

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

.....

No. 9197



Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2012

LICENSED 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 17–21 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 21 pages in the correct order and that none of these pages is blank.

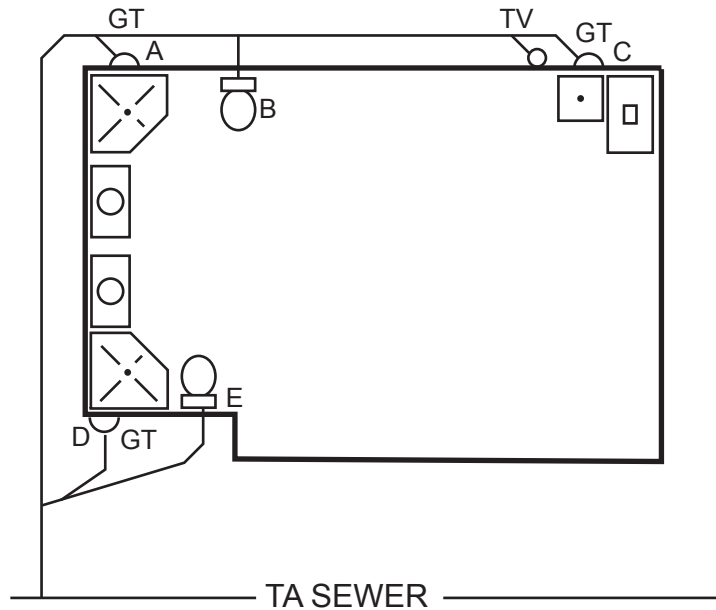
YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

Candidates that sat this examination in June 2012 were provided with the following documents:

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

SECTION A

QUESTION 1



The drawing above shows an as-built plan of foul water drains for a residential property.

A blockage has occurred causing foul water to overflow from the gully dishes marked A and C when the WC marked B is flushed.

(a) Indicate on the diagram a possible location for the blockage.

(1 mark)

(b) State how the location of the blockage could be confirmed without excavating the drain or using a camera.

(2 marks)

(c) Give THREE likely causes for the blockage in (a) to have occurred.

1

2

3

(3 marks)

QUESTION 1 (cont'd)

(d) Give the THREE installation requirements relating to bends as stated in New Zealand Building Code Clause G13/AS2 Foul Water that reduce the risk of blockages in a foul water drain.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(e) Name THREE methods that may be used to clear a blocked drain.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(f) Give FOUR actions that should be taken to clean and store equipment that has been used to clear a blocked drain in order to reduce the risk of illness from exposure to foul water.

- _____
- _____
- _____
- _____

(2 marks)

Total 14 marks

QUESTION 2

State the purpose of the following items as they relate to septic tank systems.

(i) Dosing system

(ii) Baffle

(iii) Filter

(iv) Anaerobic bacteria

(v) Distribution box

(5 marks)

(b) Give FOUR considerations (excluding soil type) that should be taken into account when selecting a suitable site for an effluent disposal field.

1

2

3

4

(4 marks)

(c) Describe the effect if an effluent disposal field is installed in an area where the ground has a high concentration of the following materials.

(i) Gravel

(ii) Clay

(2 marks)

QUESTION 2 (cont'd)

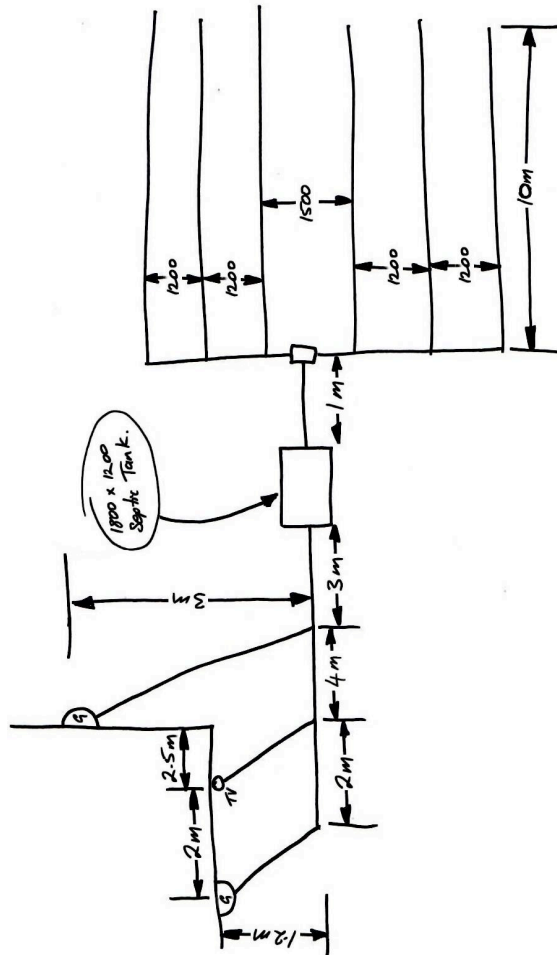
(d) It is common practice to fill a septic tank with water as soon as possible after installation.

Give the reason for this.

(1 mark)

(e) The sketch below shows a plan view of a septic tank system installation.

On the page opposite, draw an as-built plan of the sketch using a scale of 1:100.



(10 marks)

Total 22 marks

QUESTION 3

(a) Give THREE benefits of correctly ventilating a foul water drain.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Give the meaning of the term surcharge in relation to drainlaying.

- _____
- _____

(1 mark)

(c) The New Zealand Building Code Clause G13/AS2: Foul Water states that every building must have a gully dish to provide overflow relief.

