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

.....

No. 9198

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2018

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 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 17 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 2018 were provided with the following documents:

- NZ Building Code clause E1: Surface 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

Give THREE recommendations that should be given to the end-user to prolong the life of an above-ground evapotranspiration effluent disposal system.

1 _____

2 _____

3 _____

Total 3 marks

QUESTION 2

(a) Complete the table below by indicating which of the situations listed require notification of particular hazardous work and which ones do not.

Description of work	Particular hazardous work Y / N
Working in an area where the temperature exceeds 45ºC.	
Working in a confined space.	
Working on a scaffold which is over 5 metres high.	
A trench which is 4 metres deep and 3 metres wide at the top.	
Work in which a person wears a face mask with filter canisters.	
Working on a residential property which is known to contain asbestos containing materials.	

(3 marks)

(b) State the organisation to which a Particular Hazardous Work Notification form needs to be submitted.

_____

(1 mark)

(c) State the minimum time before work commences that a Particular Hazardous Work Notification form must be submitted.

_____

(1 mark)

(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)

Total 10 marks

QUESTION 3

(a) List EIGHT waste products that would be classed as industrial liquid waste.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

(4 marks)

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

1 _____

2 _____

3 _____

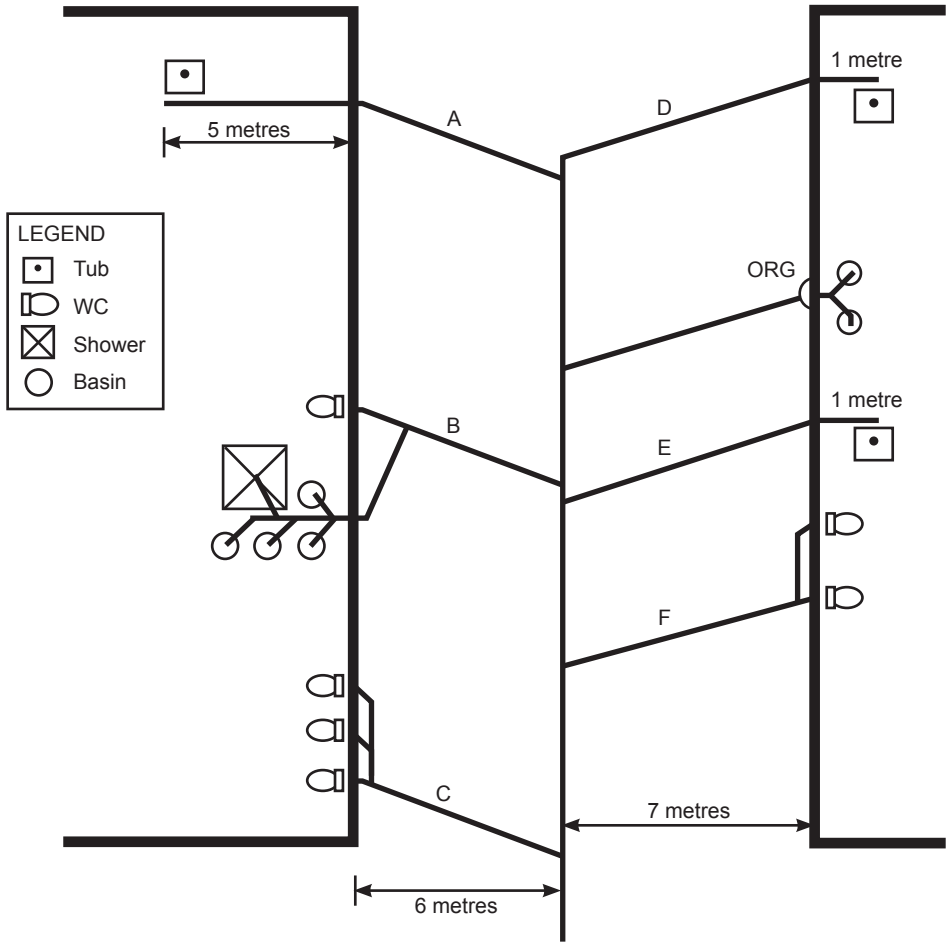
(3 marks)

Total 7 marks

QUESTION 4

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

(a) Complete the diagram to show the required locations for vent pipework. The completed system is to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.



