



**ZIMBABWE**

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL  
(HEXCO)**

**NATIONAL CERTIFICATE**

**IN**

**PLUMBING AND DRAINLAYING**

**SUBJECT: Drainlaying Theory**

**PAPER NO: 427/13/S02  
427/19/S02**

**DURATION: 3 Hours**

**MARCH/APRIL 2021 EXAMINATION**

**REQUIREMENTS**

**Pen, Pencil, Ruler, Rubber**

**INSTRUCTIONS TO CANDIDATE**

- 1. Answer All questions in Section A (40 marks).**
- 2. Answer any Three (3) questions in section B (60 marks).**

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*This paper consists of 3 printed pages.*

**SECTION A**

QUESTION 1

Define the following terms;

- a) Criterion of satisfactory service (1 mark)
- b) Depth of wafer seal (1 mark)
- c) Discharge unit (1 mark)

QUESTION 2

What are the colour which are used on drainage plans for the following according to model building by-laws (1977)?

- a) New sewer or soil pipe (1 mark)
- b) New waste pipe (1 mark)
- c) New private drain (1 mark)

QUESTION 3

Show by a means of a diagram how the loss of seal in traps occurs due to induced siphonage. (5 marks)

QUESTION 4

- a) Identify any four materials used in the manufacturing of drainage pipes. (2 marks)
- b) State the three main requirements of a single stack system. (3 marks)

QUESTION 5

Calculate the gradient required for a 150mm diameter drain flowing at full bore when the velocity of flow is to be 1.5m/s (chezy constant = 55) (5 marks)

QUESTION 6

- a) State at least three (3) advantages of flexible joints on drains over rigid joint. (3 marks)

- b) i) What are the three ways by which a urinal may be discharged? (3 marks)  
ii) List down at least three means of access to sewers. (3 marks)

QUESTION 7

A sewer is 45m long. The reading at the head on a dumpy level is 6845. What would be the reading of the connection point if a gradient of 1:60 used? (5 marks)

QUESTION 8

Draw a bowl type urinal showing the method of flushing and discharge. (5 marks)

**SECTION B**

SECTION 9

Draw a bell type flushing cistern, label and state how it operates. (20 marks)

QUESTION 10

- a) Explain the following (3 marks)  
i) Access cover (3 marks)  
ii) Sparge pipe (3 marks)  
iii) Sewerage (3 marks)  
iv) Antisiphon trap (3 marks)  
v) Relief vent (3 marks)
- b) Identify the difference between a Private sewer and a Public sewer. (5 marks)

QUESTION 11

- a) Draw a septic tank and show all the necessary components. (14 marks)  
b) Mention 3 (three) methods of testing drains. (6 marks)

QUESTION 12

- a) Identify the installation of the following appliances from the finished floor level:  
i) Wash hand basin (3 marks)  
ii) Low level flushing cistern (3 marks)
- b) Draw a single stack system on two floors. (14 marks)

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