



ZIMBABWE

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

CIVIL ENGINEERING

SUBJECT: Water and Sanitation Engineering PAPER NO: 578/15/S07

DURATION: 3 Hours

MARCH/APRIL 2016 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer ANY Five Questions.
2. All Questions Carry 20 Marks each.
3. Begin Each Question on a fresh Page.

This paper consists of 3 printed pages.

QUESTION 1

- a)
 - i) Define hydrology. (2 marks)
 - ii) State any six uses of hydrology (6 marks)
- b) By means of a diagram illustrate the hydrological cycle. (8 marks)
- c) Give reasons why catchment orientation can be a factor that affects run off as a process. (4 marks)

QUESTION 2

- a) Discuss in detail the human influence on the hydrology of an area. (12 marks)
- b) In view of (a) above, relay the role of a Water Engineer in Environmental Management. (8 marks)

QUESTION 3

- a) Outline the three forms of water impurities. (3 marks)
- b) Explain the following:
 - i) Water borne diseases
 - ii) Water washed diseases
 - iii) Water based diseases (6 marks)
- c)
 - i) Describe and explain any method by which the amount of E-coli is determined in water. (10 marks)
 - ii) Give your brief understanding of confirmatory tests. (1 mark)

QUESTION 4

- a) Define the following terms:
 - i) Filtration
 - ii) Flocculation
 - iii) Screening
 - iv) Disinfection
 - v) Turbidity (10 marks)
- b) Explain the raw water treatment process. (10 marks)

QUESTION 5

Discuss the hydrological zones A-E found in Zimbabwe, clearly highlighting the characteristics of each zone. (20 marks)

QUESTION 6

You have been tasked to assist in the construction of a primary sedimentation tank. What requirements would you consider in the construction of a primary sedimentation tank? (20 marks)

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