Affix label with Candidate Code Number here.
If no label, enter candidate Number if known

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No. 9197

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2017

TRADESMAN DRAINLAYER

QUESTION AND ANSWER BOOKLET

Time allowed THREE hours

INSTRUCTIONS

Check that the Candidate Code Number on your admission slip is the same as the number on the label at the top of this page.

Do not start writing until you are told to do so by the Supervisor.

Total marks for this examination: 100.

The pass mark for this examination is 60 marks.

Write your answers and draw your sketches in this booklet. If you need more paper, use pages 22–25 at the back of this booklet. Clearly write the question number(s) if any of these pages are used.

All working in calculations must be shown.

Candidates are permitted to use the following in this examination:

Drawing instruments, approved calculators, document(s) provided.

Publications, Acts, Regulations, Codes of Practice, or Standards other than the ones provided are NOT permitted in the examination room.

Check that this booklet has all of 25 pages in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

Candidates that sat this examination in November 2017 were provided with the following documents:

- New Zealand Building Code Clause G13 – Foul Water
- AS/NZS 3500 Part 2: Sanitary plumbing and drainage

USEFUL FORMULAE

Circumference of circle = $2 \times \pi \times R$ or Circumference of circle = $\pi \times D$

Area of circle = $\pi \times R^2$ or Area of circle = $0.7854 \times D^2$

Volume of cylinder = $\pi \times R^2 \times H$ or Volume of cylinder = $0.7854 \times D^2 \times H$

length = L
gradient = 1:G
fall = F

SECTION A

QUESTION 1

(a) Give the purpose of anchor blocks installed on a drain.

_____

(1 mark) ☐

(b) Anchor blocks are to be installed on a drain.

State the TWO conditions that must be met with regard to where on the drain the anchor blocks must be located.

1 _____

2 _____

(2 marks) ☐

(c) Give THREE requirements that must be met when anchor blocks are to be installed in a trench.

1 _____

2 _____

3 _____

(3 marks) ☐

Total 6 marks ☐

QUESTION 2

(a) Give TWO situations where a drain vent is installed at a low level.

1 _____

2 _____

(2 marks)

(b) State TWO installation requirements that must be met when a low level vent is installed.

1 _____

2 _____

(2 marks)

Total 4 marks

QUESTION 3

(a) Name the most suitable type of pump to install at the bottom of a single chamber domestic foul water pumping station pumping unscreened sewage.

_____

(1 mark)

(b) Name TWO items that should not be flushed into the chamber in (a).

1 _____

2 _____

(2 marks)

Total 3 marks

QUESTION 4

(a) Describe how a testing plug should be fitted firmly to the wall of a drain to allow for testing.

(2 marks)

(b) Give FIVE locations where flexible joints are required on a drain.

1

2

3

4

5

(5 marks)

QUESTION 4 (cont'd)

(c) Sketch and label a diagram showing how a flexible joint on a drain can be made.

(2 marks)

Total 9 marks

QUESTION 5

(a) A 100 mm diameter foul water drain 50 m long is to be tested for leakage.

Provide details of TWO acceptable test methods in the tables below.

Type of test	
Minimum test pressure	
Minimum test time	

Type of test	
Minimum test pressure	
Minimum test time	

(4 marks)

(b) Give TWO factors that can adversely affect the results of a leakage test.

1 _____

2 _____

(2 marks)

Total 6 marks

QUESTION 6

A trench is to be dug adjacent to the foundation of a building.

The trench will be open for longer than 48 hrs.

The bottom of the trench will be 450 mm below the underside of the building foundation.

(a) Calculate the minimum allowable horizontal separation between the trench and the building foundation.

(2 marks)

(b) Give a condition which would allow for the minimum separation in (a) to be reduced.

(1 mark)

Total 3 marks

QUESTION 7

(a) List FOUR devices that may be used to check that a drain is being laid in a trench at the correct gradient.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(b) Complete the table below by giving THREE factors that could cause the condition of an excavation to deteriorate, and for each factor give an effect on the excavation.

