

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 2014

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 21–25 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 2014 were provided with the following documents:

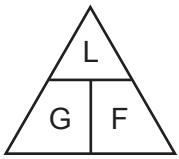
- AS/NZS 3500 Part 2: Sanitary plumbing and drainage
- New Zealand Building Code Clause G13 – Foul water

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

Different tests of drains are carried out for a variety of reasons.

(a) Briefly describe each of the following tests.

(i) A hydrostatic test.

(1 mark)

(ii) A dye test.

(1 mark)

(b) A 600 mm diameter surface water drain is to be tested using an air test.

Give TWO precautions that should be taken when carrying out the test.

1

2

(2 marks)

Total 4 marks

QUESTION 2

(a) Describe the process that occurs in an aerated chamber in a septic tank system.

(3 marks)

(b) Give TWO factors that contribute to stratification/layering in a septic tank.

1

2

(2 marks)

(c) Name the THREE layers or zones that can be found in a septic tank.

1

2

3

(1 mark)

(d) Describe the process of transpiration in relation to an effluent disposal system.

(2 marks)

QUESTION 2 (cont'd)

(e) Give THREE reasons why stormwater should not be disposed of through a septic tank system.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(f) List SIX items that should not be flushed into an on-site sewage treatment system because they would disrupt the bacteria growth within it.

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

(3 marks)

(g) Give a reason why septic tanks are buried in the ground.

- _____
- _____

(1 mark)

Total 15 marks

QUESTION 3

(a) Drainlayers can be exposed to serious infections such as hepatitis and gastroenteritis.

List THREE precautions that should be taken to reduce the risk of such exposures.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Workers are installing a new access chamber.

The benching and channels are to be plastered.

(i) State the hazard that is present when working with the plaster.

(1 mark)

(ii) Give the precaution that should be taken to minimise the hazard in (i).

(1 mark)

Total 5 marks

QUESTION 4

(a) Give THREE advantages of HDPE pipe compared with uPVC pipe.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) The table below lists different types of pipe material.

Complete the table by giving a jointing method that may be used for each pipe material.

Pipe Material	Jointing Method
High Density Polyethylene	
Earthenware	
uPVC	
Copper	

(4 marks)

Total 7 marks

QUESTION 5

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

(i) Length = 63 metres Gradient = 1:20

Fall _____

(1 mark)

(ii) Length = 105 metres Gradient = 10.85%

Fall _____

(1 mark)

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

(i) Length = 22 metres Fall = 0.68 metres

Gradient _____

(1 mark)

(ii) Length = 55 metres Fall = 0.42 metres

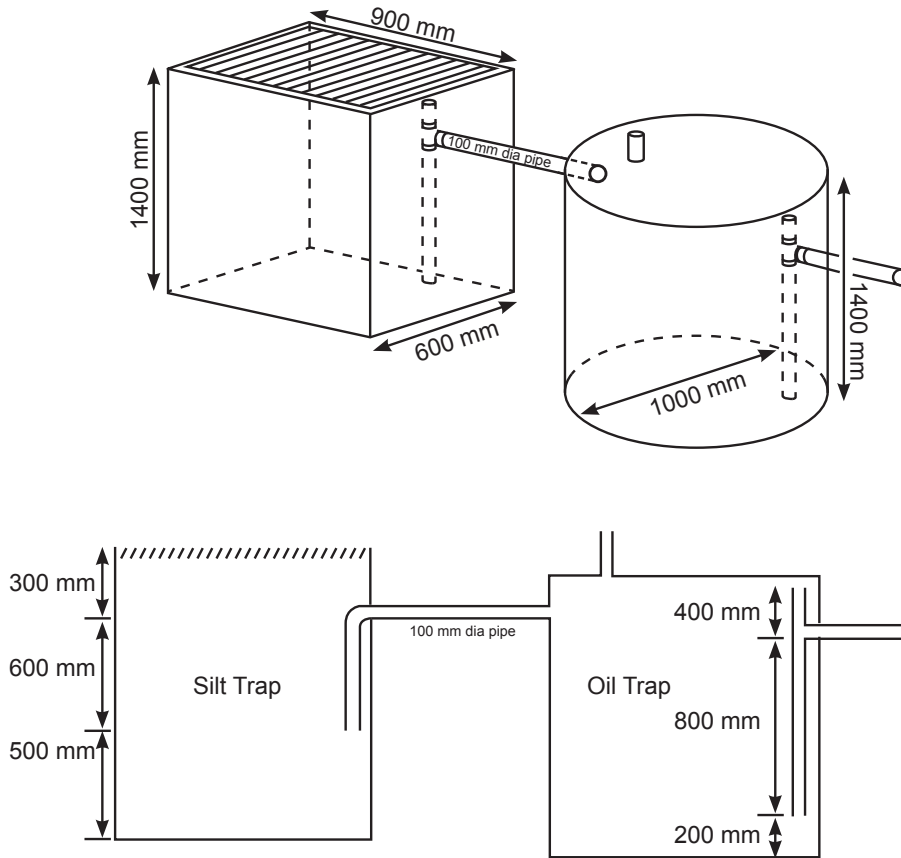
Gradient _____

(1 mark)

