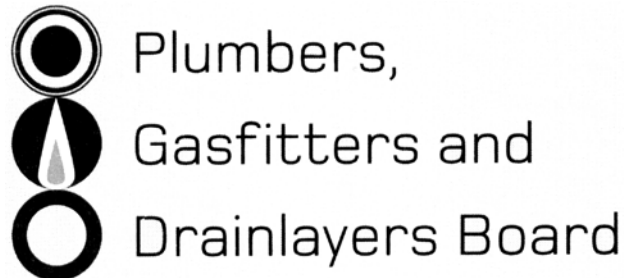


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

.....

No. 9198



REGISTRATION EXAMINATION, JUNE 2019

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 17–21 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 June 2019 were provided with the following documents:

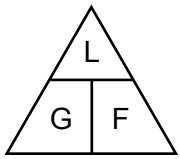
- AS/NZS 3500 Part 2: Sanitary plumbing and drainage

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

Answer the following in accordance with AS/NZS 3500.

- (a) Give the meaning of the term rising main.

(1 mark)

- (b) A rising main is being used to convey foul water.

Give the test criteria that must be met when proving the main is free from leaks.

(2 marks)

- (c) State TWO permitted locations to which a foul water rising main is allowed to discharge.

1

2

(2 marks)

Total 5 marks

QUESTION 2

(a) Name FOUR gases that may affect breathing when excavating or laying drains.

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

(4 marks)

(b) Give EIGHT items of safety equipment in addition to personal protection equipment that may be required in a drainage excavation.

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____
- 8 _____

(4 marks)

(c) A drainlayer reports to a certifying drainlayer that an unlabelled orange pipe and a second unidentified pipe have been uncovered while an excavation was being dug. The drainlayer asks for advice on the actions to take.

Give TWO actions the certifying drainlayer should advise the drainlayer to take.

- 1 _____
- 2 _____

(2 marks)

QUESTION 2 (cont'd)

(d) A trench has collapsed, trapping a fellow worker up to the waist.

- (i) Describe the safety precaution that should be taken immediately prior to commencing any drainlaying rescue operation.

(1 mark)

- (ii) Give TWO actions that could be taken after the one in (i) to assist the trapped worker.

(2 marks)

Total 13 marks

QUESTION 3

(a) Describe what is meant by each of the following terms as they relate to drainlaying.

(i) Prohibited trade waste

(1 mark)

(ii) Conditionally acceptable trade waste

(1 mark)

(iii) Acceptable trade waste

(1 mark)

(b) A system for managing industrial liquid waste is to be designed.

The waste is not hazardous, but is not permitted to be discharged directly to a sewer.

Give the TWO acceptable options for managing the waste.

1 _____

2 _____

(2 marks)

(c) Name TWO clauses of the New Zealand Building Code with which systems designed for collecting hazardous industrial liquid waste must comply.

1 _____

2 _____

(2 marks)

QUESTION 3 (cont'd)

(d) List FOUR waste products which would be classed as prohibited trade waste.

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

(4 marks)

(e) Name the type of trap that must be included in the foul water drainage design if the industrial liquid waste is flammable.

(1 mark)

Total 12 marks

QUESTION 4

The diagram on the page opposite shows a site with a building on it, and site contour lines. The foul water drainage pipework connecting the dwelling to the network utility operator's (NUO) sewer is also shown.

The pipework has been laid at a gradient of 1:60, and the distances between the points are as shown in the table below.

| Length of pipe sections | |
|-------------------------|-------------|
| Pipe section | Distance |
| A - C | 10.6 metres |
| B - C | 2.2 metres |
| C - D | 8.2 metres |
| F - D | 7.5 metres |
| D - E | 6.4 metres |