Factor	Effect

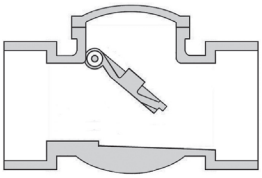
(3 marks)

Total 5 marks

QUESTION 8

Diagrams of fittings used on foul water drains are shown below.

Give the full name of each fitting, and state where it could be used on a drain installation.

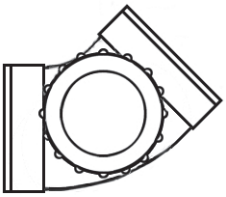
(a) 

Name: _____

Where used: _____

_____

(2 marks)

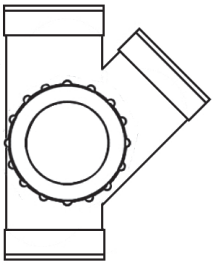
(b) 

Name: _____

Where used: _____

_____

(2 marks)

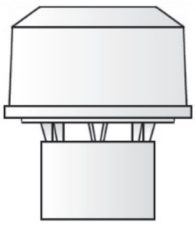
(c) 

Name: _____

Where used: _____

_____

(2 marks)

(d) 

Name: _____

Where used: _____

_____

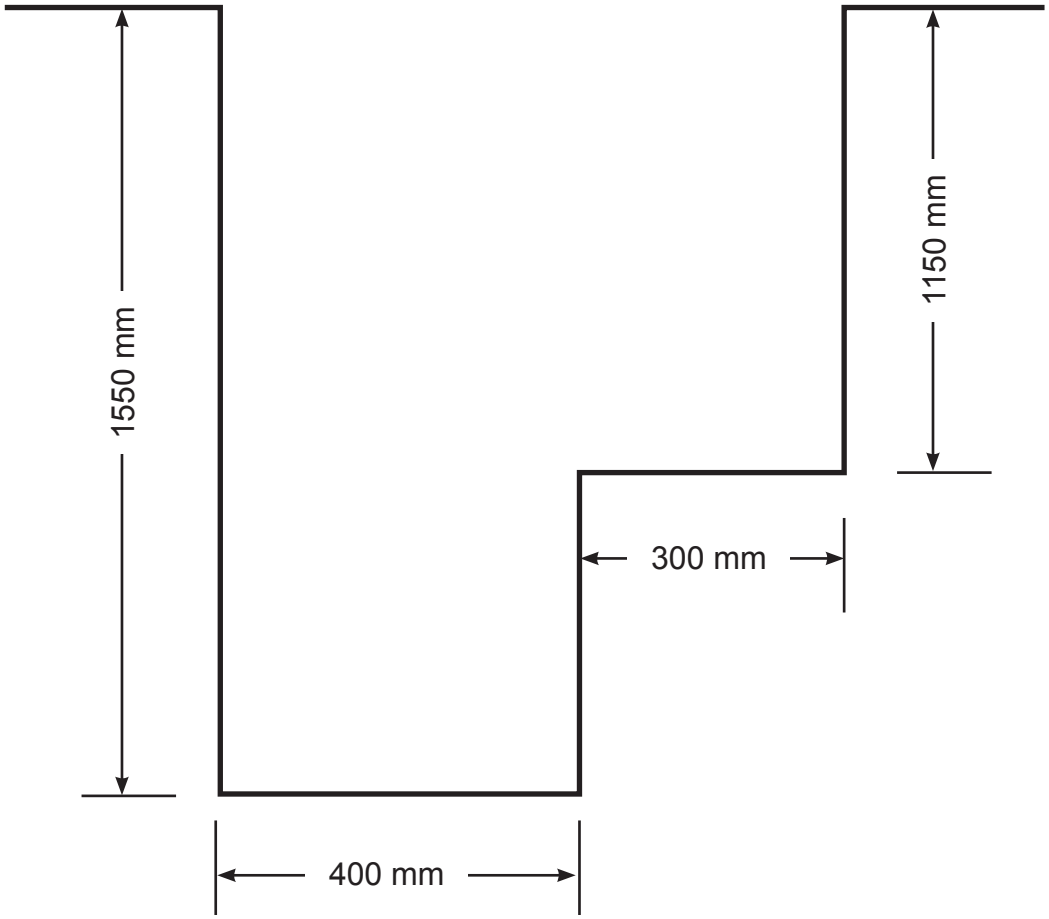
(2 marks)

Total 8 marks

QUESTION 9

The plan below shows the end elevation of a trench.

