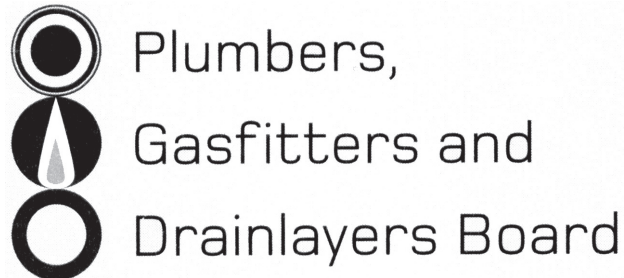


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

.....

No. 9198



REGISTRATION EXAMINATION, NOVEMBER 2017

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.

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 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 2017 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 the minimum separation distance between a foul water drain and each of the following services.

- (i) An underground, mechanically protected consumer gas pipe with marker tape along its length.

(1 mark)

- (ii) An underground, unmarked and unprotected electricity supply cable.

(1 mark)

- (iii) An above ground potable water supply pipe.

(1 mark)

- (iv) An underground 150 mm surface water drain.

(1 mark)

(b) List the THREE requirements that must be met when a service crosses an underground drain.

1 _____

2 _____

3 _____

(3 marks)

Total 7 marks

QUESTION 2

The drawing opposite shows a plan of a group of three shops and a restaurant.

The car parking area at the rear of the buildings has a sealed surface.

Foul water drainage is to connect to the appropriate sewer connection.

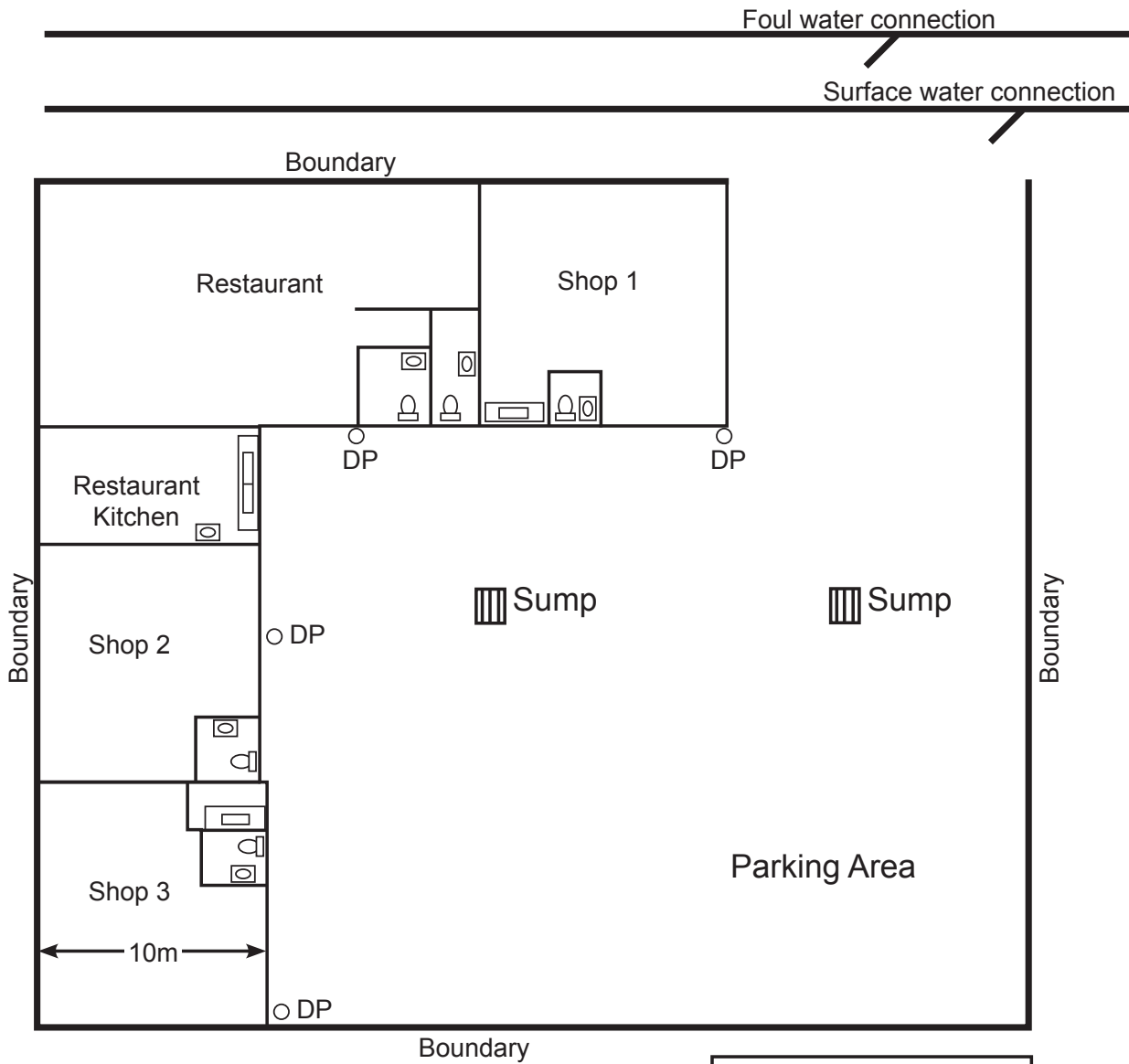
All components of the foul water drainage system are to be external to the building.

