

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, JUNE 2016

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 20–21 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 2016 were provided with the following documents:

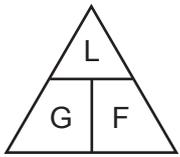
- AS/NZS 3500 Part 2: Sanitary plumbing and drainage

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) Describe THREE situations when a foul water drain must be vented.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Give THREE purposes of a vent on a drain.

- 1 _____
- 2 _____
- 3 _____

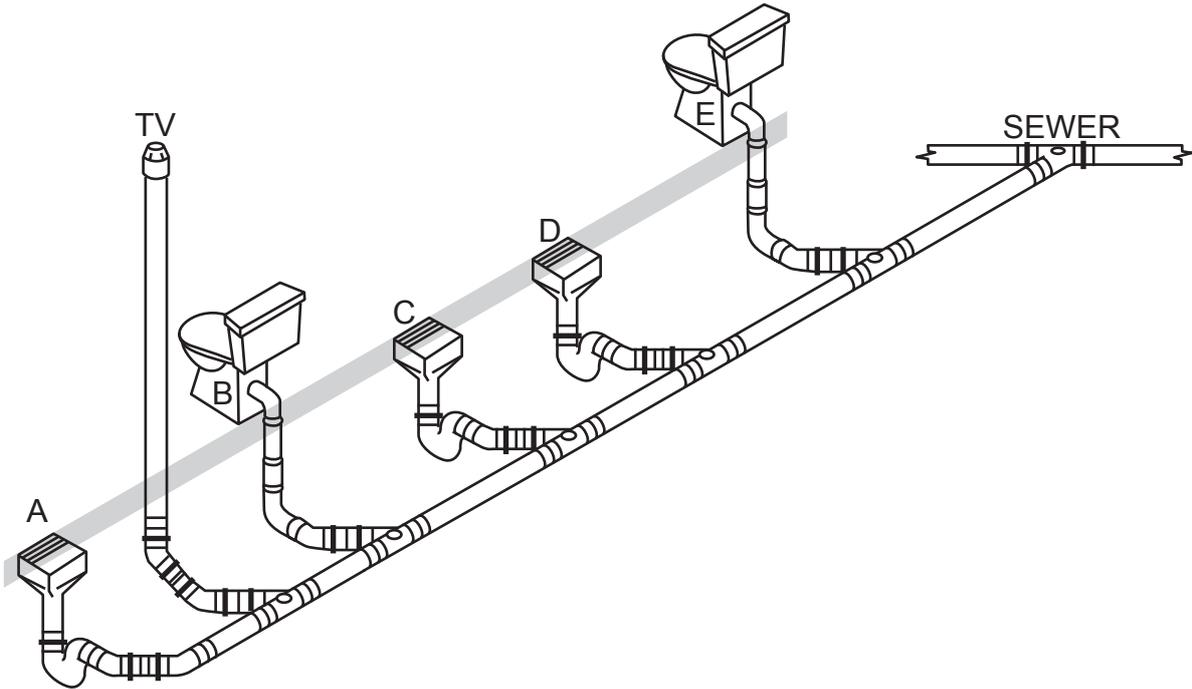
(3 marks)

(c) State why the main vent must be installed downstream of the last fixture on a foul water drain.

(1 mark)

Total 7 marks

QUESTION 2



The drawing above shows the foul water drains for a residential property.

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

(i) Show on the drawing where the blockage is located.

(1 mark)

(ii) Explain how the location of the blockage would be confirmed without excavating the drain or using a camera.

(2 marks)

(b) Give FOUR different likely reasons for the blockage in (a).

1

2

3

4

(4 marks)

QUESTION 2 (cont'd)

(c) Give FOUR factors relating to installations that reduce the risk of blockages in a foul water drain.

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

(4 marks)

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

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(e) Give FOUR actions that should be taken when cleaning and storing equipment that has been used to clear a blocked drain.

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

(4 marks)

(f) Describe why it is important to flush a drain once a drain blockage has been cleared.

(1 mark)

Total 19 marks

QUESTION 3

Give THREE situations where concrete support must be used for a drain as specified by AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

- 1 _____
- 2 _____
- 3 _____

Total 3 marks

QUESTION 4

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

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Name TWO naturally occurring hazardous gases that may be encountered in a trench.

- 1 _____
- 2 _____

(2 marks)

(c) Explain why some gases tend to gather in excavations rather than dissipate into the air.

(1 mark)

(d) State FOUR hazards that can occur when dangerous gases are present.

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

(2 marks)

Total 8 marks

QUESTION 5

(a) (i) Give an example of where a wing wall could be installed.

(1 mark)

(ii) Explain why a wing wall is installed in the location in (i).

(2 marks)

(b) Sketch a cross-sectional view of the wing wall in (a).

(4 marks)

Total 7 marks

QUESTION 6

Notifiable work requirements need to be considered when planning drainlaying work.

List FOUR drainlaying situations when drainlaying work becomes notifiable.

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

Total 4 marks

QUESTION 7

(a) Give the meaning of each of the following terms in relation to an on-site sewage treatment system.

(i) Aerobic

(1 mark)

(ii) Anaerobic

(1 mark)

(b) Give an advantage of including an aeration chamber in an on-site sewage treatment system.

(1 mark)

(c) Give a functional disadvantage of including an aeration chamber in an on-site sewage treatment system.

