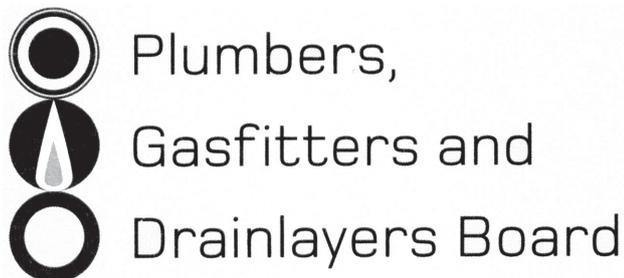


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9198



REGISTRATION EXAMINATION, NOVEMBER 2022

CERTIFYING DRAINLAYER

QUESTION AND ANSWER BOOKLET

Time allowed THREE hours

INSTRUCTIONS

Please check that the booking reference number on your booking confirmation slip is the same as the number on the label at the top of this page. **Do Not** remove the exam booking confirmation slip from your exam paper.

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

Total marks for this examination: 100.

This exam booklet consists of 2 sections

Section A – Questions 1 to 12

Section B – Questions 1 to 10

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 28–30 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.

Do not use red pen for drawings or writing in your paper.

Check that this booklet has all of 32 pages in the correct order.

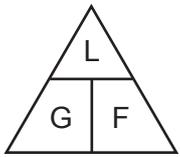
YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

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

The surface water drain from a property is to be connected to the local territorial authority's (TA) main drain connection point. The drain is lower than the connection point.

- (a) Name TWO suitable options that could be used to adequately dispose of the surface water from the property.

1 _____

2 _____

(2 marks)

- (b) Draw and label a diagram showing the key requirements that must be met for one of the options named in (a).

(4 marks)

Total 6 marks

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QUESTION 2

(a) Trench collapse is a hazard when working in an excavation.

Give THREE other hazards that may be present when working in an excavation.

1 _____

2 _____

3 _____

(3 marks)

(b) Give the meaning of the term angle of repose in relation to excavation.

(1 mark)

(c) Give THREE factors that affect the angle of repose of an excavation.

1 _____

2 _____

3 _____

(3 marks)

Total 7 marks

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QUESTION 3

(a) Give the meaning of the term exempt building work.

(1 mark)

(b) Give FOUR examples of drainlaying work that would be classified as exempt building work.

1

2

3

4

(4 marks)

(c) Give FOUR categories of people who are permitted to complete drainlaying that is classified as exempt building work.

1

2

3

4

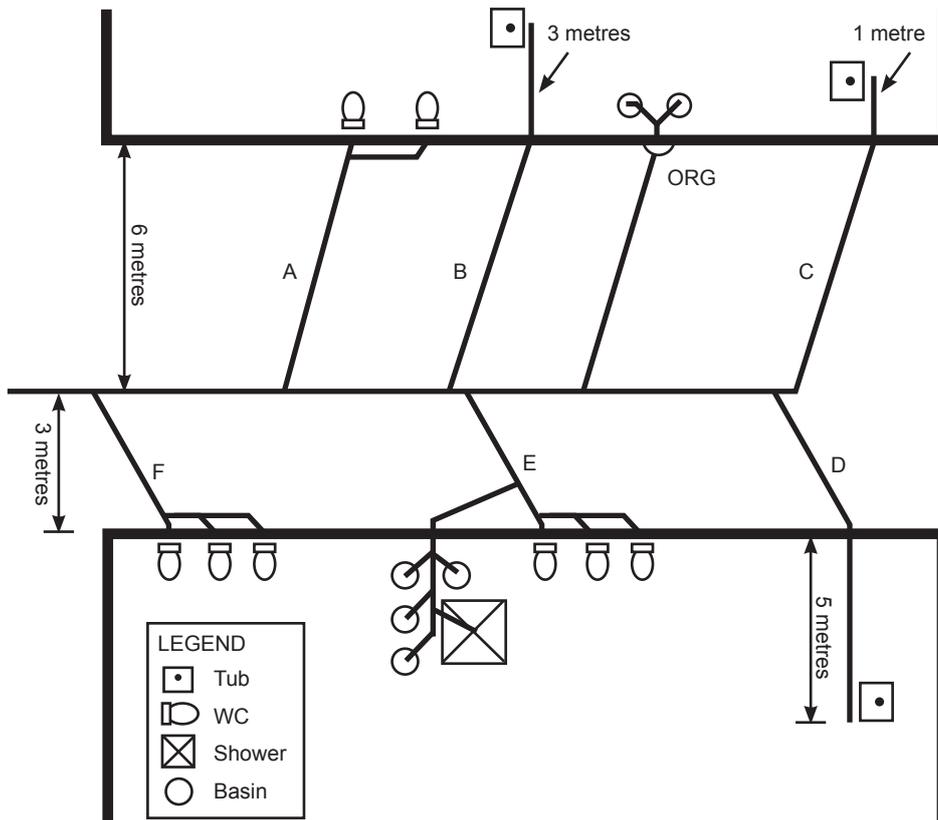
(2 marks)

