

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

.....

No. 9197



Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2013

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 22–25 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 June 2013 were provided with the following documents:

- AS/NZS 3500 Part 2: Sanitary plumbing and drainage
- Approved Code of Practice for Safety in Excavations for Shafts and Foundations

SECTION A

QUESTION 1

- (a) Complete the following table showing the Minimum Grade for a 100 mm drain according to the listed documents.

Document	Minimum Grade
E1	
G13	
AS/NZS 3500 Part 2	

(1 mark)

- (b) Give an explanation for the term reduced grade in relation to drainlaying.

(1 mark)

Total 2 marks

QUESTION 2

- (a) List SIX gases that can be encountered while carrying out drainlaying work and that may be harmful.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(3 marks)

- (b) State TWO ways that a gas may be harmful.

1 _____

2 _____

(1 mark)

QUESTION 2 (cont'd)

(c) Describe the following terms in relation to effluent disposal.

(i) Transpiration

(2 marks)

(ii) Evaporation

(2 marks)

(iii) Percolation

(2 marks)

Total 10 marks

QUESTION 3

- (a) On a set of site plans, the longitudinal sectional view (long section) of the drainage profile should clearly show relevant items of information to assist a drainlayer in setting out the drainage system.

List FOUR of these items.

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

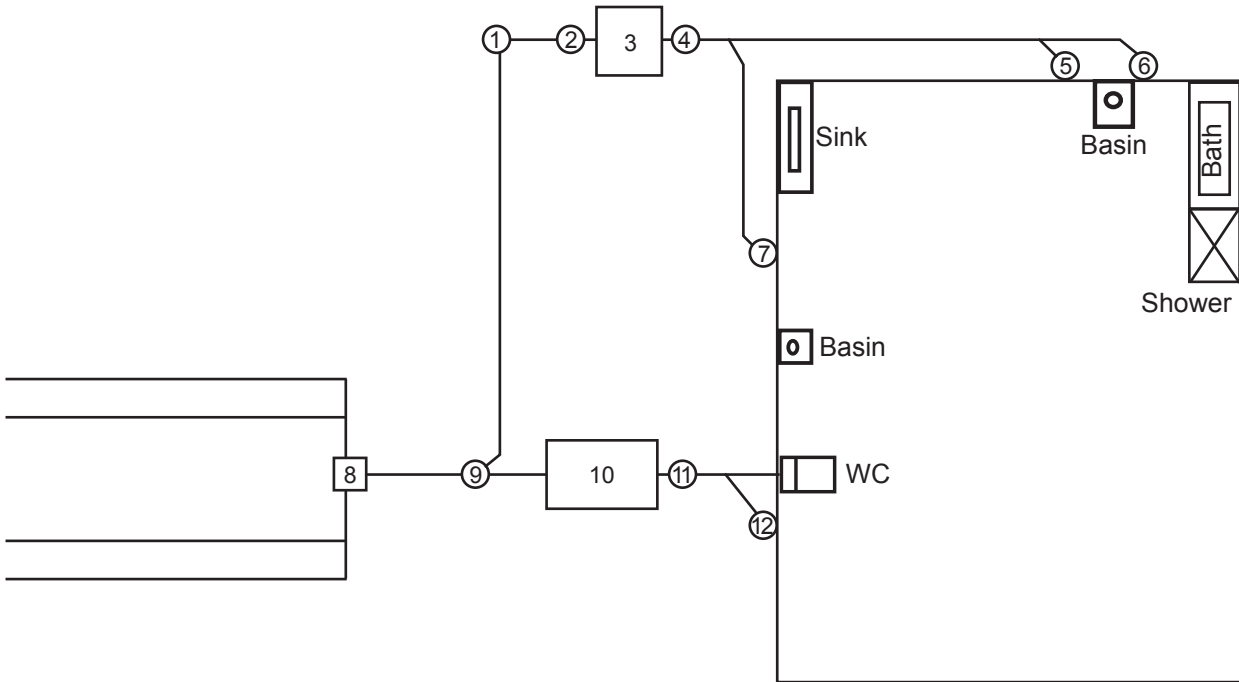
(4 marks)

QUESTION 3 (cont'd)

(b) The diagram below shows a drainage plan for an on-site waste water disposal system.

