No. 9198

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2012
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 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 2012 were provided with the following documents:

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

- New Zealand Building Code clause E1 Surface Water

- New Zealand Building Code clause G13 Foul Water

SECTION A

QUESTION 1

A surface water drain is to be water tested using the method prescribed in New Zealand Building Code Clause E1/VM1 Surface Water.

(a)   State the required length of time for the test.

_____

(1 mark)

(b)   The drain is 300 mm in diameter and 57 metres long.

Calculate in litres the maximum amount of acceptable water loss during the test.

_____

_____

_____

_____

(3 marks)

(c)   Give TWO other acceptable methods that may be used to test the drain.

1   _____

2   _____

(1 mark)

(d)   Give the additional requirements that must be met when testing a drain that has been constructed from ceramic or concrete pipe.

_____

(1 mark)

Total 6 marks

QUESTION 2

The plan below shows a building and contour lines on a building site. The plan is drawn to a scale of 1:200

The foul water from the building is to be disposed of through a single stage septic tank (A) and a trench effluent field. The effluent field is to have two separate lines approximately 35 metres long.

(a) Complete the drawing to show the foul water drains, including vents, and the complete effluent disposal system for the site. The system is to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.
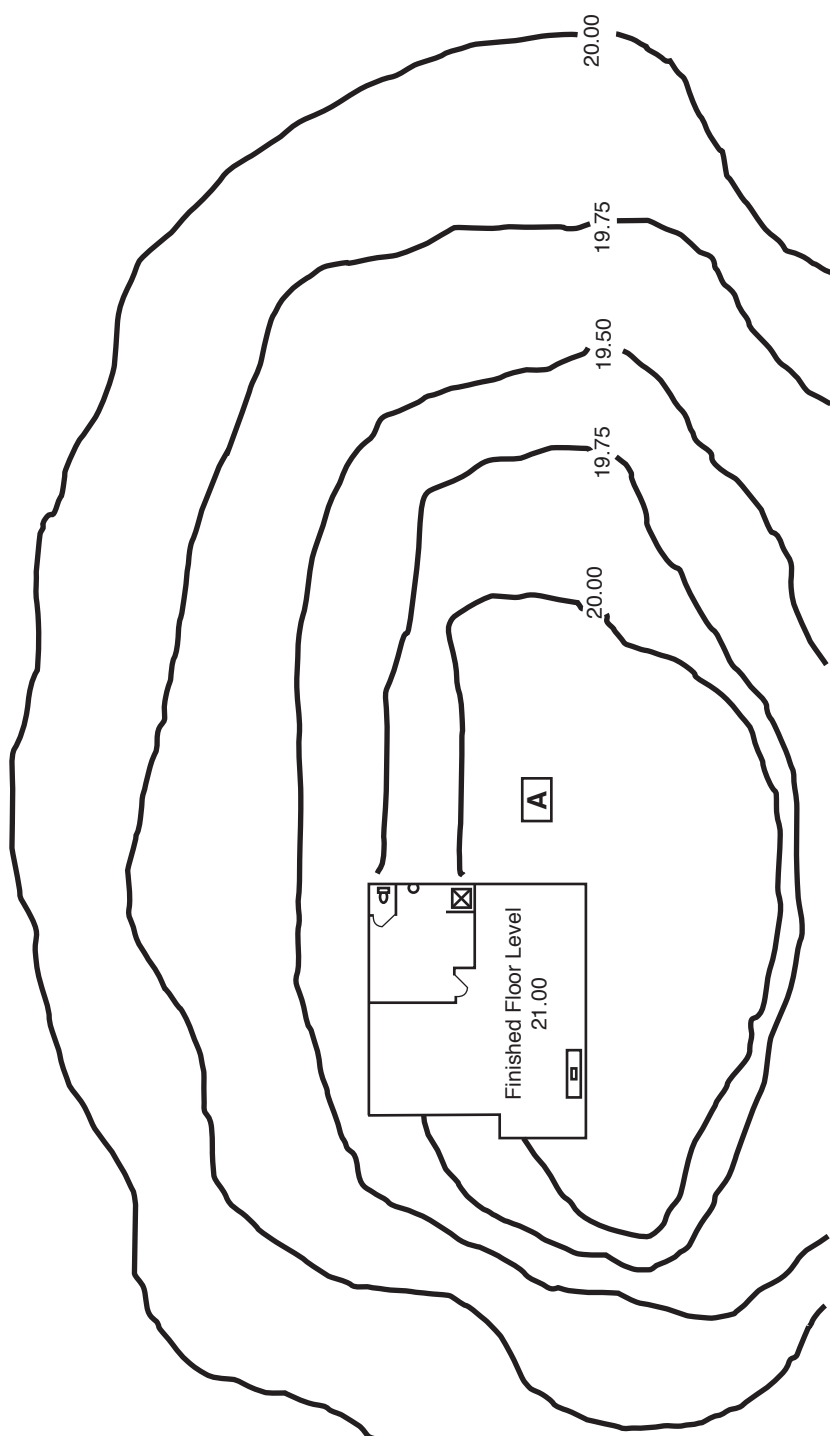
(10 marks)

