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 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 18–21 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 November 2016 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) State who is responsible for giving permission to work on a drain.

_____

(1 mark)

(b) Give the meaning of the term ‘drain in common’.

_____

(1 mark)

(c) Give an example of drainlaying work that is subject to the Resource Management Act.

_____

(1 mark)

(d) Complete the table below by writing Y if the activity is restricted drainlaying work or N if the activity is not restricted drainlaying work.

Situation	Restricted drainlaying work Y / N
Plunging a gully trap	
Connecting a surface water sump to a surface water drain	
Installing a subsoil drain	
Installing an effluent disposal field	
Renewing a damaged gully trap	
Working on a foul water sewer	

(3 marks)

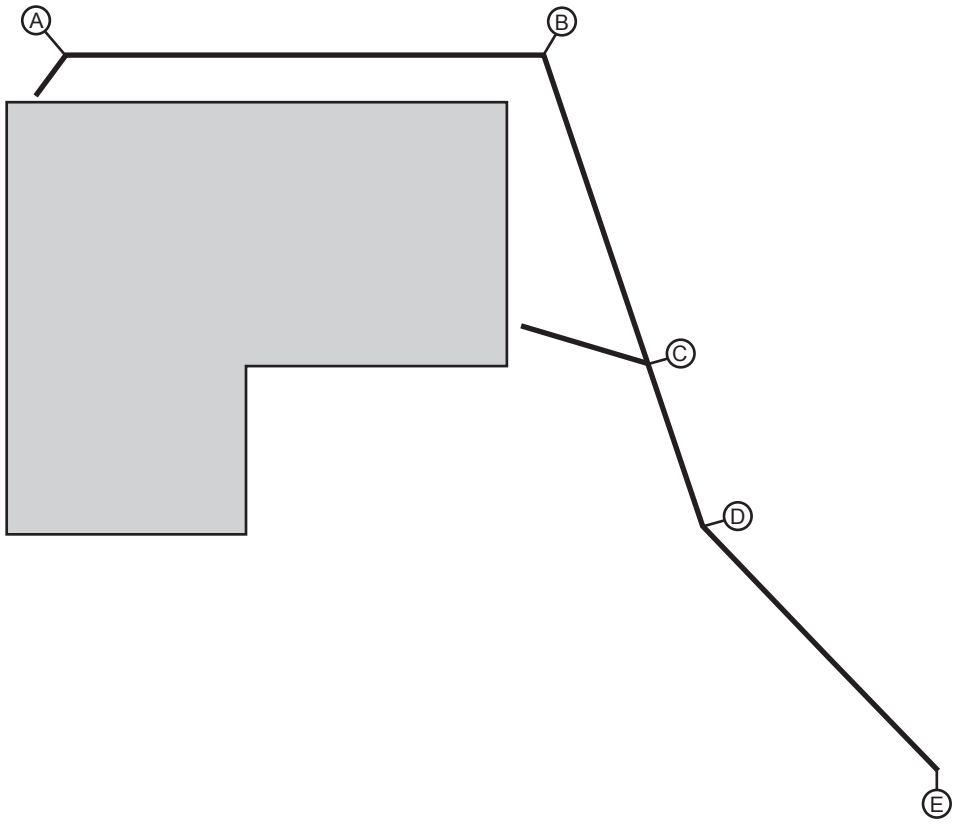
Total 6 marks

QUESTION 2

The diagram below shows a plan view of a house and surface water drainage system.

The diagram is drawn to a scale of 1:200

The drain shown is to be installed at a gradient of 2.5%.



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

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

Total 6 marks

QUESTION 3

(a) State what can be installed at the inlet to a culvert to help prevent blockages.

_____

(1 mark)

(b) Describe how the answer to (a) should be positioned.

_____

(1 mark)

(c) Explain how the positioning in (b) assists in preventing blockages.

_____

(1 mark)

(d) State TWO pieces of information that are needed on a plan provided by a Territorial Authority when requesting information regarding a sewer connection.

1 _____

2 _____

(2 marks)

(e) Give THREE tests for soundness for a surface water drain.