Total 7 marks

QUESTION 4

The diagram below shows part of the foul water drainage plan for a commercial property.

- (a) Complete the diagram to show the required locations for vent pipework. The completed system is to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.



(5 marks)

QUESTION 4 (cont'd)

- (b) Complete the table below to show the required minimum diameter and gradient for the drains for each section labelled A – F for the system to comply with AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

Drain	Minimum diameter (mm)	Minimum gradient
A		
B		
C		
D		
E		
F		

(6 marks)

Total 11 marks

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QUESTION 5

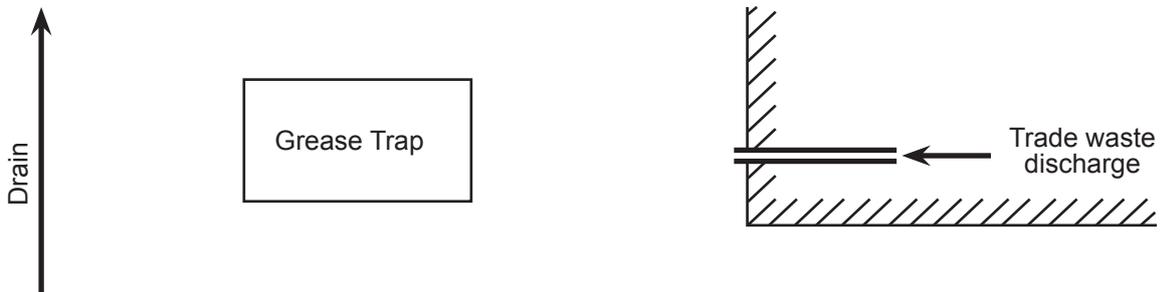
- (a) Complete the starter drawing below to show the structure of a two-chamber grease trap, and label the main components.



(4 marks)

- (b) The drawing below shows the plan of a grease trap installation.

Complete the drawing so that the installation complies with the New Zealand Building Code clause G13 Foul Water. Include the maximum allowable distance between the building and the grease trap.



(3 marks)

- (c) Describe how the minimum size of a grease trap used for a cafe is determined.

(2 marks)

Total 9 marks

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QUESTION 6

(a) Give TWO conditions under which an excavation becomes notifiable as particular hazardous work.

1 _____

2 _____

(2 marks)

(b) Give FIVE items of information that are to be provided on a particular hazardous (notifiable) work form.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks)

Total 7 marks

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QUESTION 7

(a) Define secondary flow path as it applies to drainlaying.

(1 mark)

(b) State the purpose of a secondary flow path.

(1 mark)

(c) Give FOUR factors that may determine the design of a secondary flow path.

1

2

3

4

(4 marks)

Total 6 marks

QUESTION 8

The diagram on the opposite page shows the floor plan of an ablution block, with the layout of the sanitary fixtures shown.

