No. 9197

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 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 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 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

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

1 _____

2 _____

3 _____

(3 marks) ☐

(b) Describe the THREE situations when a foul water drain requires ventilating.

1 _____

2 _____

3 _____

(3 marks) ☐

(c) The minimum grade cannot be obtained for a foul water drain.

Give TWO methods of overcoming this situation.

_____

_____

(2 marks) ☐

Total 8 marks ☐

QUESTION 2

(a)   Describe why antibiotics should not be flushed into a septic tank.

_____

_____

_____

(1 mark)

(b)   List FOUR factors that may shorten the life of an effluent field.

1   _____

2   _____

3   _____

4   _____

(2 marks)

(c)   List TWO devices that can extend the life of an effluent field.

1   _____

2   _____

(2 marks)

Total 5 marks

QUESTION 3

Complete the table below showing the gradients as a percentage and in mm per m (millimetres per metre).

Vented Drain Diameter	Ratio (gradient)	Gradient in %	mm per m
DN 150	1 in 60		
DN 65	1 in 80		
DN 100	1 in 30		
DN 300	1 in 120		

Total 4 marks

QUESTION 4

A trench is to be dug adjacent to the foundation of a building.

The trench will be open for longer than 48 hrs.

The bottom of the trench will be 450 mm below the underside of the building foundation.

(a) State the minimum horizontal separation between the trench and the building foundation.

_____

_____

(2 marks)

(b) Give a factor which would allow for the minimum separation in (a) to be reduced.
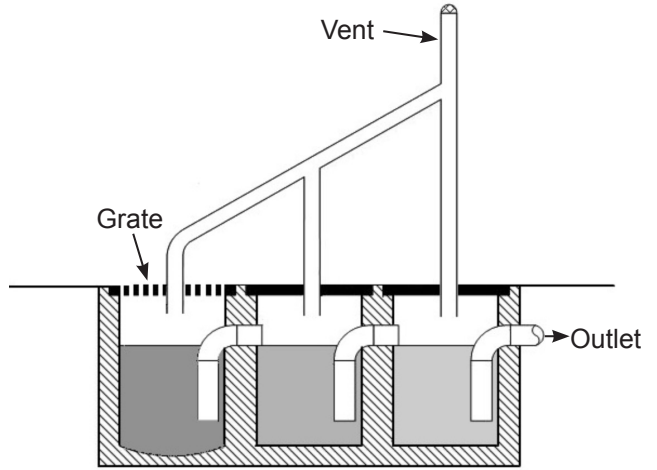
_____

(1 mark)

Total 3 marks

QUESTION 5

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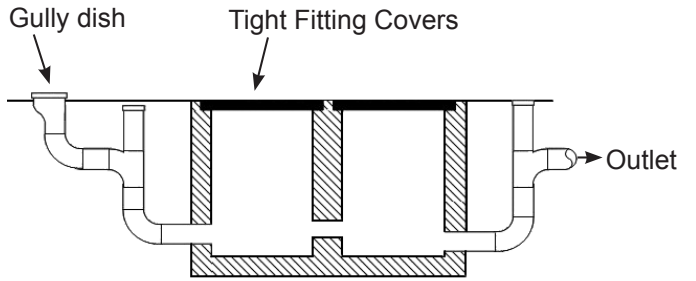
(a)

Name _____

_____

Situation _____

_____

Function _____

_____

_____

Vent

Grate

Outlet

(3 marks)

(b)

Name _____

_____

Situation _____

_____

Function _____

_____

_____

Gully dish   Tight Fitting Covers

Outlet

(3 marks)

(c)

Name _____

_____

Situation _____

_____

Function _____

_____

_____

1000 mm
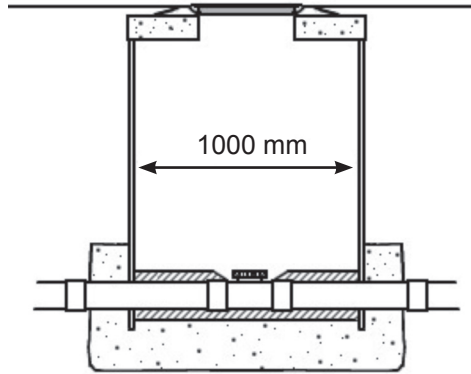
(3 marks) ☐

(d)

Name _____

_____

Situation _____

_____

Function _____

_____

_____

450 mm
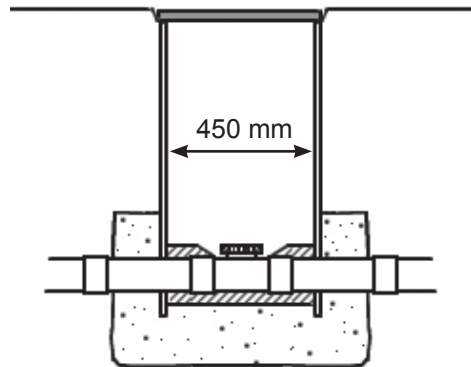
(3 marks) ☐

Total 12 marks ☐

QUESTION 6

(a)   Sketch and label a plan and elevation of an outfall wing-wall.