Surface water from the car park area and surface water drainage are to combine and discharge at the network utility operator's surface water drainage connection point.

Drainage systems are to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage, New Zealand Building Code clause E1/AS1: Surface Water, and must be economical and practical.

On the plan, draw and label the drainage systems. Include foul water and surface water systems, all pipe work, bends, junctions, fittings, traps, inspections, chambers and ventilation points.

QUESTION 2 (cont'd)



LEGEND	
	Hand Basin
	WC
	Kitchen Sink
	Double Sink
	Down Pipe
	Surface water sump

Total 12 marks

QUESTION 3

Give the minimum size of an inspection shaft for a 150 mm drain.

Total 1 marks

QUESTION 4

A trench is being excavated on a site using a small diesel-powered digger.

There is a sudden roar with a strong smell of gas coming from the excavation.

Give FOUR immediate actions that should be taken.

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

Total 2 marks

QUESTION 5

A foul water drain is to be installed at an existing petrol station.

(a) State TWO hazards that are specific to an excavated trench on this type of site.

1 _____

2 _____

(2 marks)

(b) Give FOUR safety precautions that should be taken prior to excavating at this type of site.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(c) Give TWO safety precautions that should be taken when excavating at this type of site.

1 _____

2 _____

(2 marks)

Total 6 marks

QUESTION 6

- (a) The invert level of a foul water drain serving a commercial building is below the network utility operator's sewer connection.

Sketch a wet well pumping installation that could be used to collect and discharge the waste from the building to the sewer.

(8 marks)

- (b) Explain the difference between a dry well and a wet well pumping installation.

(2 marks)

Total 10 marks

QUESTION 7

(a) Briefly explain the purpose of a reflux valve.

(1 mark)

(b) Describe a situation that would make the installation of a reflux valve necessary.

(2 marks)

(c) State where, in relation to a boundary trap, a reflux valve should be located.

(1 mark)

Total 4 marks

QUESTION 8

Give THREE provisions that are included in the New Zealand Building Code Clause G13/AS2 Foul Water to prevent surface water entering a foul water drain through a gully dish.

- 1 _____
- 2 _____
- 3 _____

Total 3 marks

QUESTION 9

Sketch and label a cross sectional diagram of a silt trap used to prevent extraneous matter from entering a surface water drainage system.

Total 4 marks

QUESTION 10

(a) A drainlayer is going to enter an access chamber on a surface water drain.

Give FOUR conditions that should be checked before the drainlayer enters the access chamber.

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

(4 marks)

(b) Give TWO safety measures that must be provided before the drainlayer enters the access chamber.

- 1 _____
- 2 _____

(2 marks)

Total 6 marks

QUESTION 11

The plan opposite (not to scale) shows a building and contour lines on a site. The foul 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.

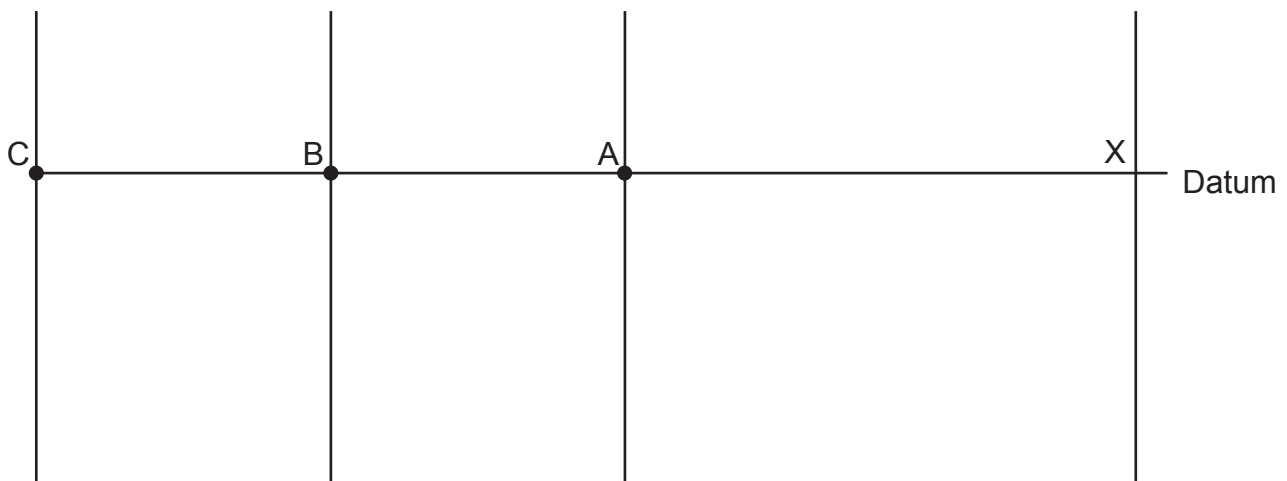
The gradient of the drain is 1:80, and the distances between the points are as shown in the table below.