Various components have been numbered.

The system complies with AS/NZS 1547 On-site domestic wastewater management.



Complete the table below by naming the listed components.

No.	Component	No.	Component
1		7	
2		8	
3		9	
4		10	
5		11	
6		12	

(6 marks)

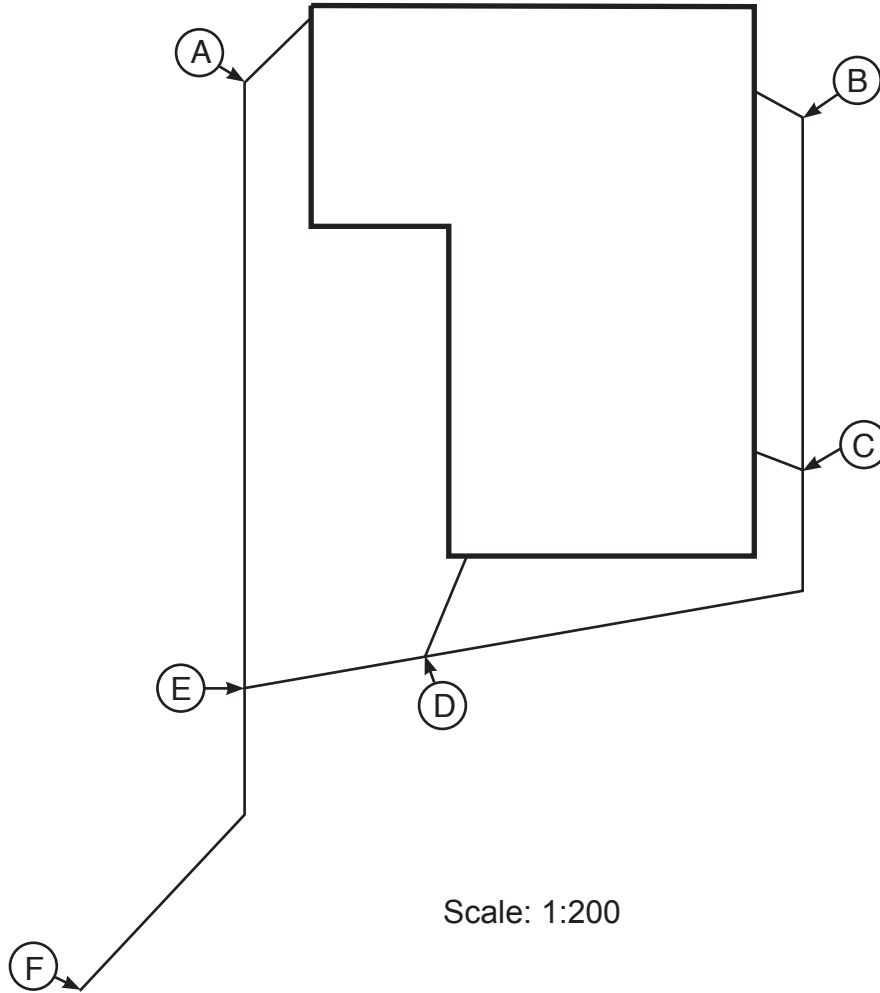
Total 10 marks

QUESTION 4

The drawing below shows an as-built plan of a drainage system.

The drawing is to a scale of 1:200.

All pipework is installed at a grade of 1:60



Complete the table below giving the length of each section of pipe and the fall in mm for each section of pipe.

Section	Total length of the section (m)	Total fall of the section (mm)
A – E		
B – C		
C – D		
D – E		
E – F		
A – F		
B – F		

Total 7 marks

QUESTION 5

Draw a sketch showing a culvert installed under a driveway. Indicate all major components.

