



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, 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 2020 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

Answer ANY FIVE (5) questions.

QUESTION 1

- (a) Which climatic factors affect the Hydrology of an area? (5 marks)
- (b) Describe the seven (7) forms of precipitation. (7 marks)
- (c) (i) State the hydrological equation (3 marks)
- (ii) The hydrological equation is based on which law. (2 marks)
- (d) Explain factors affecting evapotranspiration. (3 marks)

QUESTION 2

- (a) By means of graphical illustration, draw up the classification system of sanitation systems based on population and water needs. (10 marks)
- (b) What are the sources of wastewater? (10 marks)
- (c) Describe five water – borne disease that can be caused by wastewater. (10 marks)

QUESTION 3

- (a) The composition of groundwater is dependent of what factors. (5 marks)
- (b) Describe the processes of water treatment. (10 marks)
- (c) Which chemicals can be used as disinfectants in water treatment? (5 marks)

QUESTION 4

- (a) What are the advantages and disadvantages of onsite sanitation systems? (11 mark)
- (b) Draw and label the longitudinal cross-section of a septic tank. (9 marks)

QUESTION 5

- (a) What is solid waste management? (2 marks)
- (b) Explain the following (2 marks)
- (i) Garbage (2 marks)
 - (ii) Rubbish (2 marks)
 - (iii) Ashes (2 marks)
 - (iv) Bulky wastes (2 marks)
- (c) Describe any 3 types of water and state the use for each if any. (10 marks)

QUESTION 6

- (a) What are the advantages of using wastewater stabilization ponds? (9 marks)
- (b) Describe four (4) types of pollutions and state a pollutant for each type. (8 marks)
- (c) Explain the wet offsite technique in sanitation and give an example (3 marks)

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