The datum is the ground level at X.

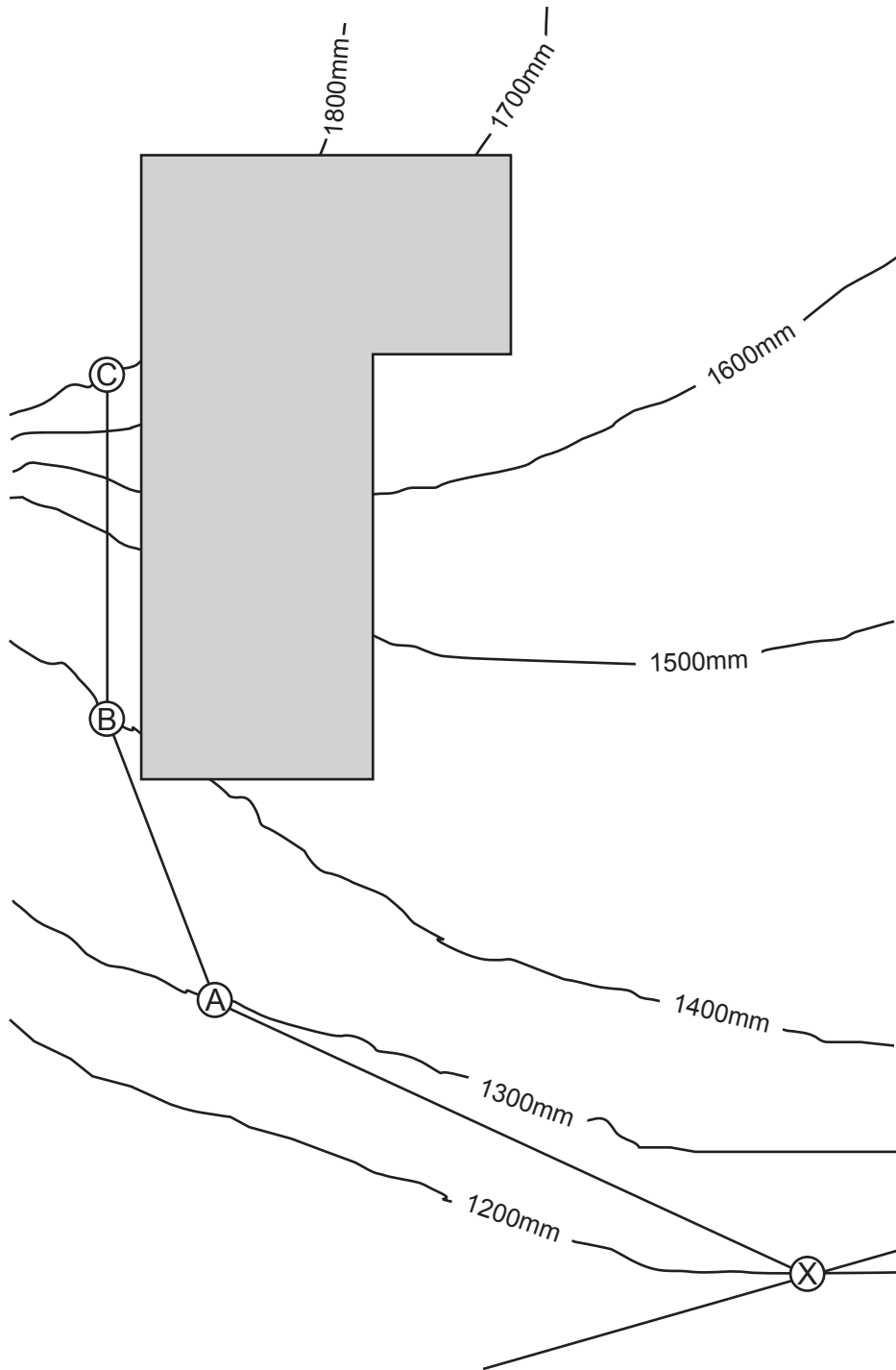
Length of pipe sections	
Pipe section	Distance
X - A	13 metres
A - B	7 metres
B - C	8 metres

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 the ground.