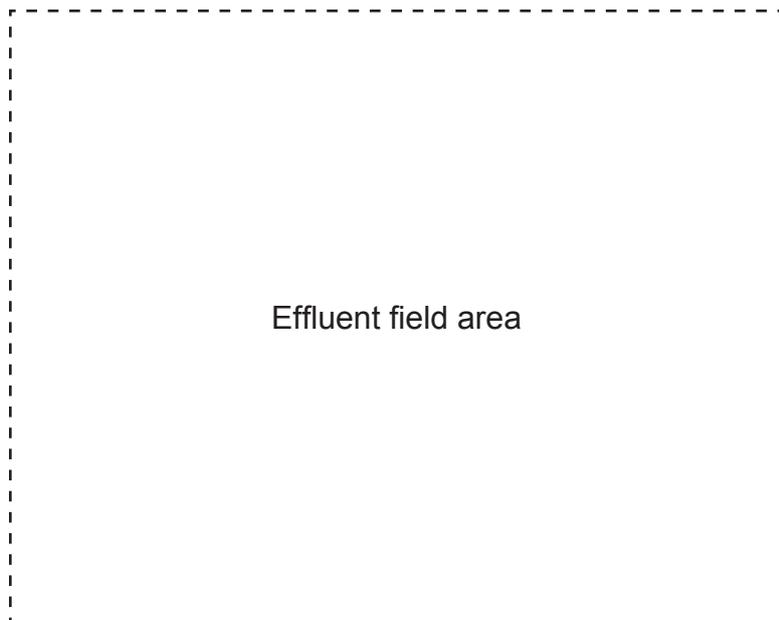
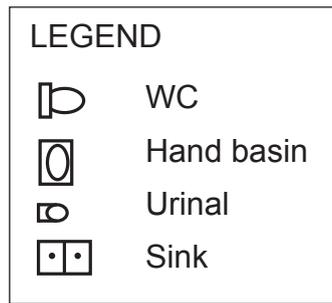
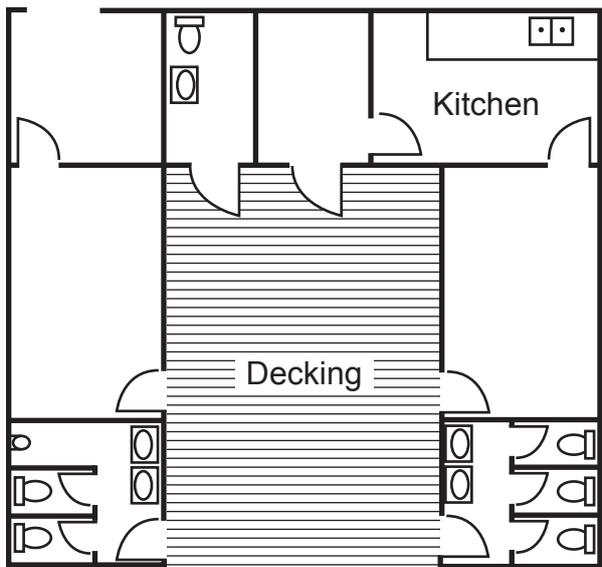
The plan also shows the proposed location of the effluent field for the waste from the ablution block.

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

Complete the site plan to show a suitable drainage system to convey dosed foul water to the effluent field.

The completed system is to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

QUESTION 8 (cont'd)



Total 10 marks

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QUESTION 9

Answer the following in accordance with AS/NZS 3500 Part 2: Sanitary Plumbing and Drainage.

(a) Give the meaning of the term rising main.

(1 mark)

(b) Give TWO permitted locations to which a foul water rising main is allowed to discharge.

1

2

(2 marks)

(c) State TWO requirements that must be met when jump-ups are installed in an inspection chamber.

1

2

(2 marks)

Total 5 marks

QUESTION 10

The plan opposite shows a building and contour lines on a site. The foul water drainage pipework connecting the dwelling to the network utility operator's (NUO) sewer is also shown.