1 _____

2 _____

3 _____

(3 marks)

Total 8 marks

QUESTION 4

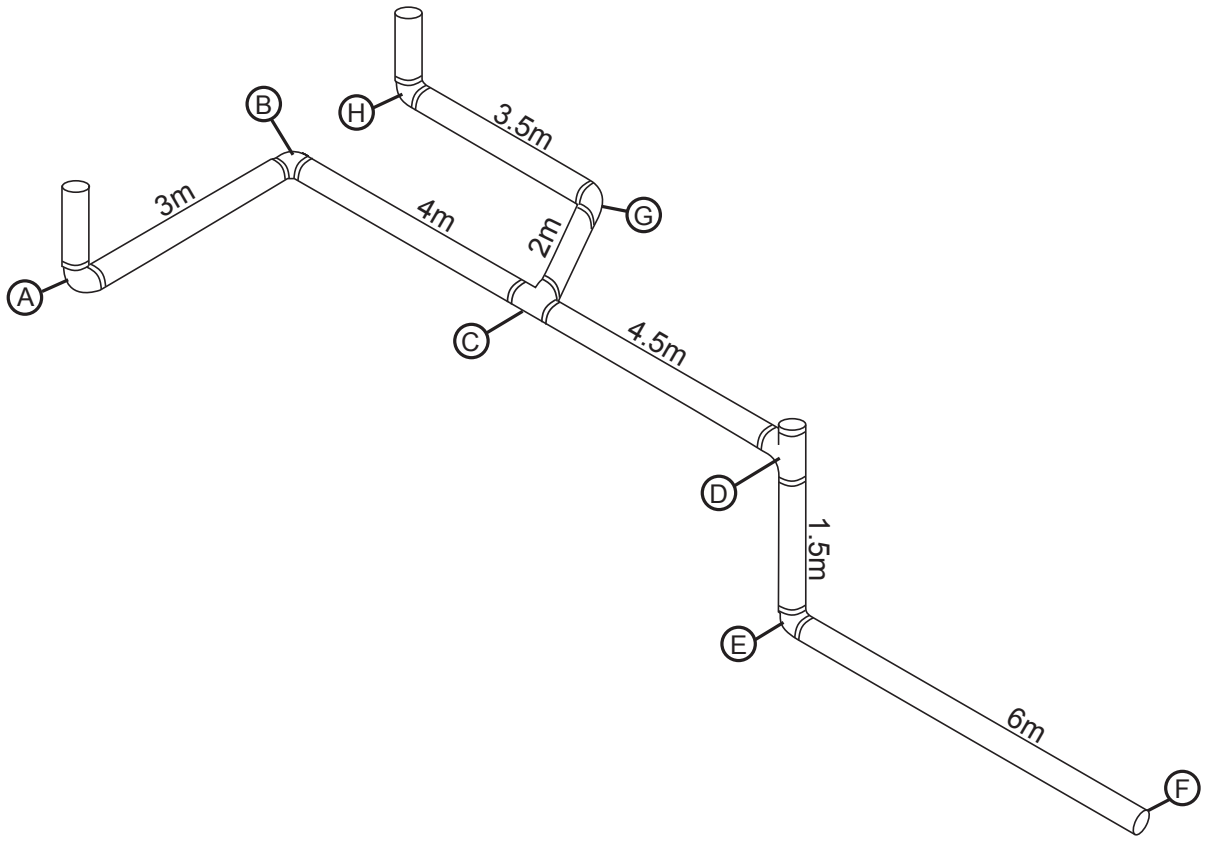
The drawing below shows a newly-laid drain, which has been laid on a level site.

The drain at point A is 700 mm below ground level.

Section D – E of the drain is vertical.

The remaining sections of the drain have been laid at a gradient of 1:60

Complete the following tables to show the fall for each section and the depth below the ground level for the excavation at points indicated.



Section	Fall
A – B	
B – C	
C – D	
D – E	
E – F	
C – G	
G – H	

Point	Depth
B	
C	
D	
E	
F	
G	
H	

Total 10 marks

QUESTION 5

(a) AS/NZS 3500 Part 2 Sanitary plumbing and drainage gives factors that must be considered when installing overflow relief gullies.

Give FOUR of these factors.

1 _____

2 _____

3 _____

4 _____

(4 marks)

(b) Give THREE ways of changing the gradient of a drain.

1 _____

2 _____

3 _____

(3 marks)

(c) Give THREE situations when a foul water drain requires a vent.

1 _____

2 _____

3 _____

(3 marks)

Total 10 marks

QUESTION 6

(a) Give THREE different methods of preventing trench collapse.

1 _____

2 _____

3 _____

(3 marks)

(b) Asbestos may be either friable or non-friable.

Give the meaning of each term.

Friable: _____

Non-friable: _____

(2 marks)

Total 5 marks

QUESTION 7

State THREE responsibilities of a licensed drainlayer with respect to his or her licence.