QUESTION 2 (cont'd)

(b) State the purpose of including two effluent disposal lines in the design in (a).

_____

_____

(1 mark) ☐

(c) Describe THREE ways in which the long-term acceptance rate of an effluent disposal field may be improved.

1 _____

2 _____

3 _____

(3 marks) ☐

Total 14 marks ☐

QUESTION 3

(a) List FIVE Acts of Parliament that directly impact on the way a certifying drainlayer can design and install on-site disposal systems.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks)

(b) Explain the difference between a New Zealand Building Code Performance Requirement and a New Zealand Building Code Acceptable Solution.

_____

_____

_____

(2 marks)

(c) State the TWO responsibilities a certifying drainlayer has with regard to an employee who has held an exemption to do drainlaying work for more than two years.

1 _____

2 _____

(2 marks)

(d) (i) Give the meaning of the term Exempt Building Work.

_____

_____

(1 mark)

QUESTION 3 (cont'd)

(ii)   Give TWO examples of drainlaying work that would be classified as exempt building work.

1   _____

_____

_____

2   _____

_____

_____

(2 marks)

(iii)   Give THREE categories of people who are permitted to complete drainlaying that is exempt building work.

1   _____

2   _____

3   _____

(3 marks)

Total 15 marks

QUESTION 4

(a) The plan opposite shows the proposed layout for the surface water drains for a commercial building and carpark. The carpark has an area of 367 m², and drains into the sump shown. The plan is not drawn to scale.

The surface water drains are to be installed at a gradient of 1:60 and are to comply with New Zealand Building Code Clause E1/AS1 Surface Water.

Complete the tables below to show the following.

The catchment area served by each downpipe.

The catchment area served by each section of drain.

The minimum diameter for each section of drain.

The fall for each section of pipe.

Area of catchment per downpipe			Area of catchment for pipe section			Minimum diameter pipe for each section	
Downpipe	Area		Section	Area		Section	Diameter
1			A – B			A – B	
2			B – C			B – C	
3			C – G			C – G	
4			G – H			G – H	
5			D – E			D – E	
6			E – F			E – F	
Sump	367 m²		F – H			F – H	
			H – X			H – X	