The trench is 32 m long.



Calculate the volume of material required to fill the trench.

Allow 20% for compaction.

Total 4 marks

QUESTION 10

Complete the table below.

Gradient	Fall (mm/m)
1.25%	
1:60	
1.50%	
1:40	

Total 4 marks

QUESTION 11

When a drain or part of a drain is no longer required, it must be disconnected from the foul water drainage system.

(a) State the position at which the drain must be disconnected.

_____

(1 mark)

(b) State what the drainlayer must use to seal the disconnection.

_____

(1 mark)

(c) State TWO effects that the incorrect disconnection of an old branch drains from a live drain may have on the drainage system.

1 _____

2 _____

(2 marks)

(d) State the purpose of an access chamber on a foul water drainage system.

_____

(1 mark)

Total 5 marks

QUESTION 12

Give FOUR effects that inadequate ventilation could have on a drainage system.

1 _____

2 _____

3 _____

4 _____

Total 4 marks

QUESTION 13

Name the structure shown of the following diagram, give a situation where it would be required and state TWO functions of the structure.

Name: _____

_____

Location: _____

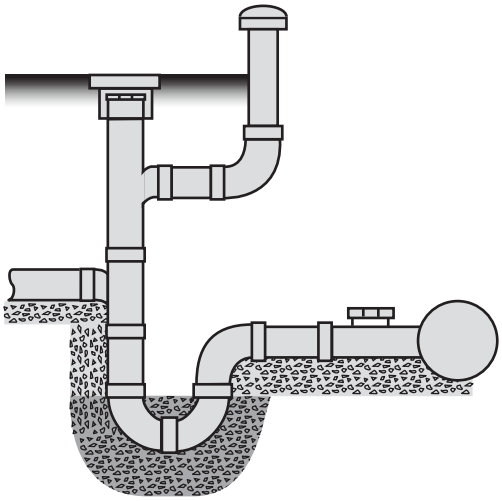
_____

Function 1: _____

_____

Function 2: _____

_____



Total 4 marks

QUESTION 14

(a) Name FOUR environmental hazards that may affect breathing when excavating or laying drains.

1 _____

2 _____

3 _____

4 _____

(4 marks)

(b) Describe FOUR items of safety equipment in addition to personal protection equipment that may be required in a drainage excavation.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(c) Dry cutting of concrete pipes by grinding in a confined space may create an explosive situation.

State how this hazard can be minimized.

_____

(1 mark)

(d) A petrol driven pump is to be used to dewater a trench.

Give TWO precautions that need to be taken to safeguard workers.

1 _____

2 _____

(2 marks)

Total 9 marks

QUESTION 15

List FIVE locations in which a square junction is permitted to be used on a drain.

1 _____

2 _____

3 _____

4 _____

5 _____

Total 5 marks

QUESTION 16

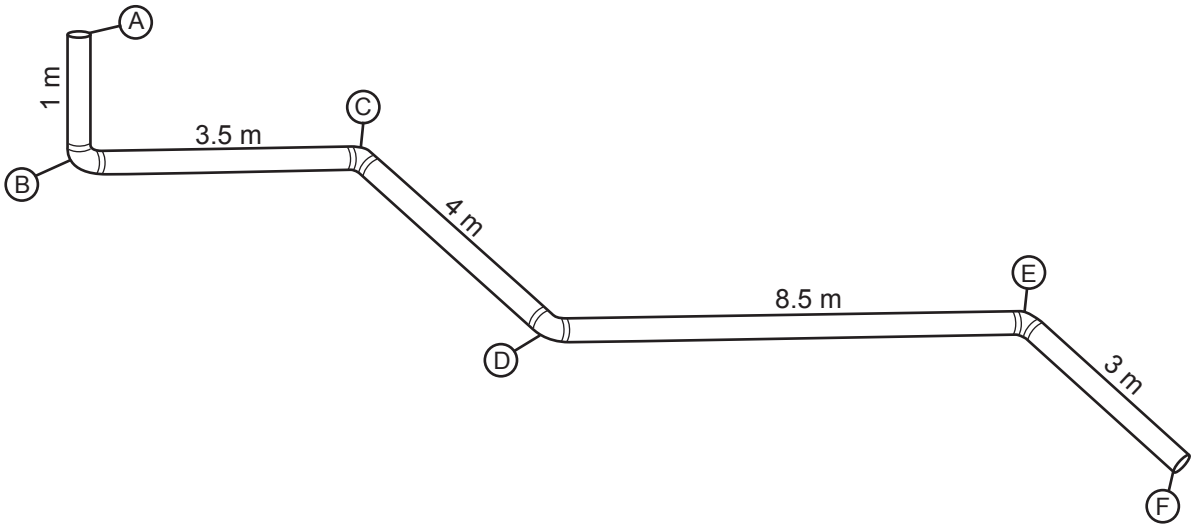
The drawing below shows a drain.

