Affix label with Candidate Code Number here.
If no label, enter candidate Number if known

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No. 9198

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2021

CERTIFYING 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.

This exam booklet consists of 2 sections

Section A – Question 1 to 11

Section B – Question 1 to 10

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 26–29 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.

Blue or Black pens only.

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 30 pages in the correct order.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

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 the meaning of the term exempt building work.

_____

(1 mark) ☐

(b) Give FOUR examples of drainlaying work that would be classified as exempt building work.

1 _____

_____

2 _____

_____

3 _____

_____

4 _____

_____

(4 marks) ☐

(c) Give FOUR categories of people who are permitted to complete drainlaying that is classified as exempt building work.

1 _____

2 _____

3 _____

4 _____

(4 marks) ☐

Total 9 marks ☐

INTENTIONALLY BLANK

QUESTION 2

A surface water drain is to be laid in a manner to prevent scouring where it discharges into a stream.

(a) Name THREE structures that may be used to protect the stream from scouring.

1 _____

2 _____

3 _____

(3 marks)

(b) Give TWO ways in which the surface water drain pipe can be designed and installed so that the likelihood of scouring can be reduced.

1 _____

2 _____

(2 marks)

Total 5 marks

INTENTIONALLY BLANK

QUESTION 3

(a) Give TWO ways in which solvent cement can enter the body.

1 _____

2 _____

(2 marks)

(b) Give TWO effects solvent cement can have on the body.

1 _____

2 _____

(2 marks)

(c) List TWO items of personal protection equipment that should be worn when working with solvent cement.

1 _____

2 _____

(1 mark)

Total 5 marks

INTENTIONALLY BLANK

QUESTION 4

(a) Give the meaning of the word detention as it applies to drainlaying.

_____

(2 marks)

(b) Give the circumstance in which detention of surface water would be required.

_____

(1 mark)

(c) Name TWO examples of surface water detention systems.

1 _____

2 _____

(2 marks)

(d) Describe the operation of a surface water detention system.

_____

_____

_____

(3 marks)

Total 8 marks

QUESTION 5

(a) Give THREE characteristics of a work site that determine that the site will be considered to be a confined space.

1 _____

_____

2 _____

_____

3 _____

_____

(3 marks)

(b) Give TWO examples of a situation in which working in a confined space may become particular hazardous work.

1 _____

_____

2 _____

_____

(2 marks)

(c) Name the agency that must be contacted before undertaking particular hazardous work.

_____

(1 mark)

QUESTION 5 (cont'd)

(d) Give FIVE items of information that are to be provided on a Particular Hazardous Work Notification form.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks)

(e) Give a situation where notifiable work may be performed prior to sending Particular Hazardous Work Notification form.

_____

_____

(1 mark)

Total 12 marks

INTENTIONALLY BLANK

QUESTION 6

(a) A certifying drainlayer has just employed the categories of people listed in the table below.

Complete the table by stating the licence type and minimum period of time each employee must work in the presence of the certifying drainlayer.

Category of employee	Licence type	Minimum period in the presence of
Apprentice		
Unskilled labourer		
An ex-apprentice who has not passed the Licencing exam within 12 months of receiving New Zealand Certificate		

(3 marks)

(b) Name the THREE supervision types recognised by the Plumbers, Gasfitters and Drainlayers Board.

1 _____

2 _____

3 _____

(3 marks)

Total 6 marks

INTENTIONALLY BLANK

QUESTION 7

An excavation that is intended for a septic tank is full of water.

The excavation is 4.75 m long, 0.9 m wide and 1.4 m deep.

A dewatering pump has a discharge rate of 60 litres/minute.

Calculate the time required to dewater the excavation using this pump.

Total 3 marks

QUESTION 8

The plan opposite (not to scale) shows a building and contour lines on a site. The surface water drain connecting the dwelling to the network utility operator's (NUO) system is also shown.

The invert for the NUO's connection at X is 1.5 metres below ground level.