(5 marks)

(b) Complete the table below to show the minimum required diameter and gradient for each section of drain labelled A – F for the system to comply with AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

Drain	Minimum diameter	Minimum gradient
A		
B		
C		
D		
E		
F		

(9 marks)

Total 14 marks

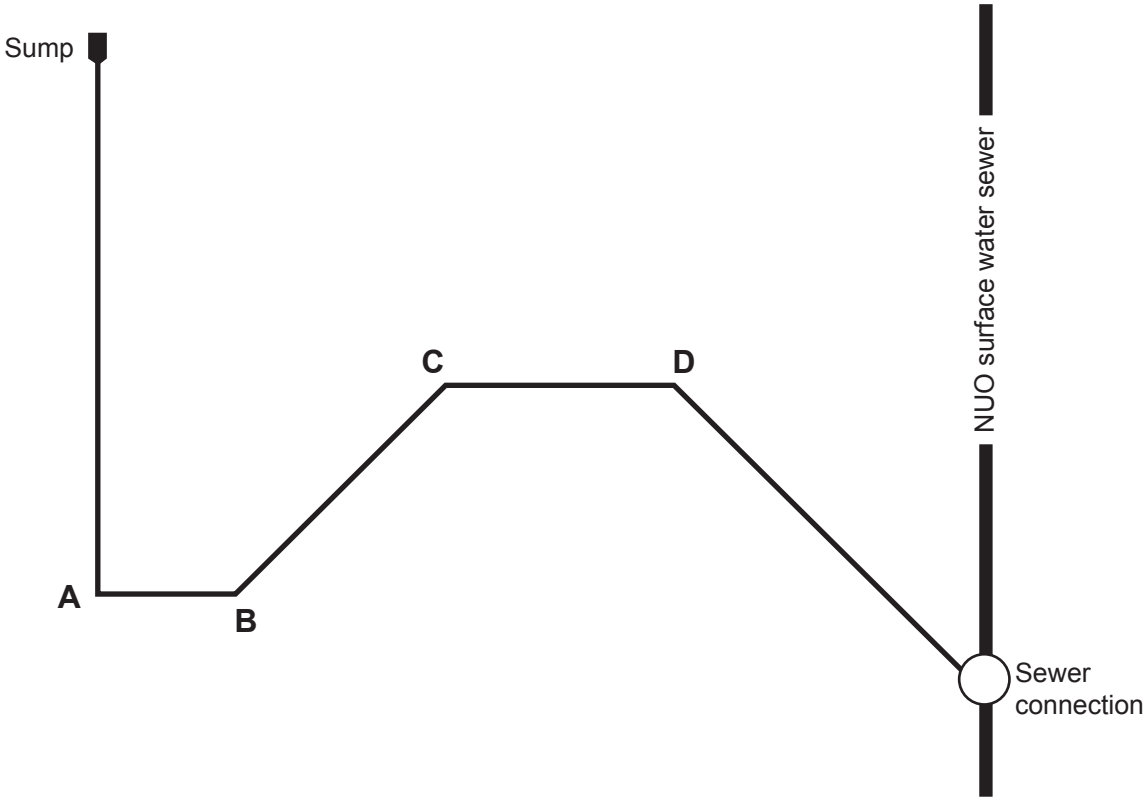
QUESTION 5

The diagram below shows the layout of a surface water drain from a sump to the Network Utility Operator's (NUO) sewer connection.

The changes of direction at points B, C and D are 45º.