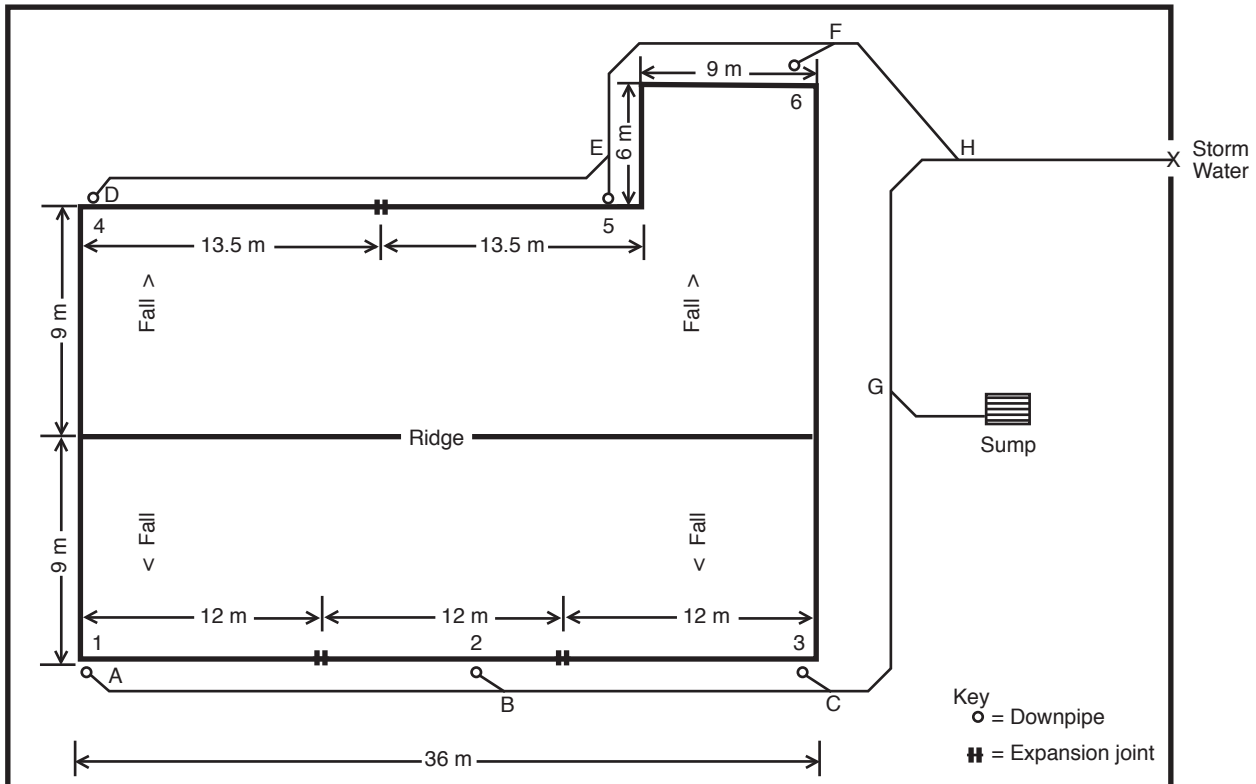| Fall per section of pipe		
Section	Length	Fall
A – B	18 metres	
B – C	19 metres	
C – G	17 metres	
G –H	15 metres	
D – E	27 metres	
E – F	16 metres	
F – H	10 metres	
H – X	12 metres	

(15 marks)

(b) Calculate the minimum depth required at the connection point X.

_____

(1 mark)

QUESTION 4 (cont'd)

(c) As work progresses, it becomes apparent that the network connection point will be above the expected drain level.

Give TWO ways in which the design could be changed to allow for this.

1 _____

2 _____

(2 marks)

(d) State FOUR locations where access to a surface water drain must be provided, as specified by New Zealand Building Code Clause E1/AS1 Surface Water.

1 _____

2 _____

3 _____

4 _____

(2 marks)

Total 20 marks

QUESTION 5

The plan opposite shows a building and contour lines on a site. The foul water drainage pipework connecting the dwelling to the TA sewer is also shown.