The pipework has been laid at a gradient of 1:60, and the distances between the points are as shown in the table below.

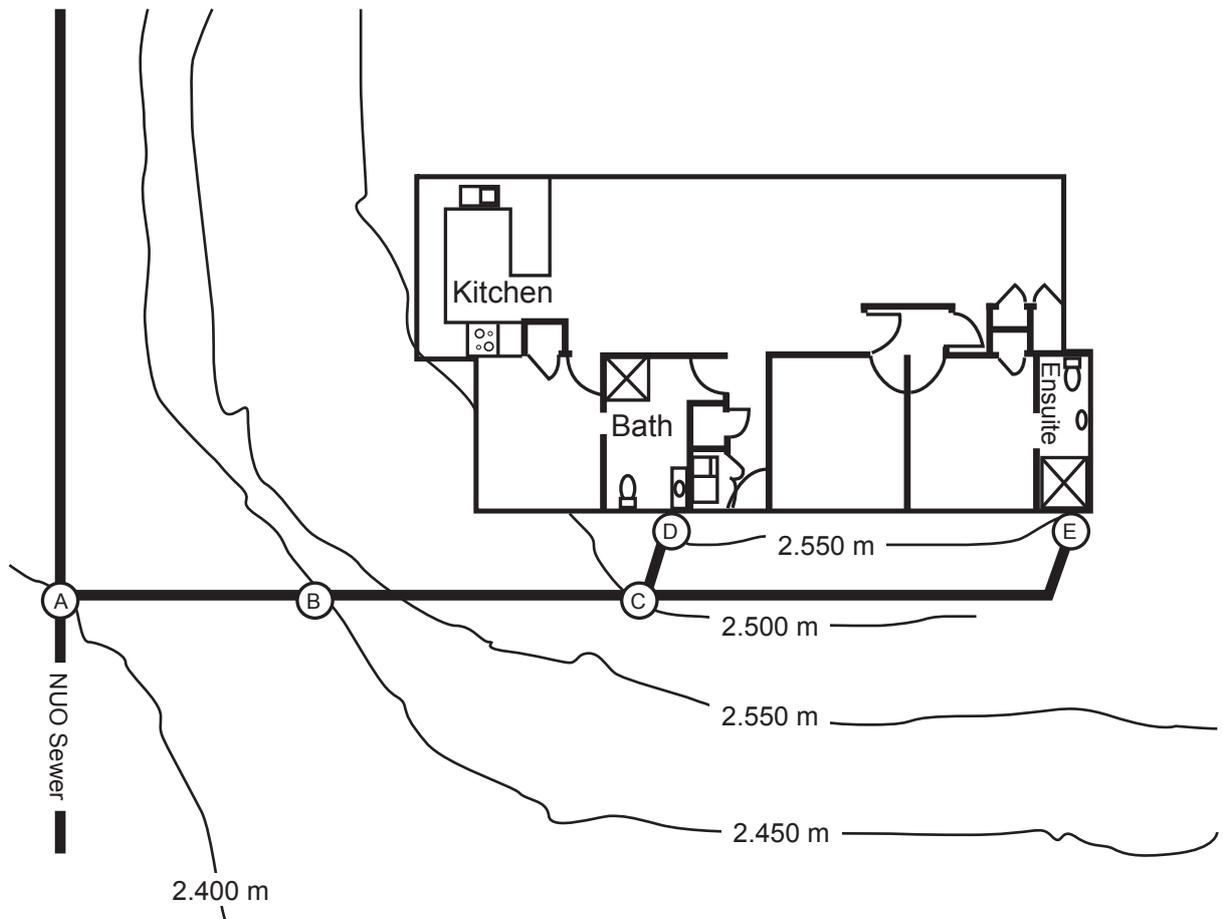
Pipe sections		
Pipe section	Distance (m)	Fall (mm)
A – B	6.4	
B – C	8.2	
C – D	2.2	
C – E	10.6	

The invert for the NUO connection marked A on the plan is 1.35 m below ground level.