The diagram has been drawn to a scale of 1:500

Complete the diagram to show the required locations for the rodding points. The completed system is to comply with the minimum requirements of New Zealand Building Code clause E1/AS1 Surface Water.



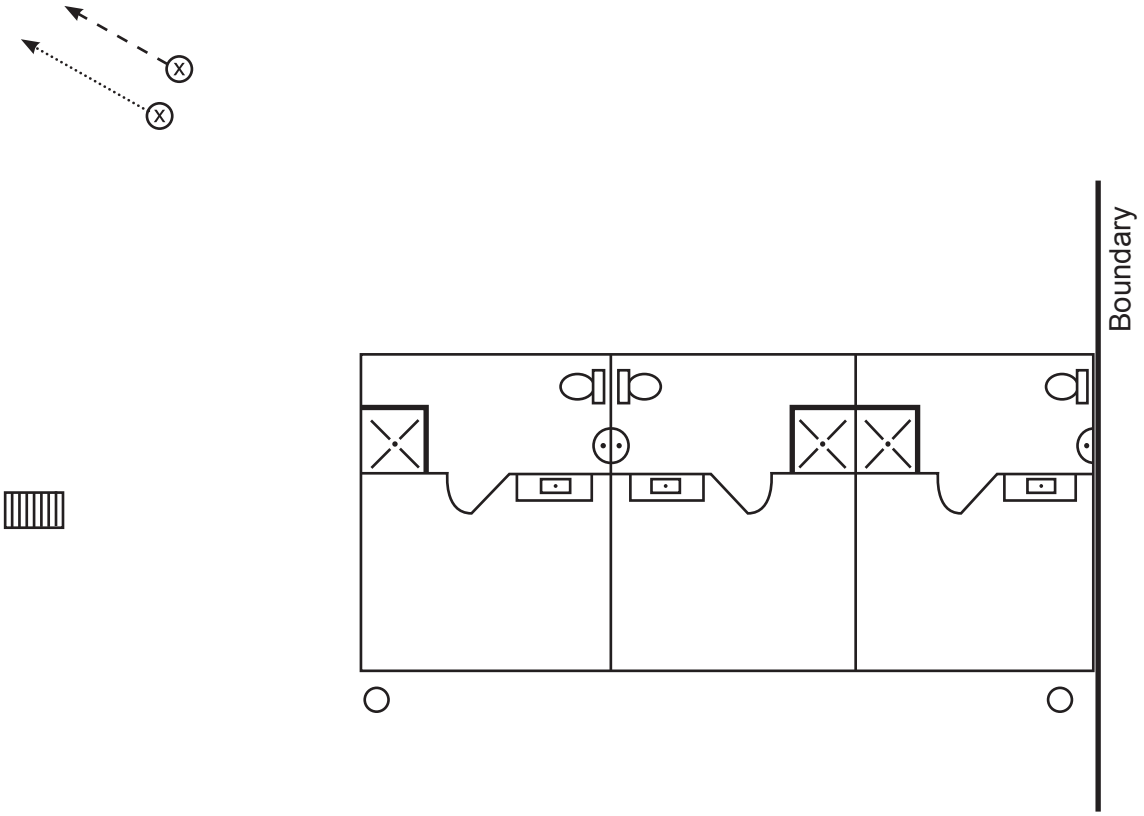
Total 6 marks

QUESTION 6

(a) The diagram below shows a plan view of a motel block with three units, drawn to a scale of 1:200. The connection points for the surface water and foul water drains are also shown.

On the diagram, draw and label a drainage plan that will enable the completed systems to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage, and New Zealand Building Code clause E1/AS1 Surface Water.

All drainage is to be exterior to the building.



LEGEND

Sink	Down pipe
Basin	Foul water drain
Water Closet	Surface water drain
Shower	Connection point
	Sump (type 1)

(9 marks)

QUESTION 6 (cont'd)

(b) The invert level at the head of the foul water drain in (a) is 500 mm below the finished floor level. The drain is to be laid at a gradient of 1:60.