The drain at point A is at ground level.

Section A-B of the drain is vertical.

The remaining sections of the drain have been laid at a gradient of 1 in 60 (1.65%).

Complete the following tables to show the fall for each section and the depth below the ground level for the excavation at points C, D, E and F.



Section	Fall
B – C	
C – D	
D – E	
E – F	

Point	Depth
A	Ground level
B	1 m
C	
D	
E	
F	

Total 6 marks

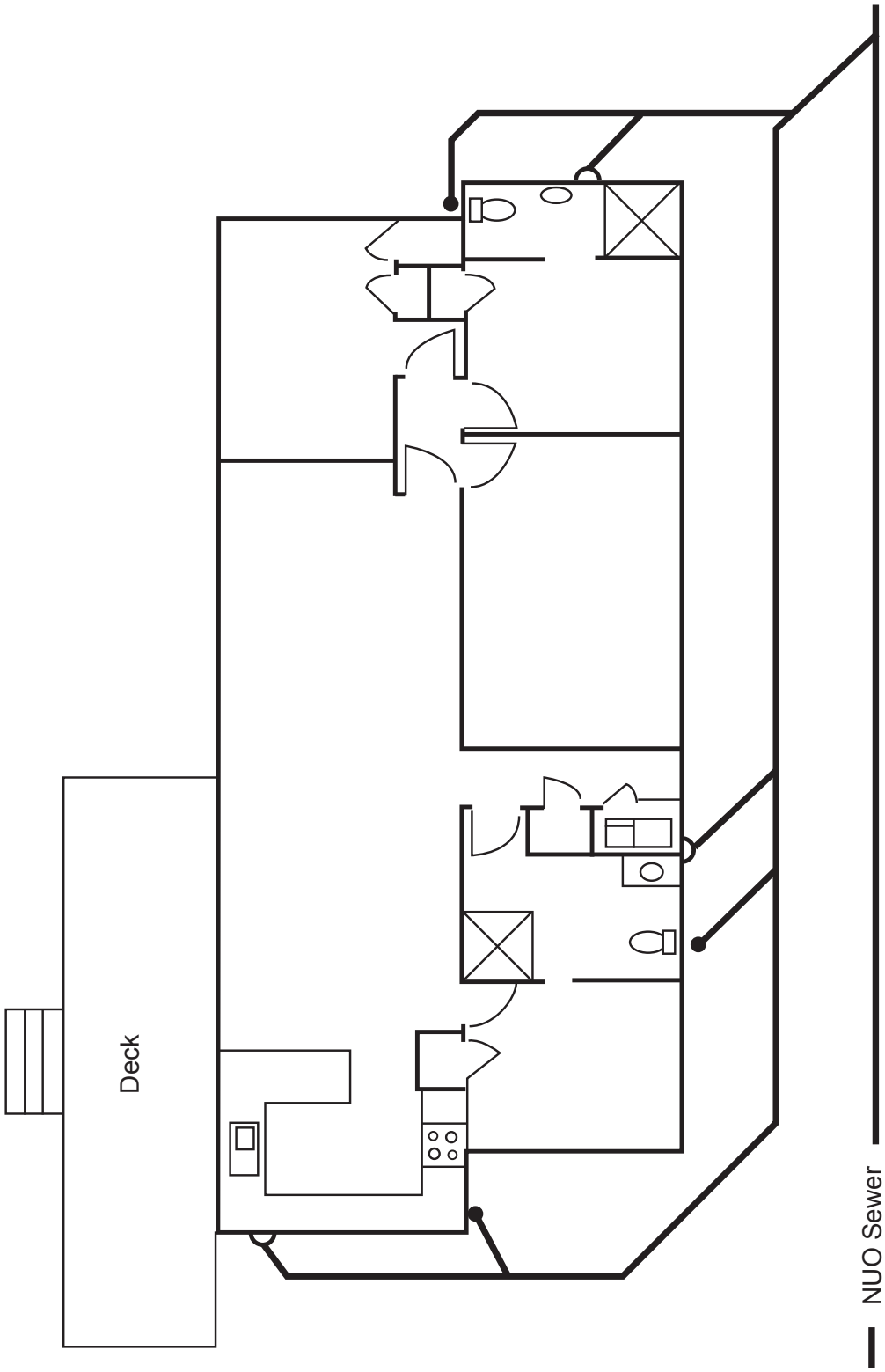
QUESTION 17

The diagram below shows a dwelling and foul water drainage system.

The diagram has been drawn to a scale of 1:100

Show on the plan the locations of the required inspection openings.

The completed system is to comply with the minimum requirements of the New Zealand Building Code Clause G13/AS2 Foul Water.



Total 5 marks

SECTION B

Answer the following multiple-choice questions by writing your answer (A, B, C, D or E) in the box provided after each one of the questions.

Each correct answer in this section of the examination is worth 1 mark.

Should your choice of answer be unclear no mark will be awarded.

1. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, what is the minimum height an overflow relief gully trap grate is permitted to be installed above unpaved ground level?

   A 50 mm

   B 75 mm

   C 100 mm

   D 125 mm

   E 150 mm

   ☐

2. A section of drain acting as a vent must not be smaller than what size?

   A 32 mm

   B 40 mm

   C 50 mm

   D 65 mm

   E 80 mm

   ☐

3. What is the minimum permitted width of a trench excavated for a 150 mm drain?

   A 200 mm

   B 250 mm

   C 300 mm

   D 350 mm

   E 450 mm

   ☐

4. A trench is to be excavated.

   The trench is deeper than 1.5 m and its depth is greater than its width at the top.