Complete the table above to give the fall, in mm, of each given pipe section, and the table below to give the depth, in mm, below ground level to the invert of each given point B – E.

Depth of invert of drain	
Point	Depth (mm)
A	1350
B	
C	
D	
E	

QUESTION 10 (cont'd)



Total 6 marks

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QUESTION 11

(a) A certifying drainlayer has just employed the people listed in the table below.

Complete the table by stating the licence type and minimum period of time each employee must work in the presence of their supervisor.

Employee	Licence category	Minimum period 'in the presence of'
New apprentice		
Unskilled labourer		
Provisional license holder		

(6 marks)

(b) Name the THREE supervision types recognised by the Plumbers, Gasfitters and Drainlayers Board.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 9 marks

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QUESTION 12

A surface water drain is to be water tested using the method prescribed in New Zealand Building Code clause E1/VM1 Surface Water.

(a) State the length of time required for the test.

(1 mark)

(b) The drain is 200 mm in diameter and 65 metres long.

Calculate in litres the maximum amount of acceptable water loss during the test.

(3 marks)

(c) Give TWO other acceptable methods that may be used to test the drain.

1

2

(2 mark)

(d) Give the additional requirements that must be met when testing a drain that has been constructed from ceramic or concrete pipe.

(1 mark)

Total 7 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 the New Zealand Building Code clause G13/AS2 Foul Water, which of the following gives the maximum number of discharge units permitted to be conveyed by a 100 mm pipe laid at a gradient of 1:80?

A 104

B 122

C 149

D 205

E 255

2. Soil is being removed from an excavation. The soil weighs 700 kg/m³. How much will 0.6 m³ of the soil weigh?

A 42 kg.

B 60 kg.

C 420 kg.

D 600 kg.

E 694 kg.

3. What is the minimum allowable gradient for an 85 mm surface water drain?

A 1:60

B 1:80

C 1:90

D 1:120

E 1:200

4. A pipe 45 m long falls 900 mm.
What gradient has it been laid at?

- A 1:50 (2.00%).
- B 1:45 (2.25%).
- C 1:40 (2.50%).
- D 1:30 (3.35%).
- E 1:20 (5.00%).

5. What is the minimum time a foul water drain installed under a concrete slab must last to meet the durability requirements of the New Zealand Building Code?

- A 1 year.
- B 2 years.
- C 5 years.
- D 15 years.
- E 50 years.

6. What is the purpose of an aerated chamber on a septic tank system?

- A To convey the effluent evenly over the disposal field.
- B To mix the tank contents thoroughly.
- C To supply oxygen to the bacteria within the tank.
- D To prevent grease from travelling through the system.
- E To make sure all sludge is retained within the system.

7. What is the purpose of a drainage easement on a certificate of title?

- A To allow a drain to be laid within a neighbouring property.
- B To prevent flooding caused by surface water from a neighbouring property.
- C To allow two neighbouring properties to share a drainage system.
- D To permit the storm-water from the property to discharge to a curb and channel.
- E To show the as-laid location of the drainage system on the certificate of title.

8. When air testing drains, as the drain pipe diameter increases from 100 mm the test pressure should:

- A remain the same
- B be increased
- C be decreased
- D pipes require wetting
- E pipes require bracing

9. What is meant by the term surcharge loads in relation to shoring a trench?

- A The amount of ground water in the area of the trench.
- B Slippage of soil along bedding planes applying extra forces on the shoring.
- C Extra weight from soil or vehicles near the edge of the trench.
- D The removal of ground water via well-pointing changing the structure of the soil.
- E Building foundations within 1 m of a trench.

10. How much notice (time) must be given before particular hazardous work is to be carried out?

- A 24 hours.
- B 48 hours.
- C 72 hours.
- D 5 working days.
- E 10 working days.

Total 10 marks

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Section B		
Total		