Calculate the depth below the finished floor level of the foul water connection point 'X'.

(3 marks)

Total 12 marks

QUESTION 7

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) sewer is also shown.

The invert for the NUO's connection at Y is 0.9 metres below ground level.

The gradient of the drain is 1:60 and the distances between the points are as shown in the table below.

Complete the table below to give the fall in millimetres for each listed section of drain.

Length of pipe sections		
Pipe section	Distance (m)	Fall (mm)
A - B	13	
B - C	30	
C - Y	15	

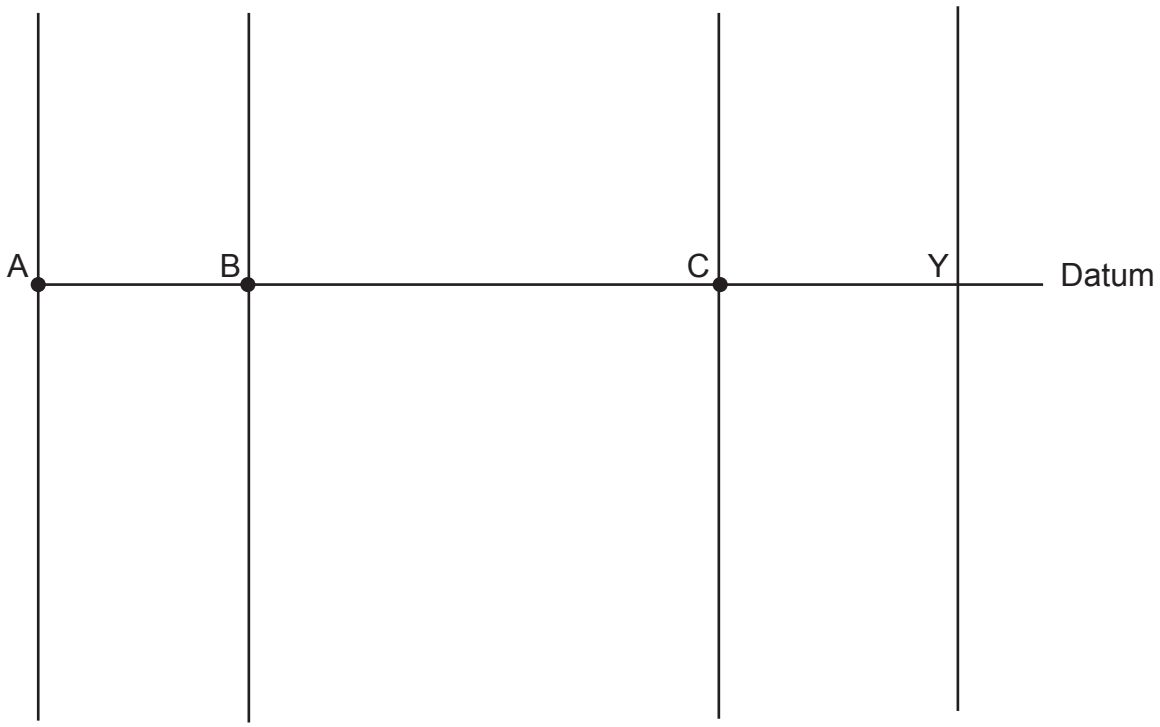
(3 marks)

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

The ground levels. (3 marks)