Total 4 marks

QUESTION 6

The diagrams below show a silt trap and an oil interceptor trap used for steam cleaning at a car automotive dismantling yard.



(a) Calculate in m^3 the volume of silt that may be trapped, before the silt trap is blocked.

(2 marks)

(b) Calculate in litres the liquid capacity of the oil trap.

(5 marks)

Total 7 marks

QUESTION 7

(a) State what is meant by the term notifiable work.

(1 mark)

(b) State who is to be notified when this type of work is to be performed.

(1 mark)

(c) Give THREE different situations where drainage work is notifiable.

1

2

3

(3 marks)

Total 5 marks

QUESTION 8

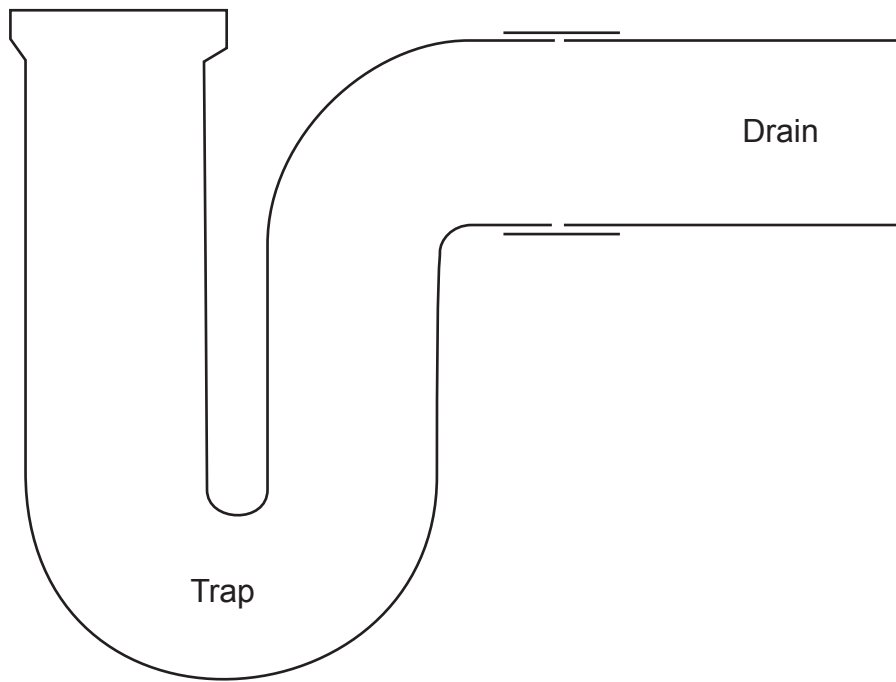
(a) A section of drain is regularly blocking.

Give THREE possible causes of this.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) The diagram below shows a trap connected to a section of drainage pipe.



Label the drawing to show the following:

- weir
- water seal depth
- soffit
- invert.

(4 marks)

Total 7 marks

QUESTION 9

(a) Give THREE hazards that should be avoided when using an electrical extension lead on a building site.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Give TWO devices that reduce the risk of electrocution when using a power tool.

- 1 _____
- 2 _____

(2 marks)

(c) Give FOUR drainlaying tools that can be used to determine the fall of a length of drain.

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

(2 marks)

Total 7 marks

QUESTION 10

Complete the table below by matching the most suitable pump to each situation given. Use each type once.

Pump selection:

- A Centrifugal pump
- B Diaphragm pump
- C Multi-stage centrifugal pump

Situation	Pump selected
Pumping out a trench.	
Pumping effluent to a disposal field.	
Pumping high pressure water for an irrigation system.	

Total 2 marks

QUESTION 11

According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, two 45° bends may be required to attach the stack to a drain at the base of the stack on a multi-storied building.

- (a) Explain how the length of the straight pipe installed between the two 45° bends is determined.

(1 mark)

- (b) Give the minimum length of a straight section of 150 mm diameter pipe to be used in (a).

(1 mark)

- (c) State a situation where an 88° bend may be used at the base of a stack.