   Which of the following organisations must be notified before starting the excavation?

   A The Plumbers Gasfitters and Drainlayers Board.

   B The local territorial authority or regional council.

   C WorkSafe.

   D Energy Safety.

   E The Licensed Building Practitioners Board.

   ☐

5. Which clause of the New Zealand Building Code covers the design and construction of soak pits?

   A B2 Durability.

   B E1 Surface Water.

   C E2 External Moisture.

   D G12 Water Supplies.

   E G13 Foul Water.

   ☐

6. At what length does a branch drain require a vent when it is being installed in order to comply with New Zealand Building Code clause G13/AS2 Foul Water?

   A 2.500 m.

   B 5.000 m.

   C 7.500 m.

   D 10.000 m.

   E 15.000 m.

   ☐

7. According to the New Zealand Building Code clause G13/AS2 Foul Water, verifiable levelling devices must be used to ensure uniform gradients of drains laid at gradients in what range?

   A 1:40 or less.

   B 1:60 or less.

   C 1:80 or less.

   D 1:100 or less.

   E 1:120 or less.

   ☐

8. According to the New Zealand Building Code clause G13/AS2 Foul Water, what is the minimum diameter for a main drain vent is?

A 40 mm.

B 50 mm.

C 65 mm.

D 80 mm.

E 100 mm.

☐

9. What is the maximum permissible height from the top edge of a gully dish to the water level in a gully trap?

A 25 mm.

B 100 mm.

C 425 mm.

D 500 mm.

E 600 mm.

☐

10. Which of the following describes the soffit of a pipe?

A The top of the inside of a pipe.

B The highest point of a pipe when it is on a grade.

C The top of the outside of a pipe.

D The highest point of a pipe when it is on a grade.

E The lowest point inside a pipe.

☐

Total 10 marks ☐

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
Section B		
Total		