The gradient of the drain is 1:80 and the distances between the points are as shown in the following table.

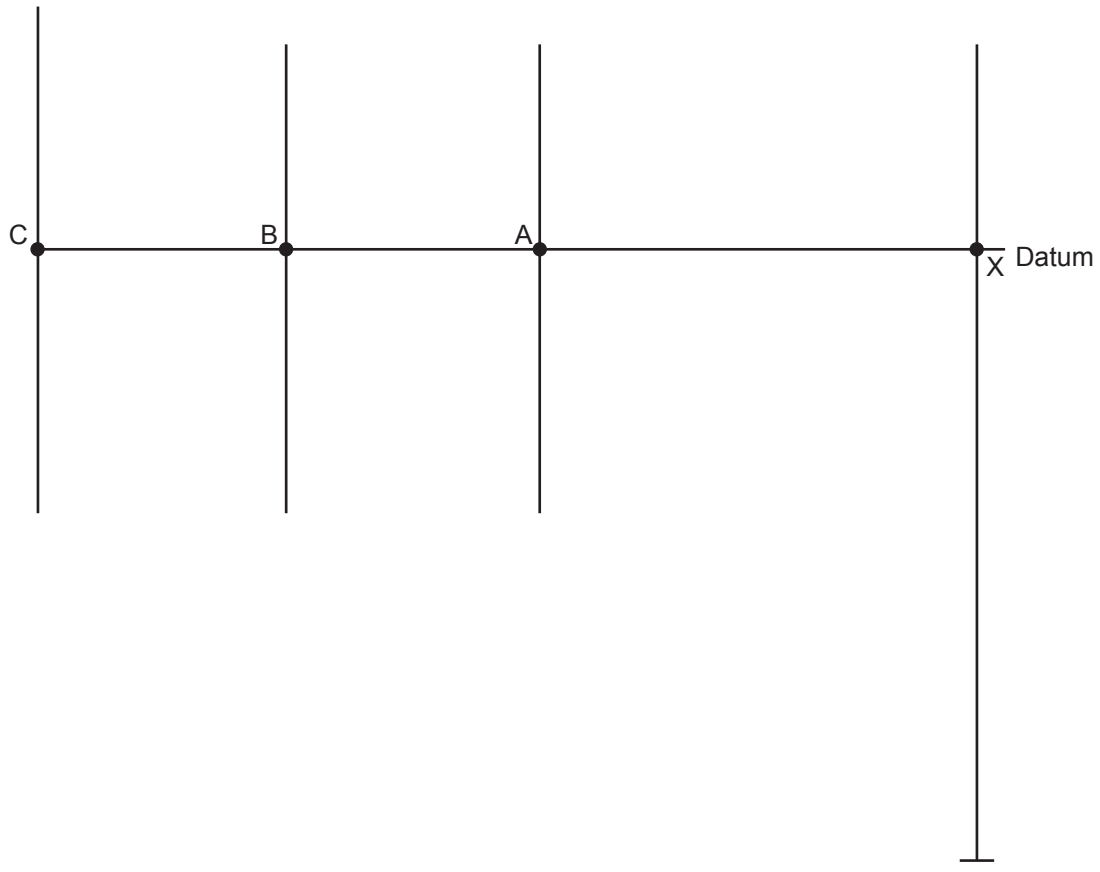
Length of pipe sections		
Pipe section	Distance	Fall
X - A	13 metres	
A - B	7 metres	
B - C	8 metres	

On the chart below, show the following information using a scale of 1:20 for the vertical distances.