Total 5 marks

QUESTION 6

State THREE responsibilities of a trainee drainlayer with respect to his or her limited certificate.

- 1 _____
- 2 _____
- 3 _____

Total 3 marks

QUESTION 7

(a) Describe the operation of a siphon dosing system.

(2 marks)

(b) Describe how the operation of the siphon dosing system will assist with making the disposal field last longer.

(2 marks)

(c) An effluent field is to be laid in an area where appropriate depths are not available due to a high water table.

Give THREE options for the disposing of the effluent.

1

2

3

(3 marks)

Total 7 marks

QUESTION 8

- (a) To measure the developed length of a drain, state where the measurement is taken and what it includes.

(1 mark)

- (b) State the purpose of contour lines on a site plan.

(1 mark)

Total 2 marks

QUESTION 9

(a) Give TWO essential differences between a wet inspection chamber and a dry inspection chamber.

- 1 _____

- 2 _____

(2 marks)

(b) List FIVE locations where flexible joints are required on a drain.

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

(5 marks)

(c) Give a situation where a fresh air inlet is required on a drain.

(1 mark)

Total 8 marks

QUESTION 10

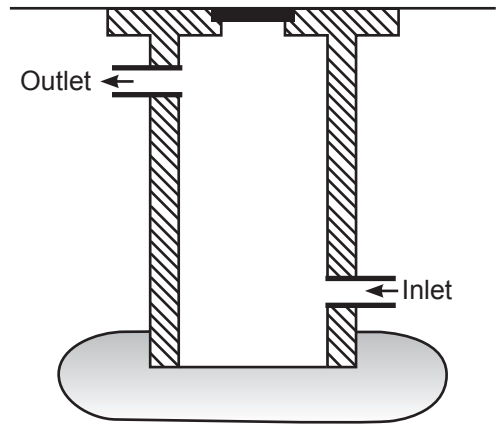
Name the structure shown in each of the following diagrams, give a situation where it would be required and state its function.

(a)

Name _____

Situation _____

Function _____



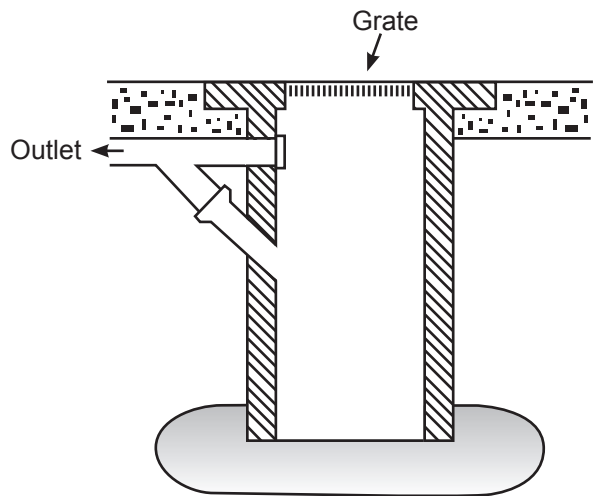
(3 marks)

(b)

Name _____

Situation _____

Function _____



(3 marks)

QUESTION 10 (cont'd)

(c)

Name _____

Situation _____

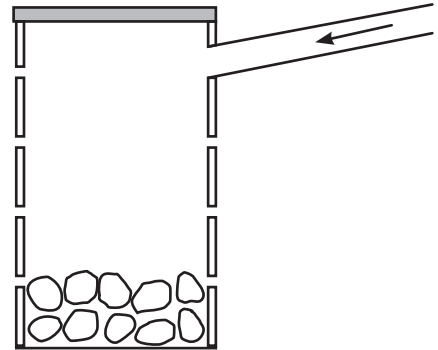
Function _____

(d)