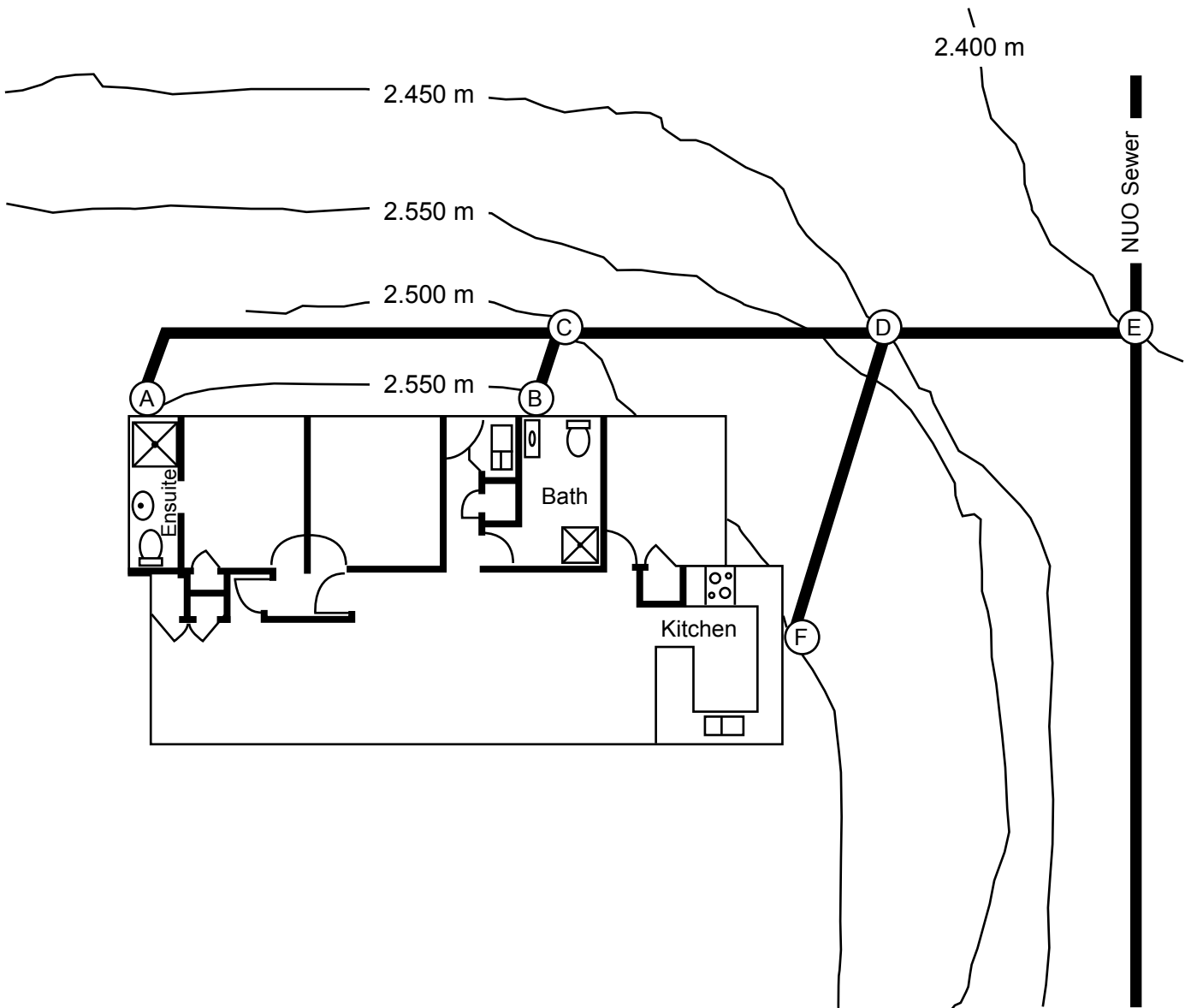
The invert for the NUO connection marked E is 1.35 m below ground level.

Complete the table below to show the depth below ground level to the invert of the drain at each of the points indicated.

| Depth of invert of drain | |
|--------------------------|------------|
| Point | Depth (mm) |
| A | |
| B | |
| C | |
| D | |
| F | |

Total 10 marks

QUESTION 4 (CONT'D)



QUESTION 5

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

(2 marks)

(ii) Explain why detention would be required for surface water.

(1 mark)

(iii) Give TWO examples of surface water detention systems.