(5 marks)

(b)   Explain how the velocity of the water at the outfall of a wing-wall could be reduced.

_____

_____

(1 mark)

Total 6 marks

QUESTION 7

The diagram below shows a plan view indicating the position of a drain.
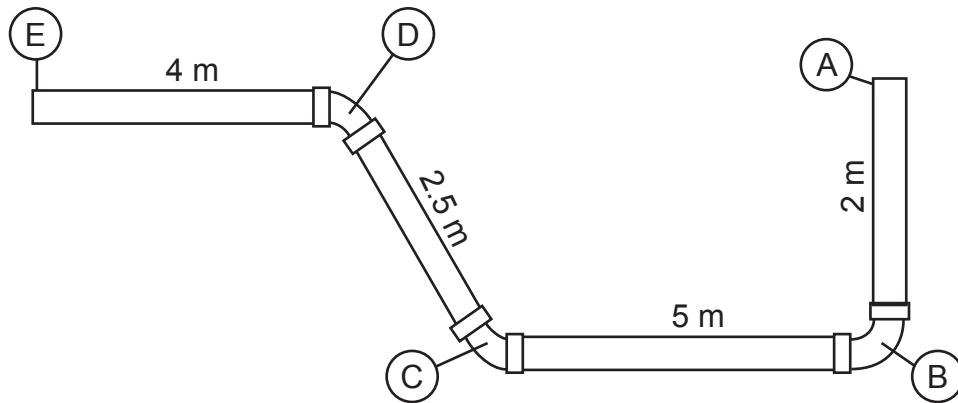
The drain invert at point A is 400 mm below the datum.

The drain has been laid at a gradient of 1 in 80 (1.25%).

Complete the following table to show the fall between each change of direction and the depth below the datum for the excavation at points B, C, D and E.

Point	Fall	Depth
A	0 mm	400 mm
B	25 mm	425 mm
C	62.5 mm	487.5 mm
D	31.25 mm	518.75 mm
E	50 mm	568.75 mm

Total 8 marks

QUESTION 8

Give EIGHT situations that require concrete support to be used for a drain.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

Total 4 marks

QUESTION 9

(a) Give the meaning of aerobic in relation to on-site sewage treatment systems.

_____

(1 mark)

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

_____

(1 mark)

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

_____

(1 mark)

Total 3 marks

QUESTION 10

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

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

Network Stormwater Sewer

4m

6·5m

8m

6·5m

5m

12m

7m

4m

9m

2m

Total 7 marks

QUESTION 11

(a) Describe geotextile material (filter cloth), and give a situation where it is required.

_____

_____

_____

(2 marks)

(b) According to the New Zealand Building Code Clause G13 Foul Water, state the maximum distance permitted between the top of a gully dish and the top of the water seal.

_____

(1 mark)

(c) Give the reason for the maximum measurement in (b).

_____

(1 mark)

Total 4 marks

QUESTION 12

(a)   A 50 m long x 100 mm diameter foul water drain is to be tested for leakage.

Complete the tables below by naming TWO types of tests used to ensure the water tightness of the drain, and for each type of test giving the minimum pressure for the test and the minimum time required for the test.

Type of test	
Minimum test pressure	
Minimum test time	

Type of test	
Minimum test pressure	
Minimum test time	

(6 marks)

(b)   Give TWO conditions that can adversely affect the results of a leakage test.

1   _____

2   _____

(2 marks)

Total 8 marks

QUESTION 13

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

1 _____

2 _____

(1 mark)

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

_____

_____

(1 mark)

(c) Give a method of preventing hazardous gases from gathering in an excavation.

_____

_____

(1 mark)

(d) If there is a likelihood of air contamination in an excavation, state when the air quality will require testing.

_____

_____

(1 mark)

Total 4 marks

QUESTION 14

(a) List FOUR devices that may be used to ensure a drain that is being laid in a trench has the correct gradient.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(b) Complete the table below by giving TWO ways in which the safe condition of an excavation could deteriorate overnight and giving a cause for each.