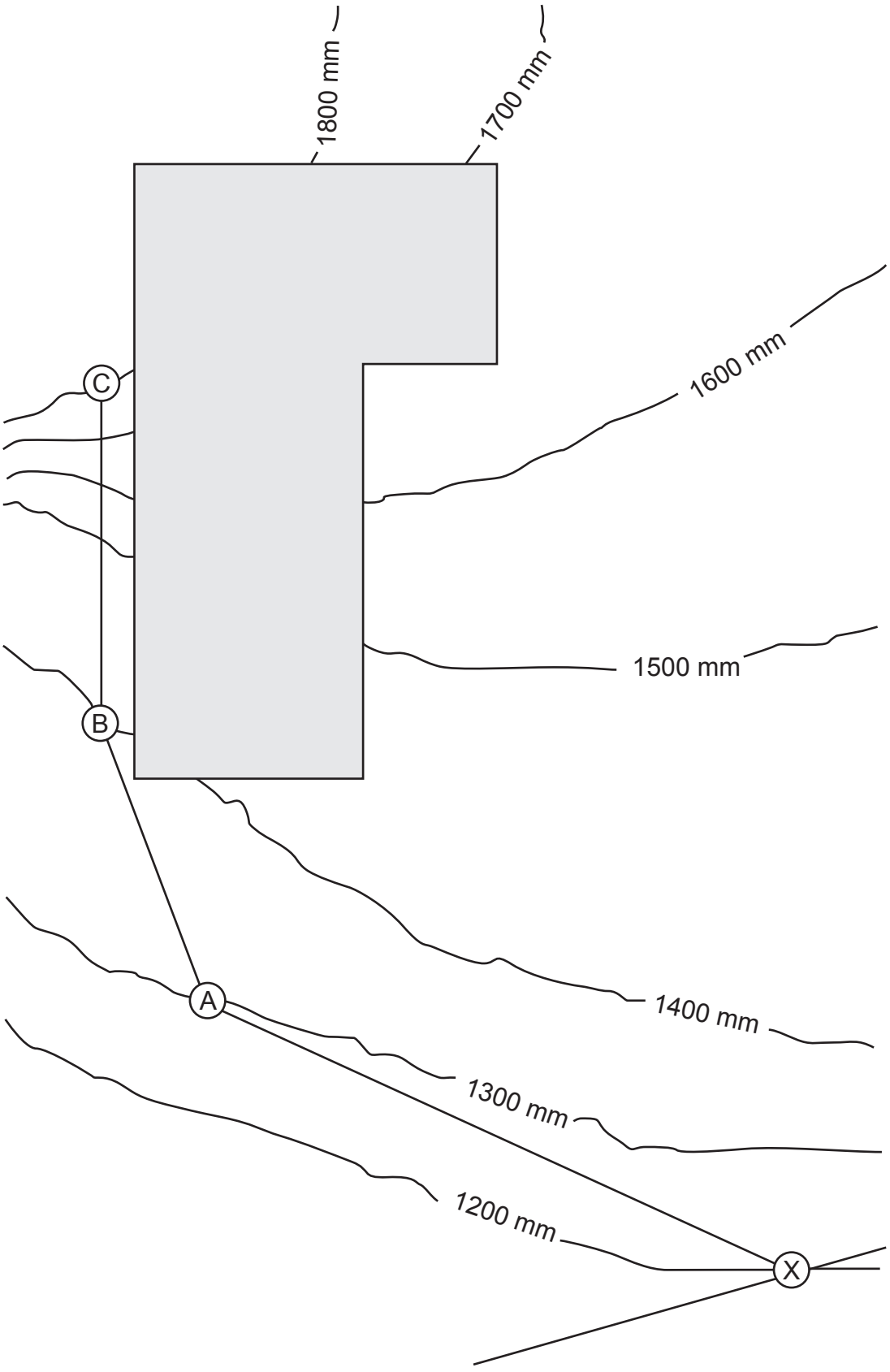
(a) The ground levels.

(b) The depth of the drain invert below the datum.

(c) The depth of the drain invert below ground level.



