPER NO: 578/15/S08

DURATION: 3 Hours

MARCH/APRIL 2022 EXAMINATION

REQUIREMENTS

1. Calculator
2. Graph paper
3. Ruler
4. Pencil

INSTRUCTIONS TO CANDIDATE

1. Answer any four (4) questions.
2. Each question carries 25 marks.
3. Begin each question on a fresh page.

This paper consists of 3 printed pages.

QUESTION 1

- a) Define the following:
- i) Trip generation (2 marks)
 - ii) Trip distribution (2 marks)
- b) Determine the size of a bus fleet needed to service the tips between two zones given the following conditions:
- Bus capacity = 15 seat at 100% utilisation
Number of person trips == 700
Peak hour period = 1.5 hours
Duration of a round trip = 30 minutes (6 marks)
- c) Discuss three (3) methods of collecting origin destination survey data, pointing out the challenges you are most likely to face when carrying out the survey. (15 marks)

QUESTION 2

- a) Discuss the design principles related to the preparation of safe-layouts of at-grade intersections. (12 marks)
- b) Explain the important design elements of a rotary intersection with the help of relevant sketches. (13 marks)

QUESTION 3

- a) Briefly discuss ways or measures used to improve highway safety. (10 marks)
- b) Discuss the importance of traffic flow data in the development and management of the road network. (15 marks)

QUESTION 4

- a) Explain the functions in terms of the service they provide of the following highway sections:
- i) Arterial road (4 marks)
 - ii) Sub-arterial road (4 marks)
 - iii) Collector street (4 marks)
 - iv) Local street (4 marks)
- b) Discuss the rules governing the application of channelization in traffic engineering. (9 marks)

QUESTION 5

- a) Discuss the factors that influence selection of road alignment.
(10 marks)
- b) A gradient of 1% meets a gradient of 4% at an intersection point I. The chainage and reduced level of which are 500m and 261.30m respectively. A 100m long vertical curve is to be inserted between the gradients. Calculate the corrected grade elevations at 25m intervals.
(15 marks)

...../pm