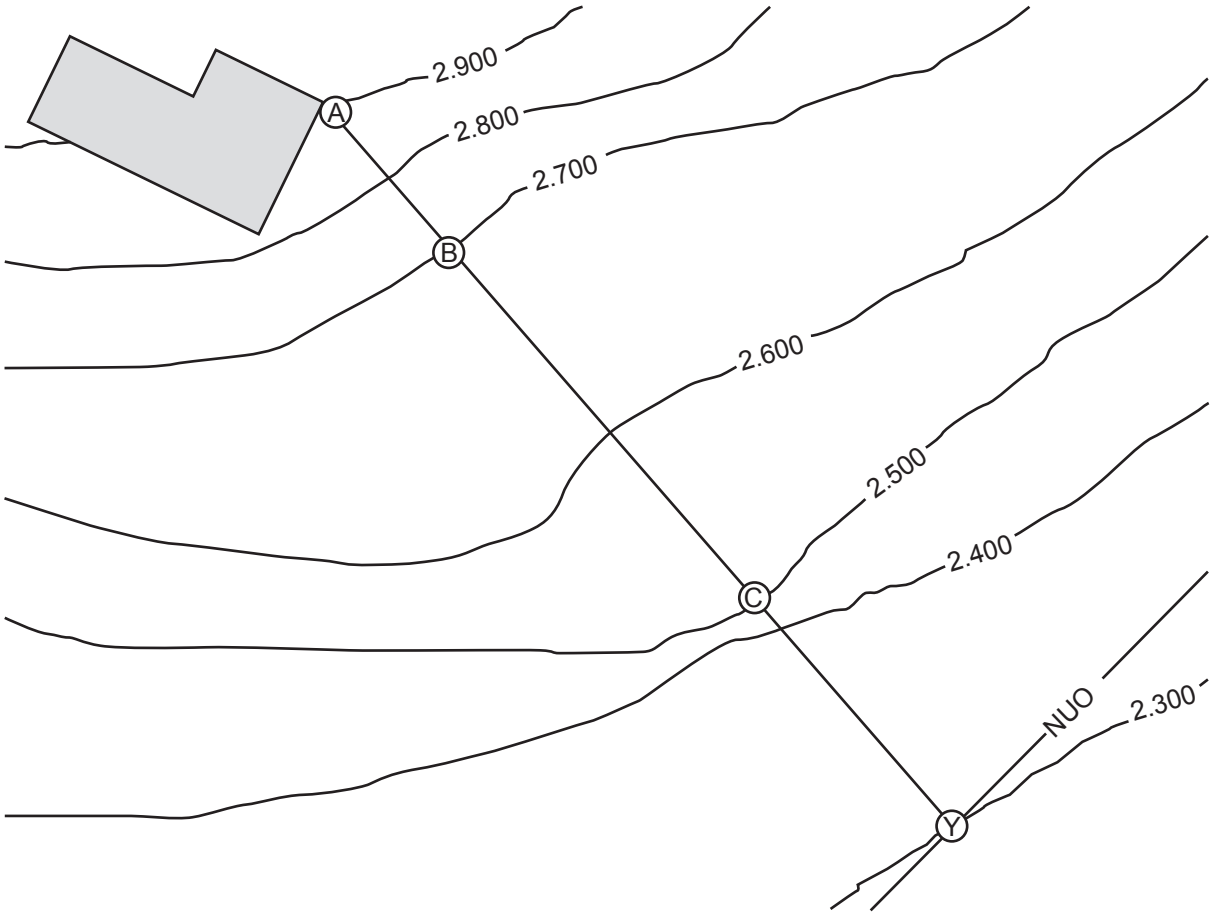
The depth of the drain invert below the datum. (3 marks)

The depth of the drain invert below the ground. (3 marks)



Total 12 marks

QUESTION 7 (cont'd)



QUESTION 8

(a) Sketch and label a diagram of a bubble up chamber.

(5 marks)

(b) Explain what a bubble up chamber would be used for.

(1 mark)

Total 6 marks

QUESTION 9

List THREE drainlaying-related guides or Codes of Practice provided by WorkSafe.