QUESTION 8 (cont'd)



Total 12 marks

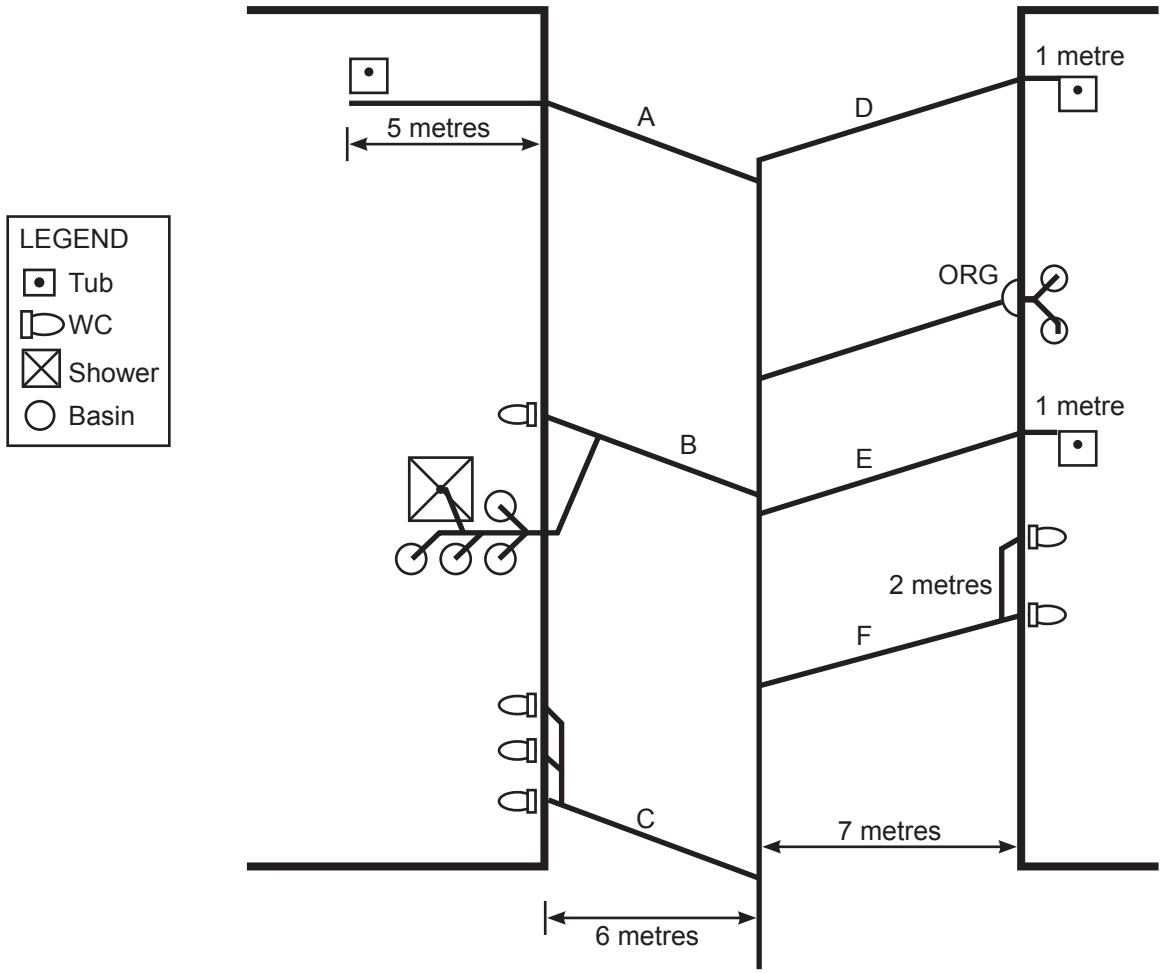
INTENTIONALLY BLANK

QUESTION 9

The diagram below shows part of the foul water drainage plan for a commercial property.

The completed installation is to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

(a) Complete the diagram to show the required locations for vent pipework.



(5 marks)

(b) Complete the table below to show the minimum required diameter and gradient for the drains for each section labelled A – F for the system.