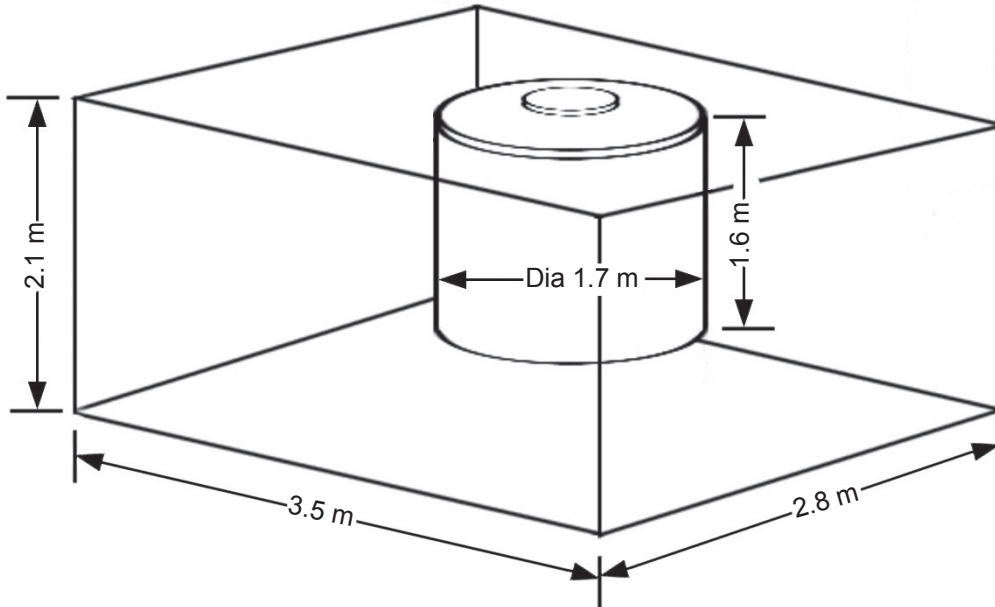| Way	Cause

(2 marks)

Total 4 marks

QUESTION 15

Calculate in m³ the total volume of material required to fill the excavation for the tank shown below. Allow a 20% compaction rate.

Formula: Volume of cylinder = 0.7854 × D × D × H

_____

_____

_____

_____

_____

Total 5 marks

QUESTION 16

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

List FIVE drainlaying situations when drainlaying work becomes notifiable.

1 _____

2 _____

3 _____

4 _____

5 _____

Total 5 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.

1. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, which of the following shows the normal minimum grade of a 125 mm drain?

   A   0.12%.

   B   1.25%.

   C   1.65%.

   D   1.50%.

   E   2.50%.

2. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, above what grade are anchor blocks required when a drain is being installed?

   A   20%.

   B   25%.

   C   30%.

   D   45%.

   E   60%.

3. According to New Zealand Building Code Clause G13/AS2 Foul Water, what is the maximum distance that a gully dish that discharges into a grease trap should be from the grease trap?

   A   1 m.

   B   1.2 m.

   C   1.8 m.

   D   2.4 m.

   E   3 m.

4. According to New Zealand Building Code Clause G13/AS2 Foul Water, no access point is required at the junction of a branch drain where it joins to another drain if the branch drain only serves a gully trap, and is less than which of the following lengths?

    A   2 m.

    B   2.4 m.

    C   3 m.

    D   6 m.

    E   10 m.

5. According to New Zealand Building Code Clause G13/AS2 Foul Water, an access point is required where a drain exits from within what distance under a building?

    A   0.6 m.

    B   1.0 m.

    C   2.0 m.

    D   2.4 m.

    E   3.0 m.

6. According to New Zealand Building Code Clause G13/AS2 Foul Water, the minimum width of a trench for a drain must be no less than the diameter of the pipe plus what measurement?

    A   100 mm.

    B   200 mm.

    C   300 mm.

    D   400 mm.

    E   600 mm.

7. According to New Zealand Building Code Clause G13/AS2 Foul Water, verifiable levelling devices must be used to ensure uniform gradients of drains laid at gradients in what range?

    A   1 in 40 or less.

    B   1 in 60 or less.

    C   1 in 80 or less.

    D   1 in 100 or less.

    E   1 in 120 or less.

8. According to New Zealand Building Code Clause G13/AS2 Foul Water, what is the minimum allowable capacity of a grease trap?

    A   80 litres.

    B   100 litres.

    C   140 litres.

    D   180 litres.

    E   200 litres.

9. How may well-pointing make soil unstable?

    A   The soil becomes dry and cracks.

    B   The soil no longer has water to float in.

    C   Fine particles of soil can be pumped out with the water.

    D   The vibration of the pump disturbs the soil.

    E   Forcing the drive pipe into the ground breaks up the soil.

10. Which of the following is NOT classed as PPE?

    A   Earmuffs.

    B   Safety glasses.

    C   High visibility vest.

    D   Head lamp.

    E   Breathing apparatus.

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		
16		
Section B		
Total		