1

2

(2 marks)

(b) Describe the operation of a **foul** water detention system.

(3 marks)

Total 8 marks

QUESTION 6

- (a) Give THREE instances when an excavation must be examined by an employer or an employer's representative.

1 _____

2 _____

3 _____

(3 marks)

- (b) State the minimum width of the trench in which a foul water drain with a diameter of 110 mm can be installed.

(1 mark)

Total 4 marks

QUESTION 7

(a) A certifying drainlayer has just employed people as 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.

| Employee | Licence category | Minimum period 'in the presence of' |
|--|------------------|--|
| New apprentice | | |
| Unskilled labourer | | |
| An ex-apprentice who has not passed the Tradesman exam, after receiving National Certificate | | |

(6 marks)

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

1 _____

2 _____

3 _____

(3 marks)

Total 9 marks

QUESTION 8

(a) Give TWO methods that are used to provide oxygen to aerobic bacteria within an aerated waste water system, and briefly explain how each method works.

1 _____

2 _____

(4 marks)

(b) Give TWO advantages of installing an aerated sewage treatment system compared with a traditional septic tank installation.

1 _____

2 _____

(2 marks)

(c) Give TWO disadvantages an aerated system has compared with a traditional septic tank installation.

1 _____

2 _____

(2 marks)

Total 8 marks

QUESTION 9

(a) Give the meaning of the term sullage tank.

(1 mark)

(b) Give a situation in which a sullage tank would be required

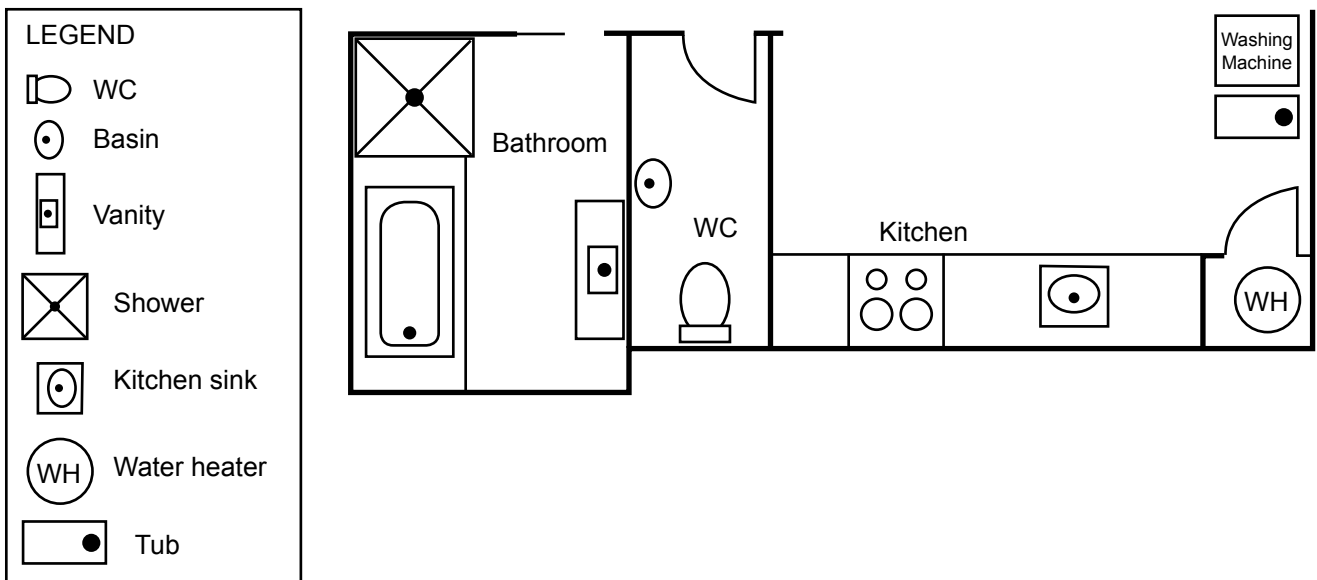
(1 mark)

(c) The diagram below shows the layout of sanitary fixtures in a dwelling.