Drain	Minimum diameter	Minimum gradient
A		
B		
C		
D		
E		
F		

(6 marks)

Total 11 marks

INTENTIONALLY BLANK

QUESTION 10

(a) Give SIX waste products that would be classed as industrial liquid waste.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(3 marks)

(b) Name THREE methods by which industrial liquid waste can be treated prior to discharge to an outfall.

1 _____

2 _____

3 _____

(3 marks)

Total 6 marks

QUESTION 11

The plan below shows the layout of sanitary fixtures in part of a dwelling and a septic tank for the dwelling. Contour lines for the building site are also shown.

A drainage system is being designed to comply with AS/NZS 3500 Part 2: Sanitary plumbing and drainage and AS/NZS 1547 On-site domestic wastewater management.

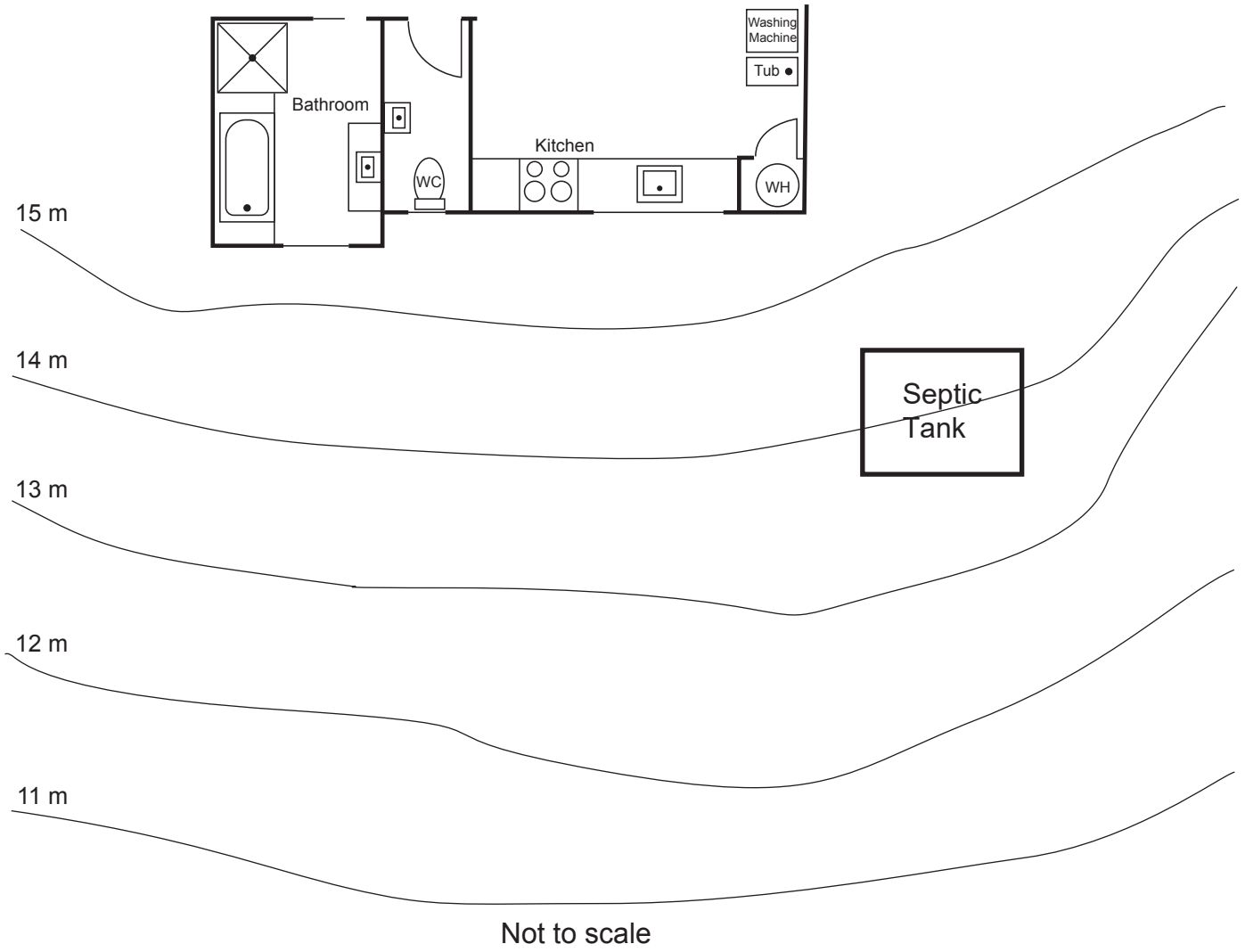
(a) Complete the plan to show the foul water drains.