1 _____

2 _____

3 _____

Total 3 marks

QUESTION 10

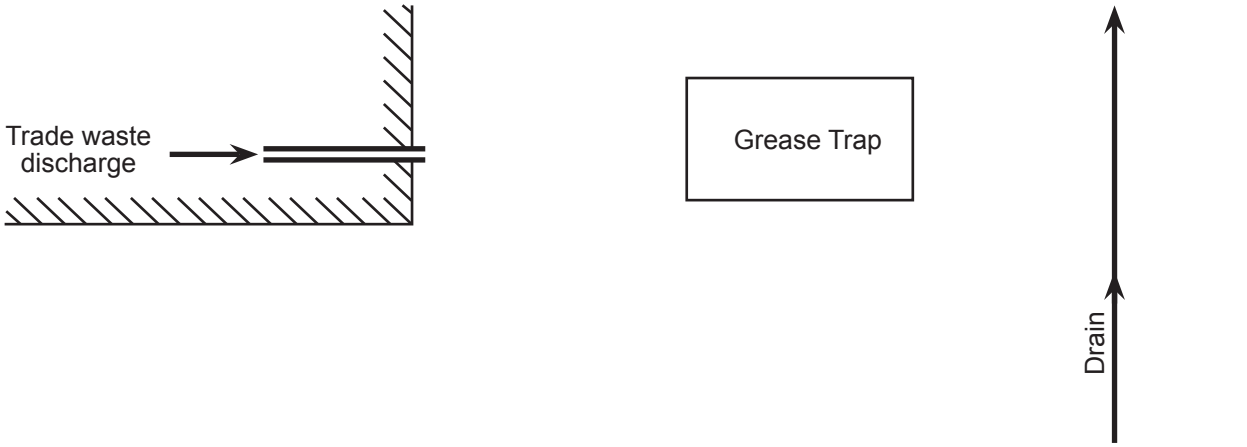
(a) Complete the starter drawing below to show the structure of a two-chamber grease trap, and label the main components.

Label the main components of the grease trap.

(4 marks)

(b) The drawing below shows the plan of a grease trap installation.

Complete the drawing so that the installation complies with New Zealand Building Code clause G13 Foul Water.



(3 marks)

(c) State the minimum allowable size of a grease trap.

_____

(1 mark)

Total 8 marks

QUESTION 11

A drainage contract requires excavation and site works.

Give THREE environmental factors that should be allowed for under the Resource Management Act before carrying out the work.