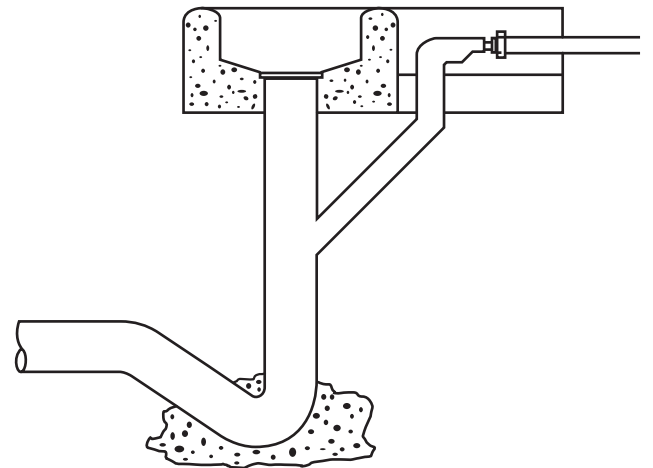
Name _____

Situation _____

Function _____



(3 marks)

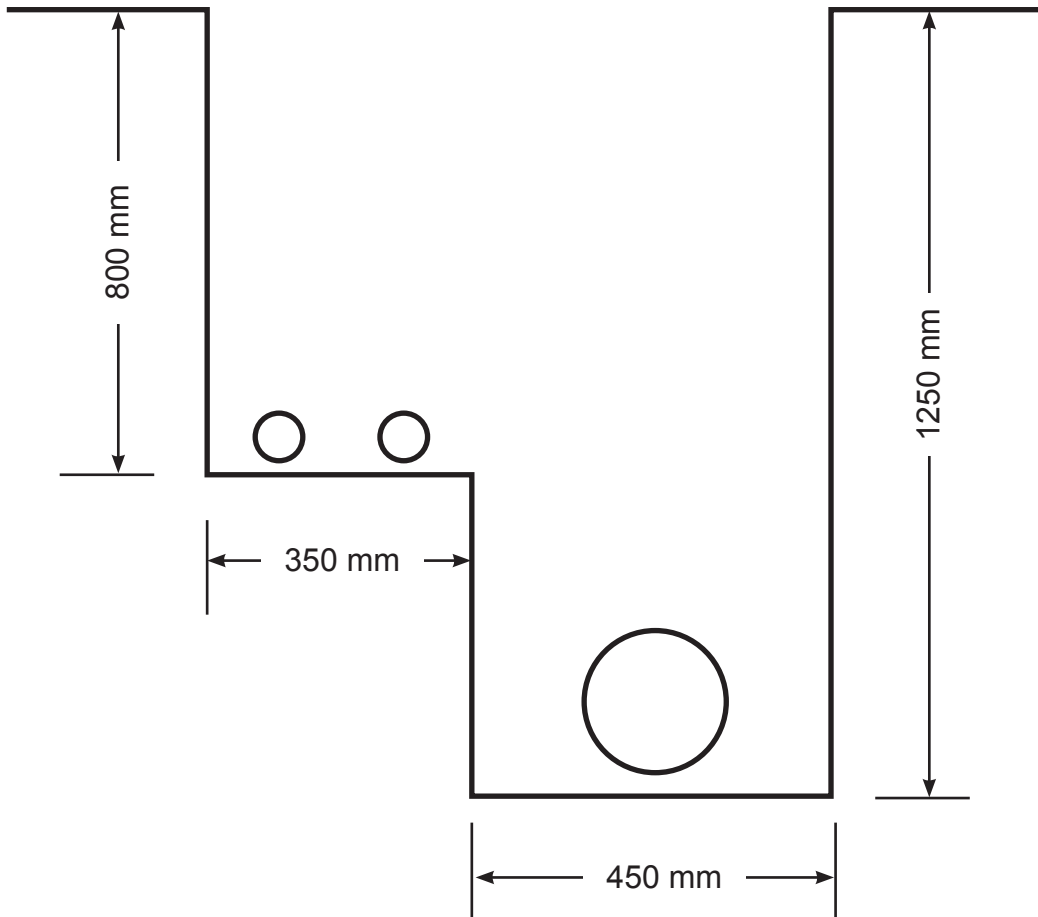


(3 marks)

Total 12 marks

QUESTION 11

The plan below shows the front elevation of a trench. The trench is 26 m long.