1 _____

_____

2 _____

_____

3 _____

_____

Total 3 marks

QUESTION 8

According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, two 45º bends may be required to connect a discharge 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 45º 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)

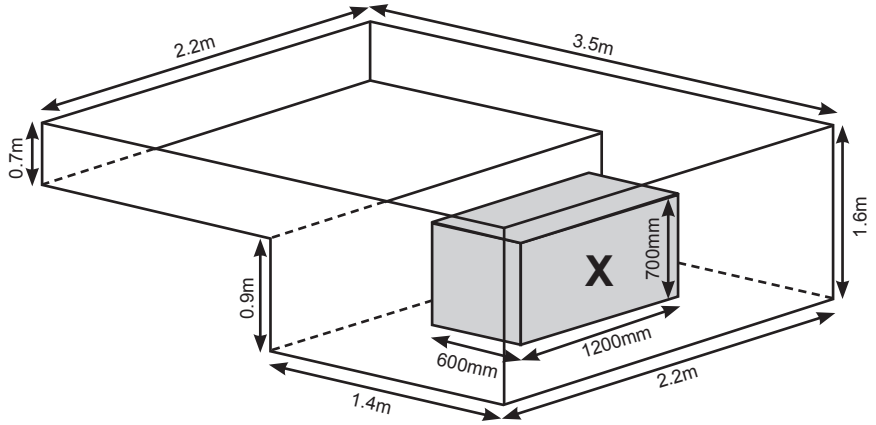
(c) State a situation where an 88º bend may be used at the base of a stack.

(1 mark)

Total 3 marks

QUESTION 9

The diagram below shows an excavation for a septic tank.



Calculate in cubic metres the volume of material required to back-fill the excavation.

Total 5 marks

QUESTION 10

(a) Draw a sketch of a septic tank, and label its components.

(5 marks)

(b) On your drawing in (a), show the layers of the tank contents, and name each layer.

(3 marks)

(c) Describe the following terms in relation to drainlaying.

(i) Evaporation

(2 marks)

(ii) Transpiration

(2 marks)

(iii) Percolation

(2 marks)

Total 14 marks

QUESTION 11

(a) List SIX gases that can be encountered while drainlaying that may be harmful.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(3 marks) ☐

(b) State TWO ways in which a gas may be harmful.

1 _____

2 _____

(1 mark) ☐

(c) Sewage contains micro-organisms that can be harmful if they were to enter a person's body.

List FOUR ways that micro-organisms present in sewage can enter the body.

1 _____

2 _____

3 _____

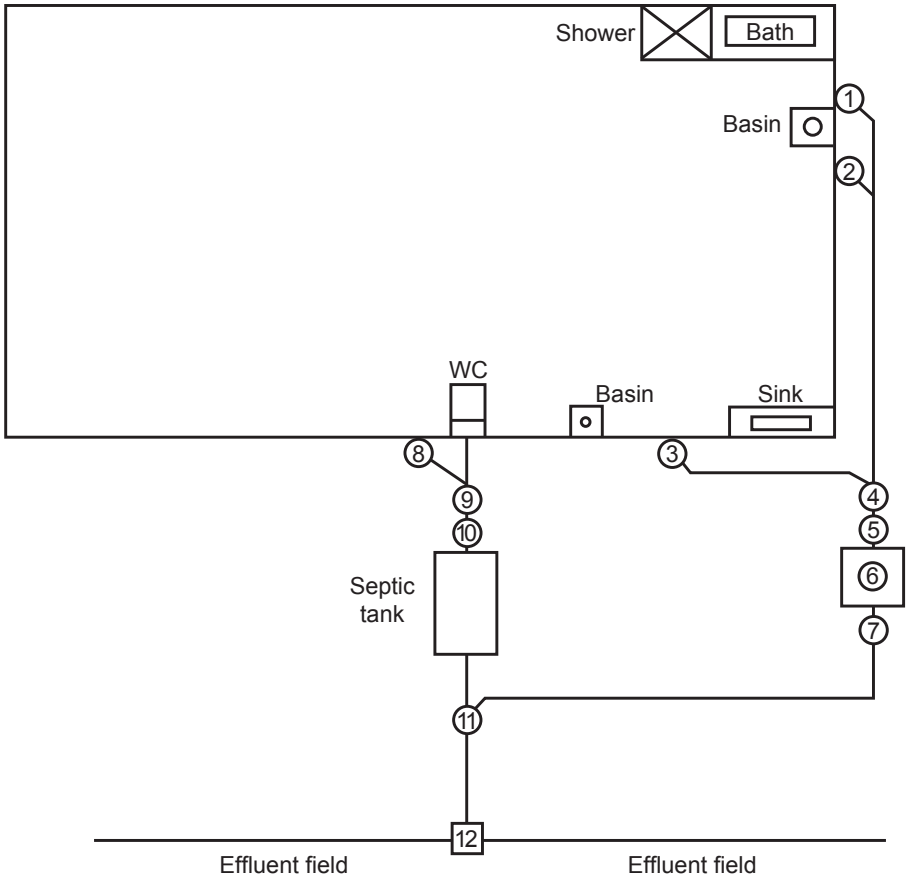
4 _____

(2 marks) ☐

Total 6 marks ☐

QUESTION 12

The drawing below shows the drainage plan for a dwelling.