1 _____

2 _____

3 _____

Total 3 marks

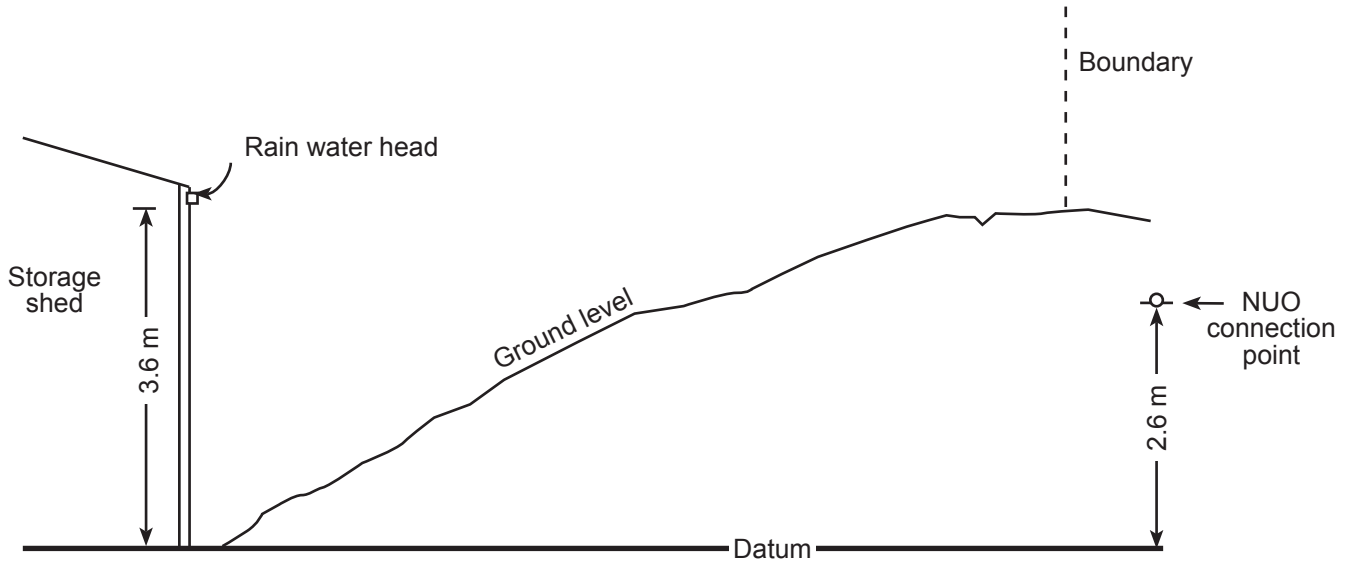
QUESTION 12

The diagram below shows a side elevation of a section which includes a storage shed. There is no electrical power on the site.

The plan also shows a connection to the Network Utility Operator's (NUO) surface water sewer as shown.

Complete the diagram to show a completed surface water drainage system for the storage shed that will enable the completed installation to comply with New Zealand Building Code clause E1 Surface Water.

Label your drawing to show all main components.



Total 6 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. When a practising licence holder changes address, within what period must the Plumbers, Gasfitters and Drainlayers Board be notified?

   A 10 days.

   B 15 days.

   C 1 month.

   D 3 months.

   E 6 months.

   ☐

2. What is the minimum length of time that an exempted person under supervision must work in the presence of his or her supervisor?

   A 18 months.

   B 24 months.

   C 30 months.

   D 36 months.

   E 40 months.

   ☐

3. A certifying practitioner ceases to supervise a person by notifying the Plumbers, Gasfitters and Drainlayers Board in writing.

   When does the certifier's responsibility for the work of the supervised person cease?

   A When the certifier informs the supervised person.

   B When the notification is signed by the certifier.

   C When the notification is received by the Board.

   D When the licensing year finishes.

   E When the notification is signed by the supervised person.

   ☐

4. There is a gas that occurs in the ground and naturally smells like rotten eggs. When exposed to large concentrations of this gas, peoples' sense of smell is lost so that the gas cannot be readily detected by its smell.

   What is the gas?

   A Methane.

   B Hydrogen sulphide.

   C Ethane.

   D Carbon dioxide.

   E Propane.

   ☐

5. A drain has been is laid at a gradient of 1:80 (1.25%) and has a fall of 120 mm.

   How long is the drain?

   A 150 mm.

   B 960 mm.

   C 1.50 m.

   D 6.66 m.

   E 9.60 m.

   ☐

6. 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.

   ☐

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

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

B To prevent vermin from entering the grease trap.

C So that the pipe does not require venting.

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

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

☐

8. Which of the following is NOT a required location for an access point on a surface water drain, as specified by New Zealand Building Code clause E1/AS1 Surface Water?

A. At least every 50 m where rodding points are used.

B At least every 100 m where inspection points, inspection chambers or access chambers are used.

C Points with changes in direction of greater than 45°.

D Points with changes in gradient of greater than 45°.

E Junctions of drains serving a single downpipe that are less than 2.0 m long.

☐

9. What is the maximum permitted head at the lower end of a drain during a water test carried out to comply with New Zealand Building Code clause E1/VM1 Surface Water?

A 1.2 m.

B 2.0 m.

C 3.0 m.

D 6.0 m.

E 10 m.

☐

10. A customer's drain is to be laid and will pass through a neighbouring property.

What is the term used to describe this on a plan?

A A right of way.

B A landowner's agreement.

C A landowner's registration.

D An easement.

E A drain in common.

☐

Total 10 marks ☐

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Section B		
Total		