(1 mark)

Total 3 marks

QUESTION 12

(a) A drain is to be installed under a building with a concrete slab on the ground floor.

Give THREE installation requirements that must be met according to the New Zealand Building Code clause G13/AS2 Foul Water.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) State the purpose of an access point on a foul water drainage system.

(1 mark)

(c) Give THREE locations where access points must be included in a foul water drainage system to comply with New Zealand Building Code clause G13/AS2 Foul Water.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 7 marks

QUESTION 13

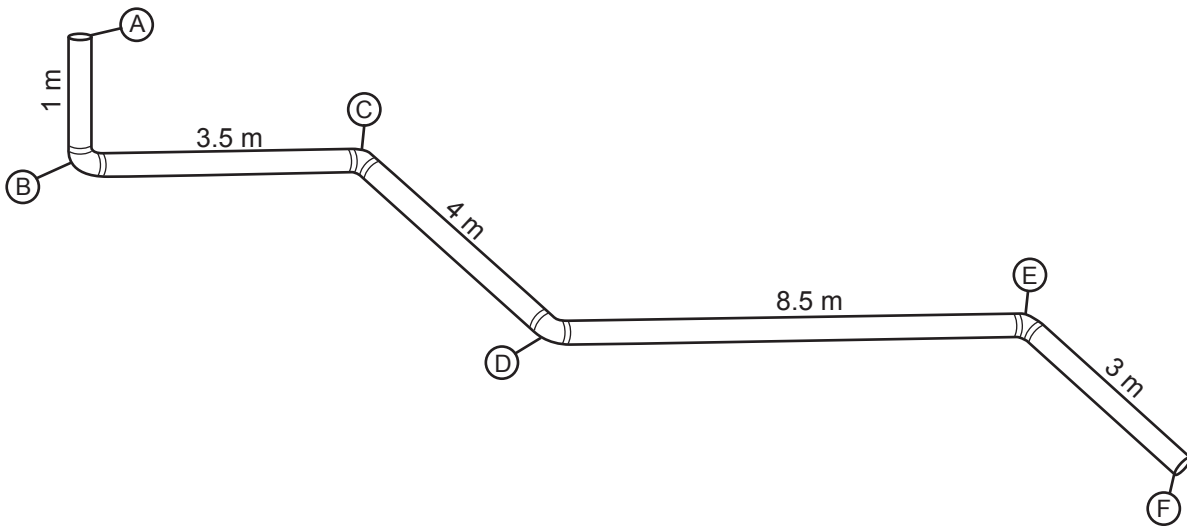
The drawing below shows a newly laid drain on a flat site.

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
C	
D	
E	
F	

Total 8 marks

QUESTION 14

(a) Give an advantage that a dry inspection chamber has over a wet inspection chamber.

(1 mark)

(b) Give an advantage that a wet inspection chamber has over a dry inspection chamber.

(1 mark)