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

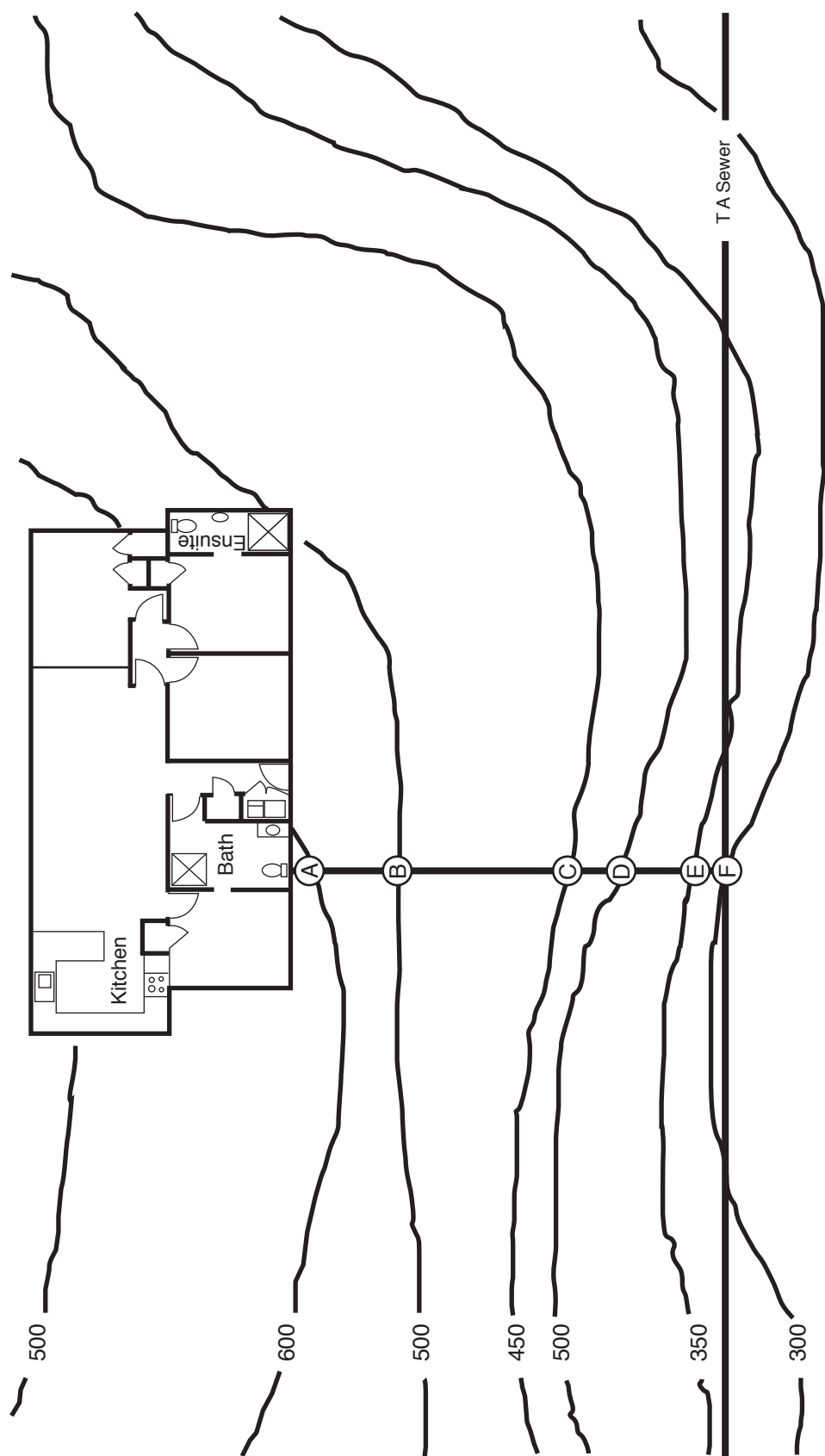| Length of pipe sections	
Pipe Section	Distance
A – B	3 metres
B – C	5 metres
C – D	1.5 metres
D – E	2 metres
E – F	0.75 metres

The invert for the TA connection marked F is 0.8 metres below ground level.

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

Depth of invert of drain	
Point	Depth
A	
B	
C	
D	
E	

Total 10 marks

QUESTION 6

A cylindrical soak pit is to be constructed so that it complies with New Zealand Building Code Clause E1/AS1 Surface Water.

The soak pit will be filled with rocks.

The total volume of the soak pit is to be 4.0 m³, and it is to have a diameter of 2.6 m.

(a) State the percentage of the total volume of the soakpit that will be available for water.

_____

(1 mark) ☐

(b) Calculate the required depth of the soak pit.

_____

_____

_____

_____

_____

(4 marks) ☐

Total 5 marks ☐

QUESTION 7

The plan below shows the layout of sanitary fixtures for a new dwelling and a connection point to the network utility operator (NUO) sewer (marked A). The plan has been drawn at a scale of 1:100

(a)   Complete the diagram to show the foul water drains required to convey the waste to the NUO sewer connection point. The system is to comply with the minimum requirements of New Zealand Building Code Clause G13/AS2 Foul Water.