Give the FOUR installation requirements that must be met for the gully dish to serve this purpose.

- 1 _____
- 2 _____
- 3 _____
- 4 _____

(2 marks)

Total 6 marks

QUESTION 4

A 110 mm uPVC foul water drain is 40 metres in length.

There is 500 mm of coverage at the head of the drain.

The drain has been laid at a gradient of 1:60

Calculate the depth of the invert of the sewer connection at the boundary.

Total 2 marks

QUESTION 5

(a) List the FIVE steps that must be taken when water testing a stormwater drain constructed from concrete pipes.

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____

(5 marks)

(b) State TWO outcomes that can be achieved with the installation of a bubble-up chamber.

- 1 _____
- 2 _____

(2 marks)

(c) Sketch a cross-sectional diagram of a bubble-up chamber and show the direction of flow through the chamber.

(4 marks)

QUESTION 5 (cont'd)

- (d) Sketch a method of constructing a chamber type soak pit that will comply with the New Zealand Building Code Clause E1/AS1: Surface Water, and label the components of your drawing.

(4 marks)

- (e) Give the reason for installing a wing wall, and give an example of where a wing wall could be installed.

(3 marks)

Total 18 marks

QUESTION 6

- (a) Give THREE locations where there is an increased risk of dangerous gases being present when excavating a trench.

1 _____

2 _____

3 _____

(3 marks)

- (b) State TWO hazards that can occur when dangerous gases are present.

1 _____

2 _____

(1 mark)

Total 4 marks

QUESTION 7

(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) Describe how a testing plug should be fitted to a drain pipe to allow for testing.

(2 marks)

(c) Name THREE tools that can be used to locate a buried drain pipe before excavation.

1 _____

2 _____

3 _____

(3 marks)

(d) Give TWO factors that should be considered when setting up a laser level on a worksite.

1 _____

2 _____

(2 marks)

(e) Give TWO examples where a flexible joint must be installed on a drainage system.

1 _____

2 _____

(2 marks)

QUESTION 7 (cont'd)

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

(2 marks)

(g) Name FOUR acceptable pipe materials that can be used to convey foul water according to New Zealand Building Code Clause G13/AS2 Foul Water.

- 1 _____
- 2 _____
- 3 _____
- 4 _____

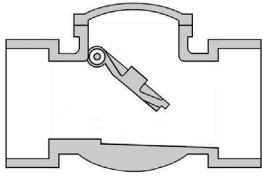
(2 marks)

Total 14 marks

QUESTION 8

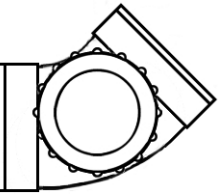
Diagrams of fittings used on a foul water drain are shown below.

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



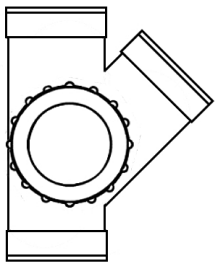
Name _____

Where used _____



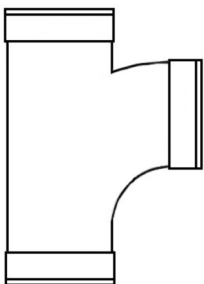
Name _____

Where used _____



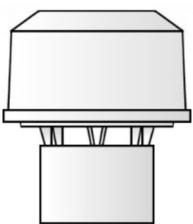
Name _____

Where used _____



Name _____

Where used _____



Name _____

Where used _____

Total 10 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.

Note that should your choice of answer be unclear in this section of the examination no marks will be awarded for that question.

Answer all questions in this section to comply with AS3500 Part 2 Sanitary plumbing and drainage.

1. What is the minimum separation distance that must be achieved when installing a sewer drain in a trench with an unmarked consumer gas pipe?

- A 150 mm.
- B 300 mm.
- C 400 mm.
- D 550 mm.
- E 600 mm.

2. What is the minimum gradient for a 150 mm diameter drain that is conveying 780 discharge units?

- A 1:20
- B 1:40
- C 1:60
- D 1:80
- E 1:100

3. What is the maximum fixture unit loading for a 100 mm vented drain that has been laid at a gradient of 1.65%?

- A 120
- B 140
- C 165
- D 205
- E 560

4. What is the minimum cover allowed for a uPVC drain that is buried in an area that is subjected to light vehicular traffic?

- A 150 mm.
- B 300 mm.
- C 450 mm.
- D 500 mm.
- E 600 mm.

5. What is the minimum diameter of an inspection shaft installed on a 300 mm drain?

- A 100 mm.
- B 150 mm.
- C 200 mm.
- D 250 mm.
- E 300 mm.

6. What is the recommended grade for the slope on the floor of an inspection chamber towards the channel?

- A 4%.
- B 6%.
- C 8%.
- D 10%.
- E 12%.

7. Where is the length of a branch drain measured from?

- A The near face of the main drain to the weir of the trap.
- B The centre of the main drain to the centre of the waste inlet.
- C The centre of the main drain to the furthest face of the waste inlet.
- D The furthest face of the main drain to the centre of the trap.
- E The near face of the main drain to the connection point of the trap.

8. Which of the following is the correct ratio for a gradient of 0.65%?

A 1:110

B 1:120

C 1:130

D 1:140

E 1:150

9. How many WC pans are permitted to be connected to an 80 mm vented branch drain?

A 1

B 2

C 3

D 4

E 5

10. What is the minimum size of a main drain?

A 65 mm.

B 80 mm.

C 100 mm.

D 150 mm.

E 300 mm.

Total 10 marks

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
Section B		
Total		