(1 mark)

(d) Give the purpose of a dosing system that is used with an on-site sewage treatment system.

(1 mark)

QUESTION 7 (cont'd)

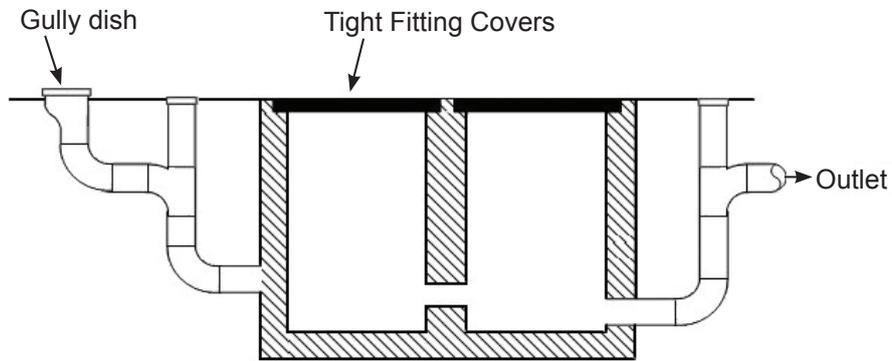
- (e) Sketch and label a diagram showing a multi-chamber on-site sewage treatment and disposal system including an aeration chamber.

(5 marks)

Total 10 marks

QUESTION 8

Name the structure shown in the following diagram, give a situation where it would be required and state its function.



Name _____

Situation _____

Function _____

Total 3 marks

QUESTION 9

(a) A drainlayer is going to enter an access chamber on a surface water drain.

Give FOUR conditions that should be checked before the drainlayer enters the access chamber.

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

(4 marks)

(b) Give TWO safety measures that must be provided for the drainlayer entering the access chamber.

- 1 _____
- 2 _____

(2 marks)

Total 6 marks

QUESTION 11

(a) Calculate the fall for each of the following drainage installations.

(i) Length = 55.75 m Gradient = 1:20

Fall _____

(1 mark)

(ii) Length = 64 m Gradient = 1.65 %

Fall _____

(1 mark)

(b) Calculate the gradient for each of the following drainage installations.

(i) Length = 35 m Fall = 0.68 m

Gradient _____

(1 mark)

(ii) Length = 105 m Fall = 2.42 m

Gradient _____

(1 mark)

Total 4 marks

QUESTION 12

(a) Sketch a cross-sectional view of a reflux valve, showing all the main features.

(4 marks)

(b) The owner of a property is having problems with surface water drain surcharge.

Give a solution to this situation other than using a reflux valve.

(1 mark)

Total 5 marks

QUESTION 13

- (a) AS/NZS 3500 Part 2: Sanitary plumbing and drainage states that all products used in sanitary drainage installations must be selected to ensure satisfactory service for the life of the installation.

Give FOUR factors that may be taken into account in this selection.

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

(4 marks)

- (b) Solvent welding is a common method of jointing uPVC drainage materials.

Explain the principle of this process.

(2 marks)

- (c) An excavator machine has dug a drainage trench deeper than required.

State TWO ways in which the base of the trench can be prepared for laying the drain.

- 1 _____
- 2 _____

(2 marks)

Total 8 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 allowable size of the upstream vent on any branch drain?

- A DN 32
- B DN 40
- C DN 50
- D DN 80
- E DN 100

2. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, what is the minimum allowable clearance between a drain and an unprotected or unmarked electrical or gas supply?

- A 300 mm.
- B 400 mm.
- C 500 mm.
- D 600 mm.
- E 700 mm.

3. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, at which gradient does it become necessary to install anchor blocks around a drain?

- A Greater than 5.0%.
- B Greater than 10.0%.
- C Greater than 15.0%.
- D Greater than 20.0%.
- E Greater than 25.0%.

4. According to New Zealand Building Code Clause G13/AS2 Foul Water, what is the maximum angle permitted between a branch drain junction and a main drain?

- A 15°
- B 22°
- C 45°
- D 60°
- E 88°

5. According to New Zealand Building Code Clause G13/AS2 Foul Water, what is the minimum allowable distance the overflow level of a gully dish must be above an unpaved surface?

- A 25 mm.
- B 50 mm.
- C 75 mm.
- D 100 mm.
- E 125 mm.

6. A 150 mm drain is to be laid in a trench to comply with the New Zealand Building Code Clause G13/AS2 Foul Water.

What is the minimum permitted width of the trench?

- A 250 mm.
- B 300 mm.
- C 350 mm.
- D 400 mm.
- E 450 mm.

7. A foul water drain is to be laid under a concrete floor.

Which New Zealand Building Code Clause, in addition to G13 Foul Water, must the drain comply with?

- A B1 Structure.
- B B2 Durability.
- C E2 External Moisture.
- D G12 Water Supplies.
- E G14 Industrial Liquid Waste.

8. 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.
-

9. What is the purpose of a dewatering system?
- A To separate solid waste from liquid waste during sewerage treatment.
 - B To dilute liquid effluent to maintain a safe level of bacteria.
 - C To use recycled waste for irrigation.
 - D To help effluent transpire through the soil.
 - E To remove ground water before excavation.
-

10. Which of the following requires two people to find a level?
- A Smart level.
 - B Plumb bob.
 - C Dumpy/builder's level.
 - D Spirit level.
 - E Laser level.
-

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		
Section B		
Total		