Show the locations of any required inspection points and vents.

(5 marks)

(b) Complete the plan to show a suitable dosed effluent disposal system that will alternate between two separate fields.

(5 marks)



Not to scale

QUESTION 11 (cont'd)

(c) Draw a cross-section of the effluent disposal bed.

(1 mark)

(d) Describe how the dosing system operates.

(2 marks)

Total 13 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. A rectangular chamber must provide 12 m^3 of storage volume. The available area to construct the chamber measures 2.2 m x 3.8 m.

   What minimum depth will the chamber need to have?

   A 1.339 m.

   B 1.435 m.

   C 1.948 m.

   D 2.424 m.

   E 2.663 m.

   ☐

2. A drain is serving a vertical discharge stack on a three-level building. A gully dish is required to be connected to the drain downstream of the discharge stack connection.

   How close to the base of the discharge stack is the junction for the gully trap permitted to be?

   A 0.5 m.

   B 1.0 m.

   C 1.5 m.

   D 2.0 m.

   E 2.5 m.

   ☐

3. What is the definition of the term drain in common?

   A A drain that conveys both storm water and foul water.

   B A drain that is maintained by the local territorial authority.

   C A drain that serves two or more properties.

   D A drain that has been permitted to cross public land.

   E A drain that discharges into a watercourse.

   ☐

4. Why is there a maximum allowable distance between a gully dish and a grease trap it is discharging into?

A To prevent vermin from entering the grease trap.

B So that the pipe does not require venting.

C So that an inspection point is not required on the inlet of the grease trap.

D To stop the waste cooling and fats solidifying on the internal wall of the pipe.

E So that the pipe can easily be cleaned without specialised equipment.

☐

5. A pipe 45 m long falls 900 mm.

What gradient has it been laid at?

A 1:50 (2.00%).

B 1:45 (2.25%).

C 1:40 (2.50%).

D 1.30 (3.35%).

E 1:20 (5.00%).

☐

6. Which of the following correctly describes stratification in relation to sewage treatment?

A A plant absorbing liquid via the root system and releasing the moisture to the air through its leaves.

B How quickly the soil will absorb the moisture from the effluent.

C The sludge, scum and effluent separating while in the septic tank.

D The moisture from the effluent field vaporising into the atmosphere.

E The breaking down of the effluent by bacteria to make a clearer liquid.

☐

7. How long should an in-ground septic tank last in order to comply with New Zealand Building Code clause B2/AS1 Durability.

A 5 years.

B 10 years.

C 15 years.

D 30 years.

E 50 years.

☐

8. What is the minimum allowable gradient for a 100 mm surface water drain?

A 1:90

B 1:120

C 1:250

D 1:300

E 1:350

☐

9. A pipe has been laid at a gradient of 1:40 (2.50%).

How much will the pipe fall over a 7 metre run?

A 70 mm.

B 175 mm.

C 280 mm.

D 1.75 m.

E 2.8 m.

☐

10. What is the maximum amount of non-friable asbestos permitted to be removed before a licence is required?

A 5 m^2

B 10 m^2

C 15 m^2

D 20 m^2

E 25 m^2

☐

Total 10 marks ☐

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Question number _____

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Question number	Marks	Marks
1		
2		
3		
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Section B		
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