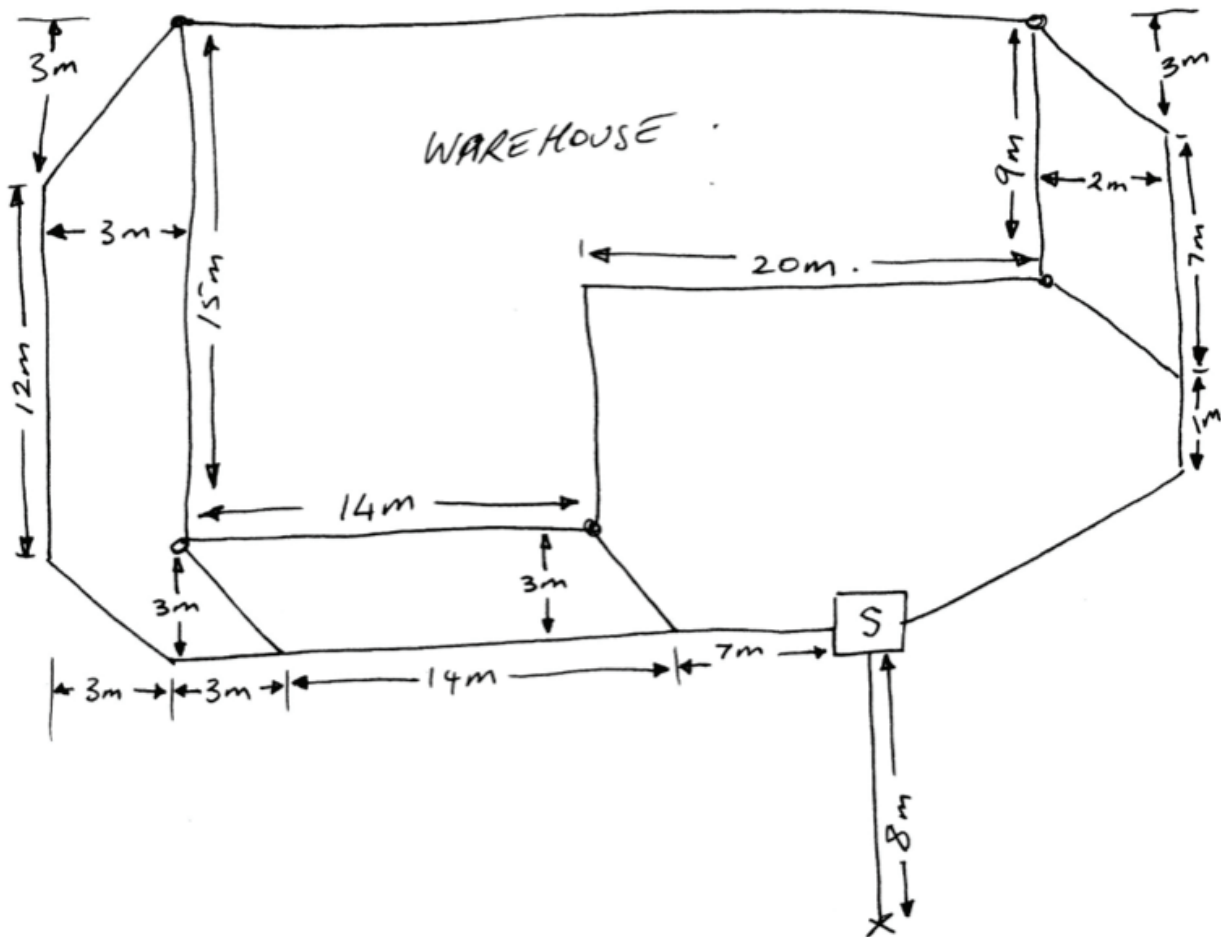
Total 2 marks

QUESTION 15

The sketch below shows a plan view of a surface water system installation.

- The sump is 1 m x 1 m square.
- The Network Utility Operator's (NUO) surface water connection is given as a start point (X).

On the opposite page, draw an as-built plan of the sketch using a scale of 1:200.



Total 7 marks



QUESTION 15 (cont'd)

X NUO surface water connection

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 no mark will be awarded for that question.

1. Which of the following is the correct unit of measure for capacity?

- A Litre.
- B Metre.
- C Square metre.
- D Cubic metre.
- E Kilogram.

2. Why are flexible joints used on a drainage pipe?

- A To allow an easy point for the drain to be disconnected.
- B To allow branches for future connections to be added.
- C To allow for settling of soil around the drain.
- D To be able to adjust the angle of a drain during installation.
- E To be able to connect two different drainage pipe materials.

3. What is a dewatering system?

- A A system that separates solid waste from liquid waste during sewage treatment.
- B A system that removes ground water before excavation.
- C A system that uses recycled waste for irrigation.
- D A system that helps effluent transpire through the soil.
- E A system that dilutes liquid effluent to maintain a safe level of bacteria.

4. What is the maximum allowable angle for a junction that connects one drain to another?

A 11.5°

B 15°

C 22°

D 45°

E 60°

5. What is the maximum number of discharge units permitted to be conveyed by a 100 mm pipe laid at a gradient of 1:40?

A 61

B 205

C 215

D 255

E 515

6. Why is there a restricted zone at the base of a discharge stack?

A To prevent trap seal loss due to compression.

B To prevent trap seal loss due to oscillation.

C To prevent blockages in the drain.

D To prevent blockages in the discharge stack.

E To prevent blockages in the drain and discharge stack.

7. According to New Zealand Building Code clause G13/AS2 Foul Water, what is the minimum diameter of a circular inspection chamber to suit a 150 mm diameter drain?

A 400 mm

B 450 mm

C 500 mm

D 600 mm

E 650 mm

8. According to New Zealand Building Code clause G13/AS2 Foul Water, when constructing a circular inspection chamber what distance should the corbel extend beyond each side of the chamber?

- A 150 mm
- B 200 mm
- C 250 mm
- D 300 mm
- E 350 mm

9. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, what is the maximum distance allowed between anchor blocks installed on an inclined drain.

- A 2.500 m
- B 3.000 m
- C 3.500 m
- D 4.000 m
- E 4.500 m

10. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, what is the minimum permitted height between the top of an overflow gully riser and the lowest fixture connected to the drain?

- A 100 mm
- B 150 mm
- C 250 mm
- D 300 mm
- E 400 mm

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		
Section B		
Total		