Calculate the volume of material required to fill the trench.

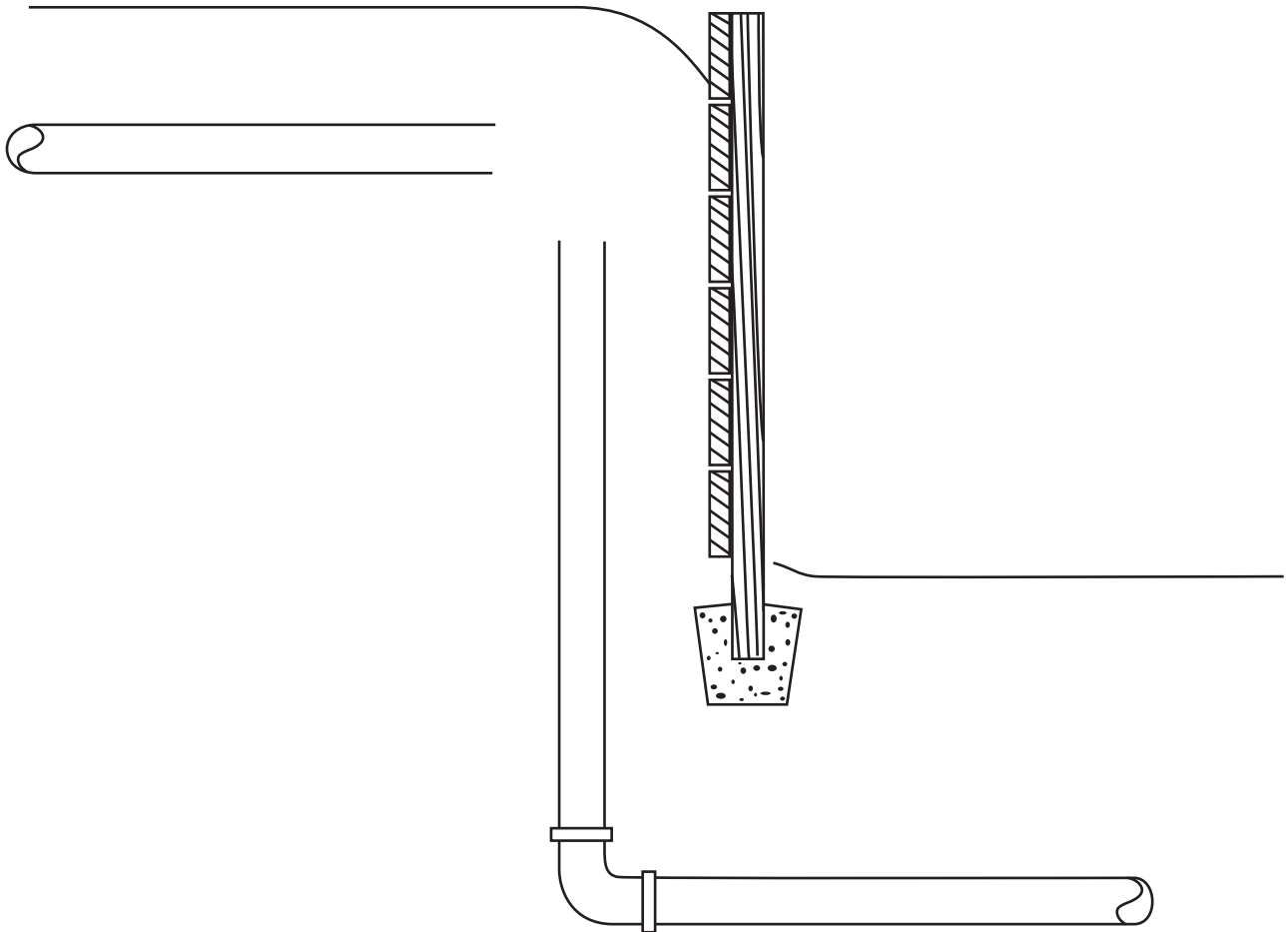
- Allow 20% for compaction.
- No allowance is required for the pipe volumes.

