

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 2015

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 24–25 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 June 2015 were provided with the following documents:

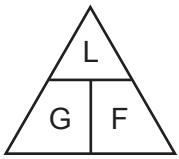
- New Zealand Building Code Clause G13 – Foul Water
- AS/NZS 3500 Part 2: Sanitary plumbing and drainage

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 THREE examples of unstable soil.

1 _____

2 _____

3 _____

(3 marks)

(b) Describe what expansive clay is.

(2 marks)

Total 5 marks

QUESTION 2

Describe each of the following terms in relation to a surface water system.

(a) Displacement system/charge system.

(1 mark)

(b) Non-displacement system/gravity system.

(1 mark)

(c) Secondary flow path.

(1 mark)

Total 3 marks

QUESTION 3

- (a) Describe the detrimental effect high-velocity flow can have on a surface water drainage system.

(1 mark)

- (b) Explain why this effect occurs more in surface water drainage systems than other water pipework.

(1 mark)

Total 2 marks

QUESTION 4

Water has to be supplied by truck or trailer to test a drain of 100 mm diameter and 50 m developed length.

A 10% allowance is to be provided for spillage and losses.

Calculate, in m³, the volume of water required, and its weight in kg.

Total 5 marks

QUESTION 5

List FOUR points of reference which are often included on a site plan.

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

Total 4 marks

QUESTION 6

(a) Give TWO accidents that could occur while carrying out drainlaying work where resuscitation (rescue breathing) may be required.

1 _____

2 _____

(1 mark)

(b) Describe the safety precaution that must be taken prior to commencing resuscitation (rescue breathing).

(1 mark)

(c) Give FOUR hazards that may affect breathing when laying drains or excavating.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(d) List FOUR items of safety equipment other than personal protection equipment that may be required in a drainage excavation.

1 _____

2 _____

3 _____

4 _____

(4 marks)

QUESTION 6 (cont'd)

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

State how this hazard can be minimised.

(1 mark)

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

Give TWO precautions that should be taken to safeguard workers.

(2 marks)

- (g) List THREE precautions that should be undertaken to ensure people do not fall into an open excavation during the hours of darkness.

1

2

3

(3 marks)

Total 14 marks

QUESTION 7

(a) Explain the term 'compaction rate' (compaction factor).

(2 marks)

(b) Explain the term 'long-term acceptance rate'.

(1 mark)

(c) Name the test that is performed to check the acceptance rate.

(1 mark)

(d) Give the purpose for finding long-term acceptance rate.

(1 mark)

(e) Give TWO reasons why mud tanks and sumps are fitted with traps.

1

2

(2 marks)

Total 7 marks

QUESTION 8

(a) A new installation is to have a trade waste product pump installed.

List THREE conditions regarding the waste product that should be considered in selecting the type of pump.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Give TWO systems that are designed to activate if a foul water pump were to fail to operate.

- 1 _____
- 2 _____

(2 marks)

Total 5 marks

QUESTION 9

All drains should be subjected to a visual inspection before other tests are done.

Give FOUR aspects that can be checked during the visual inspection.

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

Total 4 marks

QUESTION 10

Concrete can be mixed on site or supplied to site ready mixed.

(a) Give TWO ways in which the grade/strength of concrete can be increased.

1 _____

2 _____

(1 mark)

(b) State what is meant by 'certified concrete'.

(1 mark)

Total 2 marks

QUESTION 11

Complete the table below.

Gradient	Gradient as %	Fall in mm per m
1 in 80		12.5
	1.65	16.5
1 in 120	0.83	
1 in 200		5

Total 4 marks

QUESTION 12

(a) State the purpose of a neutralizing trap/system.

(2 marks)

(b) Give THREE examples of industrial processes where a neutralizing trap would be required.

1

2

3

(3 marks)

Total 5 marks

QUESTION 13

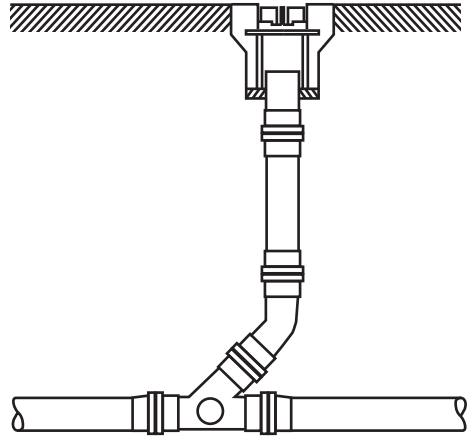
Name the structure shown in each of the following diagrams, give a situation where it would be required and state its function.