(b)   Label the diagram to indicate the location of any necessary inspection openings.
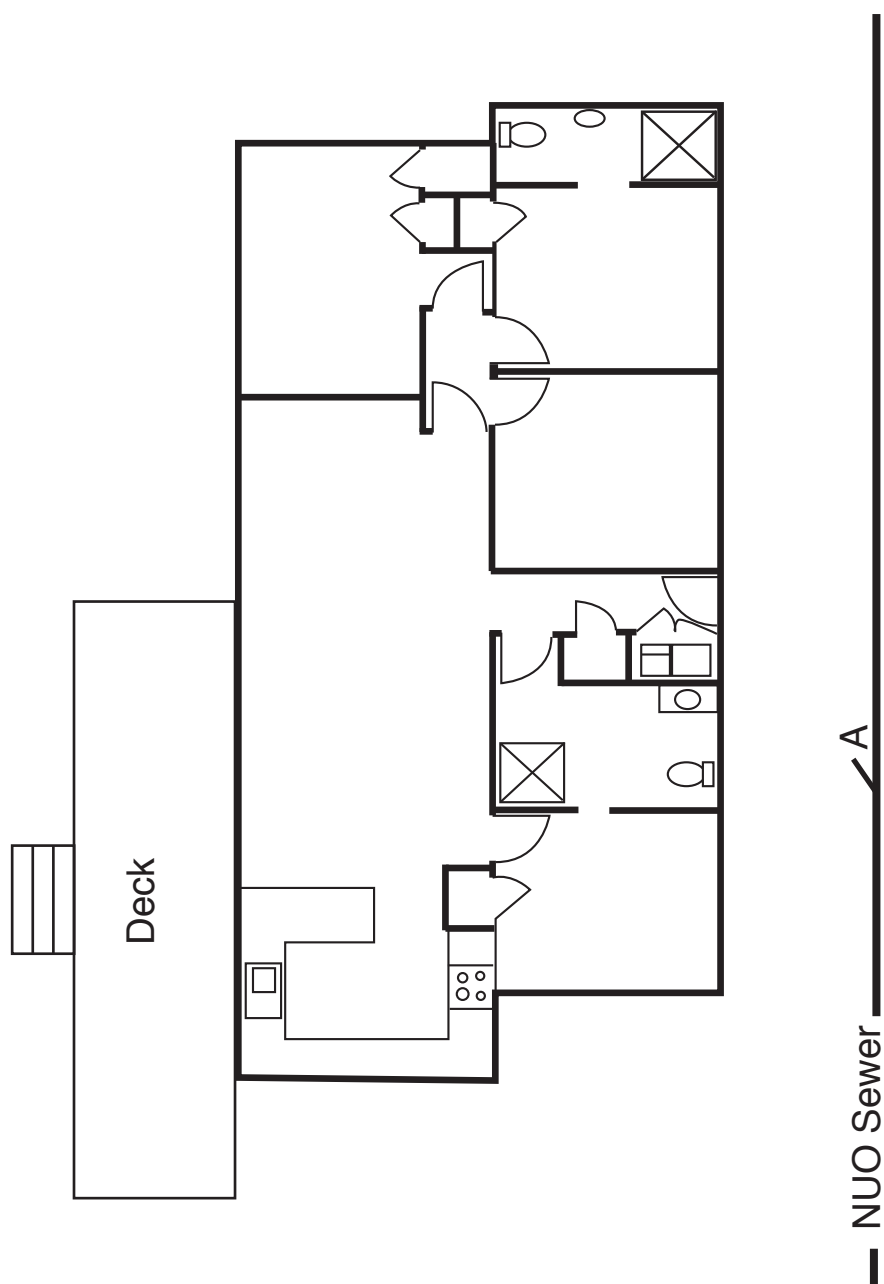
Total 10 marks

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 no marks will be awarded for that question.

1. 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 in Employment Act.

    D   A normative set of rules which must be followed.

    E   A Department of Labour preferred work practice guideline.

2. The walls of a trench are to be benched.

    What is the maximum allowable depth from the base of the trench to the first bench level?

    A   500 mm.

    B   600 mm.

    C   750 mm.

    D   1000 mm.

    E   1200 mm.

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. What is the recommended distance that should be observed between workers when using hand tools (e.g. picks, shovels) to prevent them from injuring each other?

   A   900 mm.

   B   1000 mm.

   C   1200 mm.