Total 4 marks

QUESTION 12

The starter drawing shows a jump-up adjacent to a retaining wall.

Complete the diagram so that the installation will comply with AS/NZS 3500 Part 2: Sanitary plumbing and drainage.



Total 3 marks

QUESTION 13

(a) A drain has been laid at a depth of 2 m.

List the steps in the procedure for backfilling, compacting and removing the timber shoring from the excavation.

(4 marks)

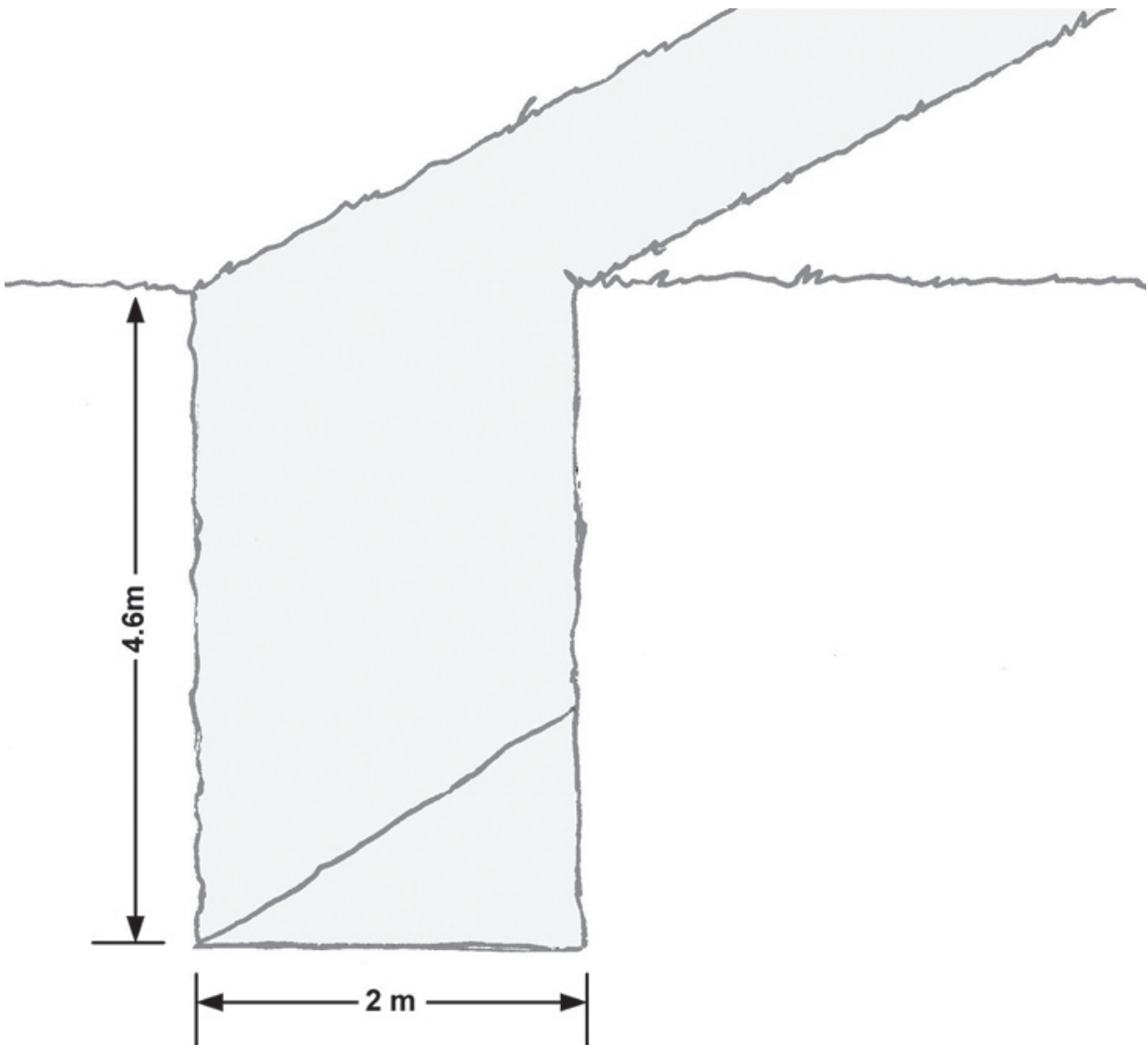
(b) The starter drawing on the page opposite shows a trench excavated in Type A soil.