Complete the plan to show the foul water drains, including a sullage tank and a septic tank.

On the diagram show the locations of any required inspection points and vents.

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



(10 marks)

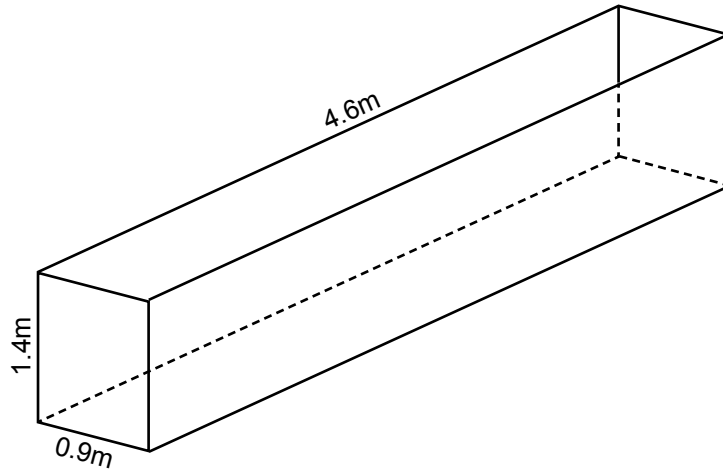
Total 12 marks

QUESTION 10

(a) The diagram below shows an excavation. The excavation is half full of water.

A dewatering pump is to be used to dewater the excavation. The pump has a discharge rate of 100 litres/minute.

Calculate the time required to dewater the trench.



(4 marks)

(b) Water has to be taken to conduct a hydrostatic test on a drain. The drain has 150 mm diameter and 50 m developed length.

Calculate the volume and weight of water required for the test.

Allow 10% for spillage and losses.

(5 marks)

Total 9 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 9 m^3 of storage volume. The available area to construct the chamber measures $2.4 \text{ m} \times 2.8 \text{ m}$.

What minimum depth will the chamber need to have?

- A 1.339 m.
- B 1.732 m.
- C 3.217 m.
- D 3.754 m.
- E 3.806 m.

2. Which of the following best describes an Approved Code of Practice?

- A A New Zealand Building Code clause.
- B A New Zealand Building Code approved alternative solution.
- C A mandatory solution for complying with the Health and Safety at Work Act.
- D A normative set of rules that must be followed.
- E A preferred work practice guideline.

3. Which of the following is NOT an acceptable reason to disturb the scene of an accident that has resulted in serious harm?

- A To prevent suffering of an injured person.
- B To save a life.
- C To recover plant and equipment from the site.
- D To maintain public access to services (e.g. gas and electricity).
- E To prevent serious damage to property.

4. Which of the following excavations would be classified as Particular Hazardous Work?

- A A trench which is 1200 mm deep and 1000 mm wide.
- B A trench which is 1200 mm deep and 1500 mm wide.
- C A trench which is 1200 mm deep and 1750 mm wide.
- D A trench which is 1500 mm deep and 1000 mm wide.
- E A trench which is 1500 mm deep and 1750 mm wide.

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 drain falls 900 mm over a 45 metre length.

What gradient has the drain been laid at?

- A 1:20 (5.00%).
- B 1:30 (3.35%).
- C 1:40 (2.50%).
- D 1:45 (2.25%).
- E 1:50 (2.00%).

7. 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.

8. Drainlaying Co Ltd has been engaged to carry out work.

Which of the following parties is classed as a PCBU and has the primary health and safety duty under the Health and Safety at Work Act?

- A The company's health and safety representative.
- B The company.
- C The owner of the property where work takes place.
- D The tradespeople doing the work.
- E The company's directors.

9. When a practising licence holder changes address, within what period must the Registrar of the Plumbers, Gasfitters and Drainlayers Board be notified?

- B 15 days.
- C 1 month.
- D 3 months.
- E 6 months.

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

- A 1 m²
- B 5 m²
- C 10 m²
- D 15 m²
- E 20 m²

Total 10 marks

For Examiner's use only

| Question number | Marks | Marks |
|-----------------|-------|-------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| Section B | | |
| Total | | |