(a)

Name _____

Situation _____

Function _____



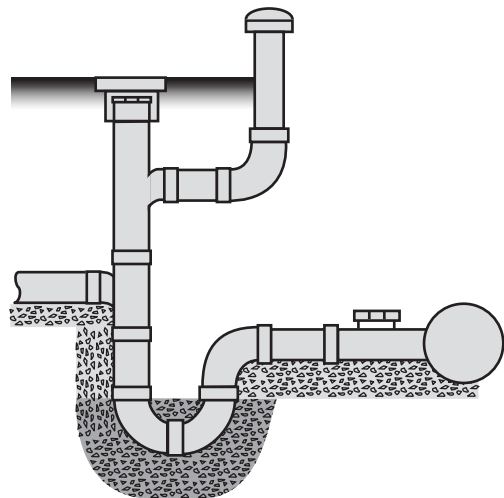
(3 marks)

(b)

Name _____

Situation _____

Function _____



(3 marks)

Total 6 marks

QUESTION 14

During the course of any work, extraneous matter must be prevented from entering a foul water drain.

List THREE different types of extraneous matter.

1 _____

2 _____

3 _____

Total 3 marks

QUESTION 15

State THREE acceptable methods for soundness testing a surface water drain before backfilling is carried out.

- 1 _____
- 2 _____
- 3 _____

Total 3 marks

QUESTION 16

Give the meaning of each of the following terms.

(a) Grey water.

(1 mark)

(b) Black water.

(1 mark)

(c) Potable water.

(1 mark)

(d) Surface water.

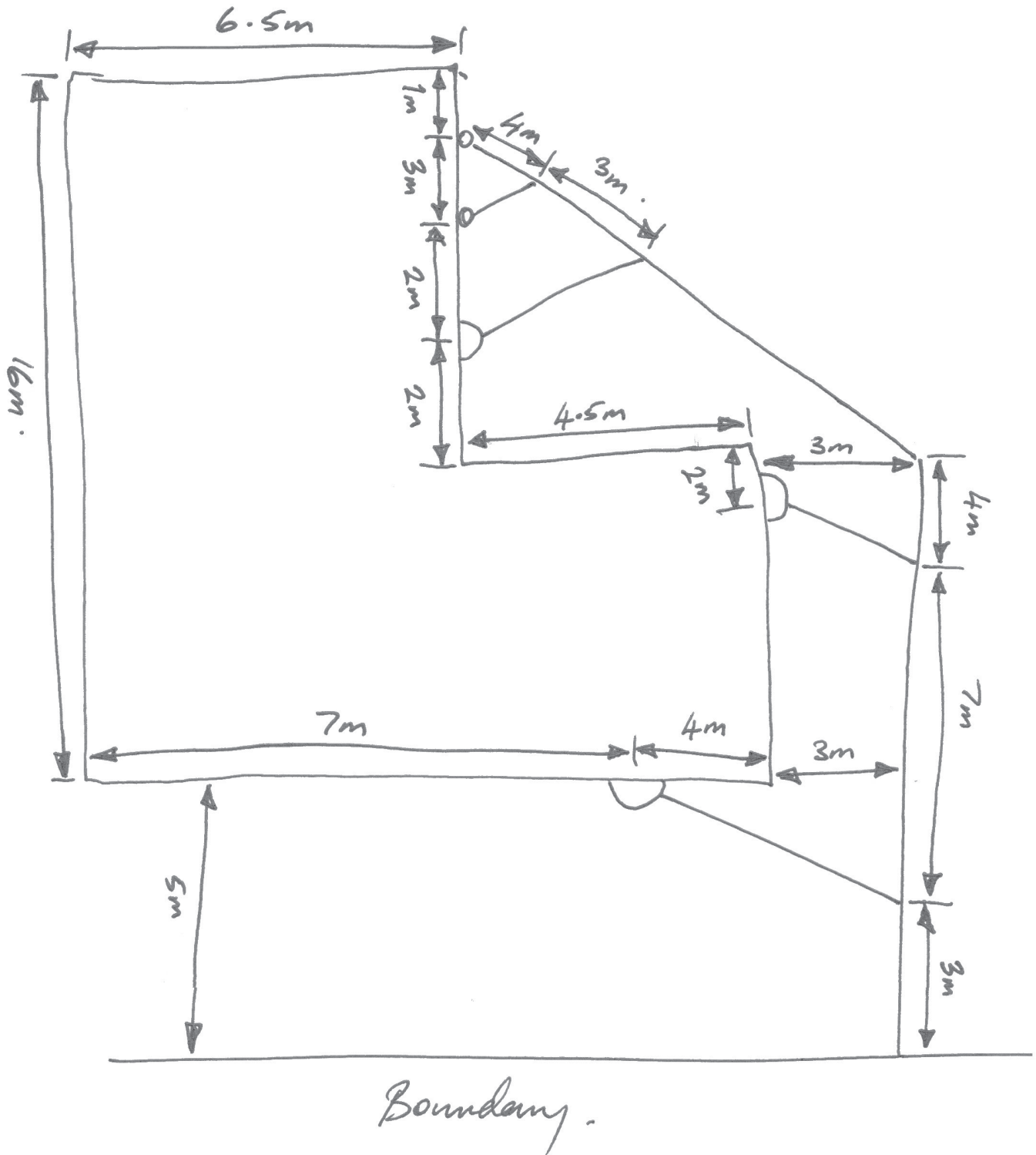
(1 mark)

Total 4 marks

QUESTION 17

The sketch below shows the foul water drain for a residential home.