Complete the drawing to show suitable timber shoring to prevent the trench collapsing so that it complies with the Approved Code of Practice for Safety in Excavations for Shafts and Foundations.

Include in your drawing:

- required shoring components
- minimum sizes for each component
- the minimum spacing for each of the components.

QUESTION 13 (cont'd)



(8 marks)

Total 12 marks

QUESTION 14

When a drain or part of a drain is no longer required, it must be disconnected from the foul water drainage system.

(a) State the position at which the drain must be disconnected.

(1 mark)

(b) State what the drainlayer must use to seal the disconnection.

(1 mark)

(c) State TWO effects that the unsatisfactory disconnection of old branch drains from live drains may have on the drainage system.

1 _____

2 _____

(2 marks)

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.

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) Which of the following is the minimum cover over a drain laid under a driveway?

- A 450 mm.
- B 500 mm.
- C 550 mm.
- D 600 mm.
- E 650 mm.

2. According to AS/NZS 3500 Part 2 the maximum length of an unvented branch drain is.

- A 4 m.
- B 5 m.
- C 6 m.
- D 8 m.
- E 10 m.

3. According to AS/NZS 3500 Part 2 the minimum diameter for a main drain vent is.

- A 40 mm.
- B 50 mm.
- C 65 mm.
- D 80 mm.
- E 100 mm.

4. According to NZBC G13 (AS2) the minimum diameter for a main drain vent is.

- A 40 mm.
- B 50 mm.
- C 65 mm.
- D 80 mm.
- E 100 mm.

5. Which of the following best describes the term hydraulics?

- A Fluid at rest.
- B Meters head from inlet to outlet.
- C Pressure within pipework.
- D Pressure loss.
- E Fluid in motion.

6. Water is to be removed from an excavation which is 15 meters deep. Which of the following tools is best suited to remove the water?

- A Surface pump.
- B Siphon.
- C Hydraulic ram.
- D Submersible pump.
- E Macerating pump.

7. When work is deemed to be more than usually dangerous, it is referred to as...

- A Dangerous work.
- B High risk work.
- C Notifiable work.
- D Restricted work.
- E Limited work.

8. The safe slope of a trench which is 2 meters in depth should not exceed a vertical to horizontal ratio of...

- A 2 vertical : 1 horizontal or the angle of repose, whichever is flatter.
- B 1 vertical : 1.5 horizontal or the angle of repose, whichever is flatter.
- C 1.5 vertical : 1.5 horizontal or the angle of repose, whichever is flatter.
- D 1.5 vertical : 1 horizontal or the angle of repose, whichever is flatter.
- E 1 vertical : 2 horizontal or the angle of repose, whichever is flatter.

9. Which of the following states the minimum distance that excavated material is permitted to be stored from the edge of the excavation?

- A 600 mm.
- B 900 mm.
- C 1200 mm.
- D 1800 mm.
- E 2400 mm.

10. Which of the following shows the unit of measure for velocity?

- A m^3/v
- B m^2/v
- C v^2
- D m/second
- E l/minute

11. According to the Approved Code of Practice for Safety in Excavations and Shafts for Foundations, ladders or stairways must be provided in every trench where work is being carried out in a trench which is greater than what depth?

- A 1.5 m.
- B 2.0 m.
- C 2.4 m.
- D 3.0 m.
- E 3.6 m.

Total 11 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		