   D   1500 mm.

   E   2000 mm.

   ☐

5. Which of the following gases is commonly found when excavating peaty soil?

   A   Methane.

   B   Carbon dioxide.

   C   Natural gas.

   D   Carbon monoxide.

   E   Sulphur dioxide.

   ☐

6. Which of the following is the definition of a trench excavation?

   A   Excavations that are deeper than the horizontal width.

   B   Excavations that are wider than the vertical depth.

   C   Excavations that are over 1.5 metres deep.

   D   Excavations that require shoring.

   E   Excavations that are dug by mechanical means.

   ☐

7. A stormwater system must be designed to cope with the expected rainfall in a 10 minute period of a storm that occurs how often?

   A   Every 10 years.

   B   Every 15 years.

   C   Every 25 years.

   D   Every 50 years.

   E   Every 100 years.

   ☐

8. What is the minimum allowable gradient for a 225 mm stormwater drain?

    A   1:90

    B   1:120

    C   1:250

    D   1:300

    E   1:350

    ☐

9. Who approves the discharge of trade waste into a sewer?

    A   The trade waste producer.

    B   The network utility operator.

    C   The Resource Management Act department.

    D   The chemical testing laboratory.

    E   The certifying drainlayer.

    ☐

10. How must piping systems conveying hazardous liquid waste be jointed so that they comply with New Zealand Building Code Clause G14/VM1?

    A   Flanged or butt-welded joints.

    B   Elastomeric rubber ring joints.

    C   Solvent cement or fusion welded joints.

    D   Threaded joints.

    E   Crimp or compression ring joints.

    ☐

11. Which document specifies how drains constructed to convey hazardous liquid waste to a sewer must be tested for leaks?

    A   New Zealand Building Code Clause B2 Durability.

    B   New Zealand Building Code Clause G13 Foul Water.

    C   New Zealand Building Code Clause G14 Industrial Liquid Waste.

    D   New Zealand Building Code Clause F1 Hazardous Agents on Site.

    E   New Zealand Building Code Clause F3 Hazardous Substances and Processes.

    ☐

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

    A   A drain that conveys both stormwater 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.

13. A house is connected to a septic tank. A foul water sewer is being extended up the street past this house.

    At what distance of the house from the sewer does connecting the house to the sewer become compulsory?

    A   20 m.

    B   30 m.

    C   40 m.

    D   50 m.

    E   60 m.

14. Under which condition can a 65 mm diameter pipe be used for a foul water branch drain?

    A   When the branch drain is laid at a gradient of 1:40 (2.5%).

    B   When the branch drain is not vented.

    C   When the branch drain is not receiving the discharge from any soil fixtures (except urinals).

    D   When the branch drain is receiving no more than 25 fixture discharge units.

    E   When provision has been made for flushing the branch drain.

15. 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 receiving no more than 18 fixture discharge units.

    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 constructed from solvent cement jointed uPVC.

16. What is the purpose of a drainage easement on a certificate of title?

    A   To allow a drain to be laid within a neighbouring property.

    B   To prevent flooding caused by surface water from a neighbouring property.

    C   To allow two neighbouring properties to share a drainage system.

    D   To permit the stormwater from the property to discharge to a curb and channel.

    E   To show the as-laid location of the drainage system on the certificate of title.

17. What is the minimum depth of cover a uPVC drain must have when installed in an area that will be subjected to heavy vehicular traffic so that it complies with AS/NZS 3500 Part 2: Sanitary plumbing and drainage?

    A   300 mm.

    B   350 mm.

    C   400 mm.

    D   500 mm.

    E   600 mm.

18. What is the minimum permitted diameter for the outlet pipework connected to a soil waste dump point?

A   65 mm.

B   80 mm.

C   100 mm.

D   150 mm.

E   200 mm.

☐

19. What is the minimum allowable gradient for the concrete base of a soil waste dump point to slope towards its outlet?

A   1:80

B   1:70

C   1:60

D   1:50

E   1:40

☐

20. What is the maximum permitted length of an unvented branch drain connected to a sullage dump point at a caravan park?

A   1.5 m.

B   3 m.

C   6 m.

D   8 m.

E   10 m.

☐

Total 20 marks ☐

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
Section B		
Total		