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



Total 7 marks



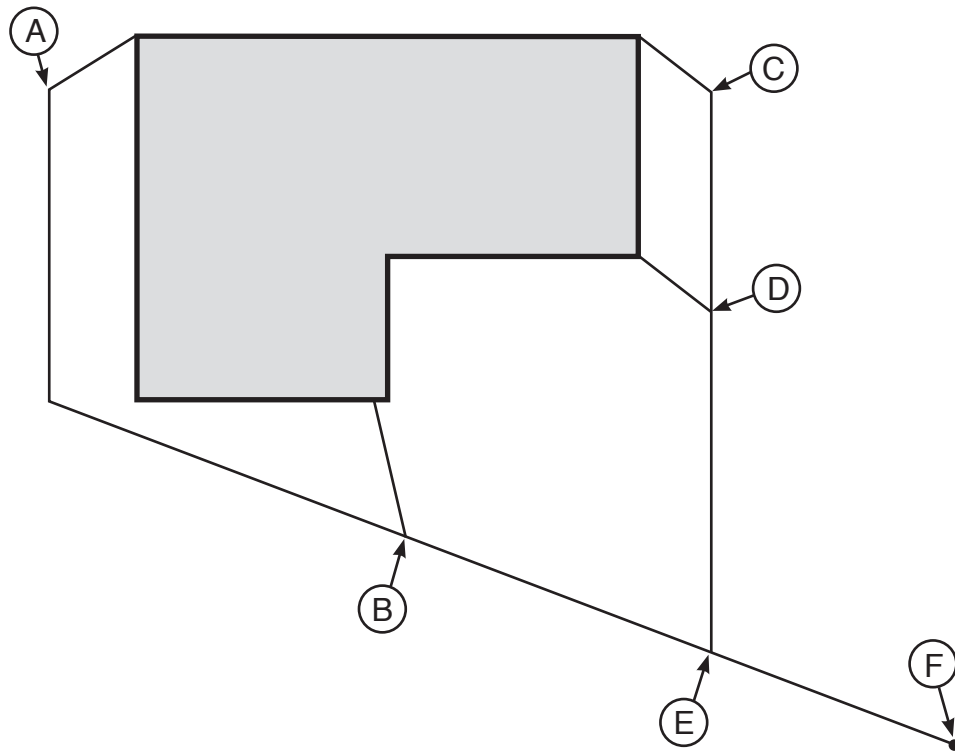
QUESTION 18

The drawing below shows an as-built plan of a drainage system.

The drawing is at a scale of 1:200

All pipework is installed at a gradient of 1:80

The lowest point is F.



Complete the table below giving the length of each section of pipe and the fall in mm for each section of pipe.

Section	Total length of the section (m)	Total fall of the section (mm)
A - B		
B - E		
C - D		
D - E		
E - F		
A - F		
C - F		

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.

Note that should your choice of answer be unclear no mark will be awarded for that question.

1. What is a dewatering system?

- A A system that separates solid waste from liquid waste during sewerage 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.

2. 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 New Zealand.
- D The Skills Organisation.
- E The Department of Building and Housing.

3. 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.

4. What is the purpose of using flexible joints on a drainage pipe?
- A To allow branches for future connections to be added.
 - B To provide an easy point for the drain to be disconnected.
 - C To allow for settling of soil around the drain.
 - D To adjust the angle of a drain during installation.
 - E To allow two different drainage pipe materials to be jointed.

5. At what length does a branch drain require a vent when it is being installed so that it is compliant with New Zealand Building Code clause G13/AS2 Foul Water?
- A 2.5 m.
 - B 5.0 m.
 - C 7.5 m.
 - D 10.0 m.
 - E 15.0 m.

6. A trench is to be dug in line with the footings of a building.
The trench is expected to be open for 36 hours.
The trench will be 1.5 metres deeper than the footings.
How far away from the base of the footings must the trench be?

- A 0.5 m.
- B 1.0 m.
- C 1.5 m.
- D 2.0 m.
- E 2.5 m.

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

8. Where should solvent cement be applied when joining uPVC pipe?

- A Only on the inside of the socket.
- B Only on the inside of the spigot only.
- C Only on the outside of the spigot.
- D On the outside of the spigot and the inside of the socket.
- E On the outside of the socket and the inside of the spigot.

9. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, which of the following gives the minimum depth of cover for uPVC piping buried in an area subject to vehicular traffic?

- A 300 mm.
- B 450 mm.
- C 500 mm.
- D 600 mm.
- E 650 mm.

10. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, where an anchor block is required on a DN150 drain, reinforcing rods must be used and bent to a radius greater than which of the following?

- A 100 mm.
- B 150 mm.
- C 200 mm.
- D 250 mm.
- E 300 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		
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18		
Section B		
Total		