QUESTION 11 (cont'd)



Total 12 marks

QUESTION 12

(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

QUESTION 13

On approaching a trench, it is noticed that a work colleague has collapsed and is lying in the bottom of the trench. The colleague is unresponsive.

(a) Give FOUR different possible reasons for this.

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

(2 marks)

(b) (i) Give the first action that should be taken in this situation.

(1 mark)

(ii) Give FOUR other actions that could then be taken.

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

(2 marks)

(c) Name TWO pieces of workplace safety documentation that may need to be completed in this situation.

- 1 _____
- 2 _____

(2 marks)

Total 7 marks

QUESTION 14

A 200 mm diameter drain has been laid when insufficient cover is available.

Sketch a suitable protection method for the drain.

Total 4 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 purpose of an aerated chamber on a septic tank system?

- A To convey the effluent evenly over the disposal field.
- B To mix the tank contents thoroughly.
- C To supply oxygen to the bacteria within the tank.
- D To prevent grease from travelling through the system.
- E To make sure all sludge is retained within the system.

2. Which of the following describes a notifiable event?

- A A foul water drain breaks due to an earthquake.
- B Working in an excavation that is 2 m deep and 1 m wide at the top.
- C An excavation which has filled with water over night.
- D An unplanned incident in the workplace that endangers the health and safety of workers.
- E Working within 1 m of an underground pipe made of material containing asbestos.

3. What is meant by the term surcharge loads in relation to shoring a trench?

- A The amount of ground water in the area of the trench.
- B Slippage of soil along bedding planes applying extra forces on the shoring.
- C Extra weight from soil or vehicles near the edge of the trench.
- D The removal of ground water via well-pointing changing the structure of the soil.
- E Building foundations within 1 m of a trench.

4. Which of the following must receive a completed Particular Hazardous Work form before the work is started?
- A The local territorial authority.
 - B The regional health and safety inspector.
 - C The Plumbers, Gasfitters and Drainlayers Board.
 - D The health and safety representative for the site.
 - E WorkSafe New Zealand.
-

5. How much notice (time) must be given before particular hazardous work is to be carried out?
- A 24 hours.
 - B 48 hours.
 - C 72 hours.
 - D 5 working days.
 - E 10 working days.
-

6. A surface water system must be designed to cope with the expected rainfall in a 10 minute period of a storm that occurs how often?
- A Once in 10 years.
 - B Once in 15 years.
 - C Once in 25 years.
 - D Once in 50 years.
 - E Once in 100 years.
-

7. Who approves the discharge of trade waste into a sewer?
- A The trade waste producer.
 - B The chemical testing laboratory.
 - C The Resource Management Act department.
 - D The network utility operator.
 - E The certifying drainlayer.
-

8. A certifying drainlayer has employed a trainee who now holds a limited certificate. For what length of time must the trainee work in the presence of the certifying drainlayer?
- A 6 months.
 - B 12 months.
 - C 24 months.
 - D 36 months.
 - E Until such time as the trainee achieves registration.

9. According to AS/NZS 3500 Part 2: Sanitary plumbing and drainage, under what circumstance is a 100 mm drain receiving waste from soil fixtures permitted to be laid at gradient of 1:80 (1.25%)?
- A When the drain is receiving 18 or more fixture discharge units.
 - B When the drain is constructed from solvent cement jointed uPVC.
 - C When the drain is less than 6 metres long.
 - D When the drain has no changes of direction greater than 30°.
 - E When the drain is receiving no more than 18 fixture discharge units.

10. What determines the cascade level of grease trap?
- A The height difference between the inlet and the baffle.
 - B The height difference between the baffle and the outlet.
 - C The height difference between the discharging fixture outlet and the grease trap inlet.
 - D The height difference between the inlet and the outlet.
 - E The height difference between the grease trap outlet and the main drain.

11. What does PCBU stand for in the Health and Safety at Work Act?
- A Principle contractor of building utilities.
 - B Private company business undertaking.
 - C Persons conducting a business or undertaking.
 - D Private construction business union.
 - E Personnel control building unit.

12. DrainlayingCo Ltd has been engaged to carry out work. Which party is classed as a PCBU and has the primary health and safety duty under the Health and Safety at Work Act?
- A The company.
 - B The company's health and safety representative.
 - C The owner of the property where work takes place.
 - D The tradespeople doing the work.
 - E The company's directors.
-

13. Which party has the responsibility to make sure the PCBU is meeting its health and safety obligations under the Health and Safety at Work Act?
- A The company.
 - B The health and safety representative.
 - C The owner of the property where work takes place.
 - D The company's directors.
 - E The Ministry of Business, Innovation and Employment.
-

Total 13 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		