Complete the table below by identifying each of the components numbered 1 – 12.

No.	Component	No.	Component
1		**7**	
2		**8**	
3		**9**	
4		**10**	
5		**11**	
6		**12**	

Total 6 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 _____

_____

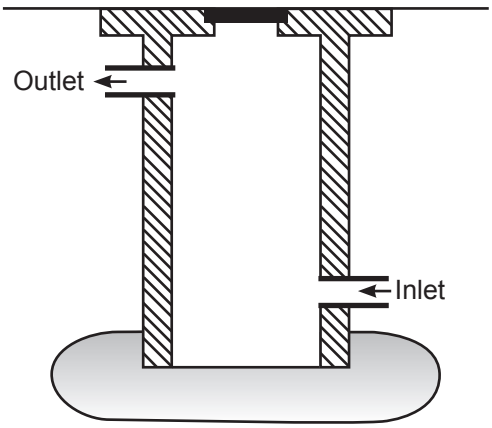
Situation _____

_____

Function _____

_____

_____



(3 marks)

(b) Name _____

_____

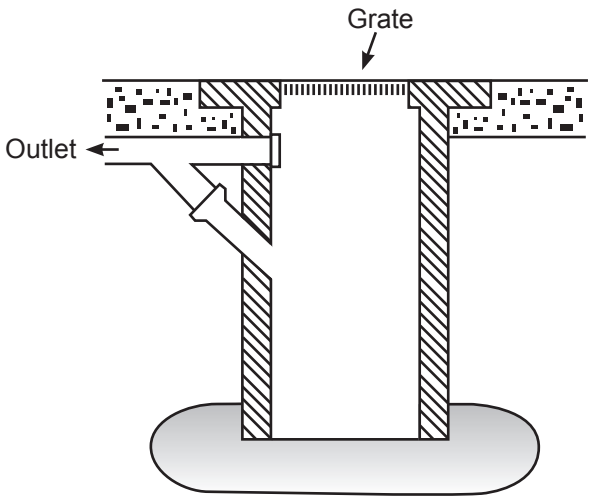
Situation _____

_____

Function _____

_____

_____



(3 marks)

Total 6 marks

QUESTION 14

A drainlayer has exposed an unlabelled yellow pipe and an unlabelled blue pipe while excavating.

Name the services that are most likely to be contained in each pipe.

Yellow: _____

Blue: _____

Total 2 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. 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°

   ☐

2. Why is there a restricted zone where a discharge stack joins the main drain?

   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.

   ☐

3. 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.

   ☐

4. 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.

☐

5. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, what is a steep grade defined as?

A Between 20% and vertical.

B Between 30% and vertical.

C Between 45% and vertical.

D Between 60% and vertical.

E Between 65% and vertical.

☐

6. 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 150 mm pipe laid at a gradient of 1:60?

A 104

B 515

C 611

D 1310

E 2920

☐

7. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, when two drains at grade are to be joined by means of a 45° unequal junction, the invert of the branch drain must meet which of the following requirements?

A Level with the soffit of the drain to which it connects.

B 25 mm lower than the soffit of the drain to which it connects.

C 10 mm higher than the soffit of the drain to which it connects.

D 50 mm higher than the soffit of the drain to which it connects.

E 10 mm higher than the invert of the drain to which it connects.

☐

8. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, where more than one jump-up is installed in a circular inspection chamber, what is the minimum allowable chamber diameter?

A 600 mm.

B 800 mm.

C 900 mm.

D 1200 mm.

E 1500 mm.

☐

9. A trench is to be excavated to a depth of 1.5 metres.

When would the excavation become notifiable work?

A When the trench crosses a public access route.

B When the trench is 1.0 metres wide.

C When the trench is in type B (saturated) soil.

D When the trench will be open for more than 48 hours.

E When the trench is being excavated with large machinery.

☐

10. What is the minimum diameter for a main drain vent as specified in the New Zealand Building Code clause G13/AS2 Foul Water.

A 40 mm.

B 50 mm.

C 65 mm.

D 80 mm.

E 100 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		
Section B		
Total		