No. 9198

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, JUNE 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 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 2017 were provided with the following documents:

- New Zealand Building Code Clause E1 – Surface Water

- New Zealand Building Code Clause G13 – Foul Water

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

USEFUL FORMULAE

Circumference of circle = 2 × π × R   or   Circumference of circle = π × D

Area of circle = π × R² or Area of circle = 0.7854 × D²

Volume of cylinder = π × R² × H   or   Volume of cylinder = 0.7854 × D² × H
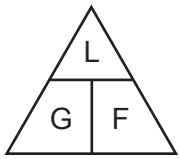
length = L

gradient = 1:G

fall = F

SECTION A

QUESTION 1

(a) New Zealand Building Code clause B2/AS1 Durability states specific lengths of time that components are required to last before needing replacement.

There are three different categories of products determined by how difficult the component is to access and replace.

Complete the following table by giving the specific time each category of product is required to last before replacement could be necessary (life expectancy) and an example of a component which fits each category.

Category	Life expectancy	Component example
Easy to access and replace		
Moderately difficult to access and replace		
Difficult to access and replace		

(6 marks)

(b) While performing consented work, a specified product has been replaced by a different product.

State TWO parties who must be notified of the change.

1 _____

2 _____

(2 marks)

Total 8 marks

QUESTION 2

(a) A system for the disposal of industrial liquid waste is to be designed.

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

Give the TWO acceptable options for disposal of the liquid waste.

1 _____

2 _____

(2 marks)

(b) Give the number and name of TWO clauses of the New Zealand Building Code with which systems designed for collecting hazardous industrial liquid waste must comply.

1 _____

2 _____

(2 marks)

(c) Give a specific requirement that a pump used to pump hazardous liquid waste must meet.

_____

(1 mark)

(d) Name the type of trap that must be included in a drainage system disposing of industrial liquid waste if the industrial liquid waste is flammable.

_____

(1 mark)

Total 6 marks

QUESTION 3

(a) State the purpose of the layer of rocks in a chamber soak pit.

_____

(1 mark)

(b) Give FOUR requirements, other than having a rock layer, that must be met in the construction of a chamber soak pit.

1 _____

2 _____

3 _____

4 _____

(2 marks)

Total 3 marks

QUESTION 4

(a) Give TWO ways in which solvent cement can enter the body.

1 _____

2 _____

(2 marks)

(b) Give TWO effects solvent cement can have on the body.

1 _____

2 _____

(2 marks)

(c) List TWO items of safety equipment that should be worn when working with solvent cement.

1 _____

2 _____

(1 mark)

Total 5 marks

QUESTION 5

(a) A certifying drainlayer has just employed the categories of people 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	Licensing category	Minimum period 'in the presence of'
New apprentice		
Unskilled labourer		
A holder of a National Certificate in Drainlaying who has not passed the Licensing exam		

(6 marks)

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

1 _____

2 _____

3 _____

(3 marks)

Total 9 marks

QUESTION 6

(a) Name a test used to determine the suitability of an area to be used for the installation of a soak pit.

_____

(1 mark)

(b) Describe how the test in (a) is performed.

_____

_____

_____

_____

(3 marks)

(c) Explain how the surface water run-off co-efficient is affected by the gradient of a site.

_____

_____

(2 marks)

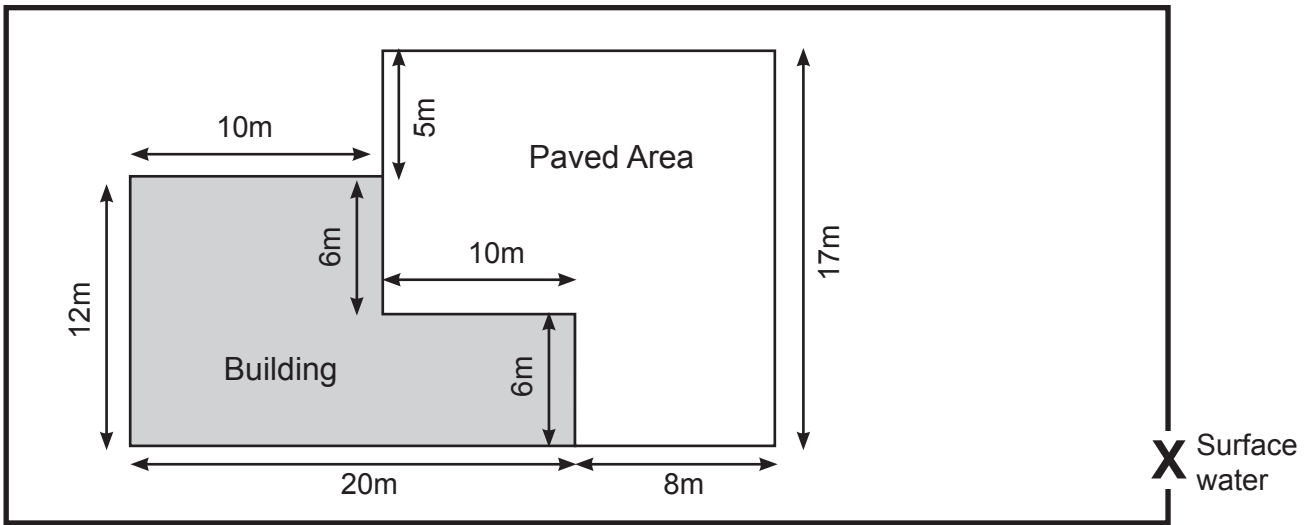(d) Calculate the corrected run-off coefficient for a sealed driveway that has a slope of 15%.

_____

(1 mark)

(e) State the organisation which would provide the most accurate rainfall intensity data for a location.

_____

(1 mark)

(f)   The plan below shows the layout for a site in Gisborne. The plan is not drawn to scale.

The surface water pipework will be laid at a gradient of 1:50

Referring to New Zealand Building Code clause E1/AS1 Surface Water, section 3.2 Sizing of drains, determine the acceptable minimum diameter for the surface water drain at the outfall marked X.

Show all working.

_____

_____

_____

_____

_____

_____

_____

(5 marks)

Total 13 marks

QUESTION 7

The drawing on the page opposite shows a plan view of a proposed commercial premises. The drawing is to a scale of 1:200

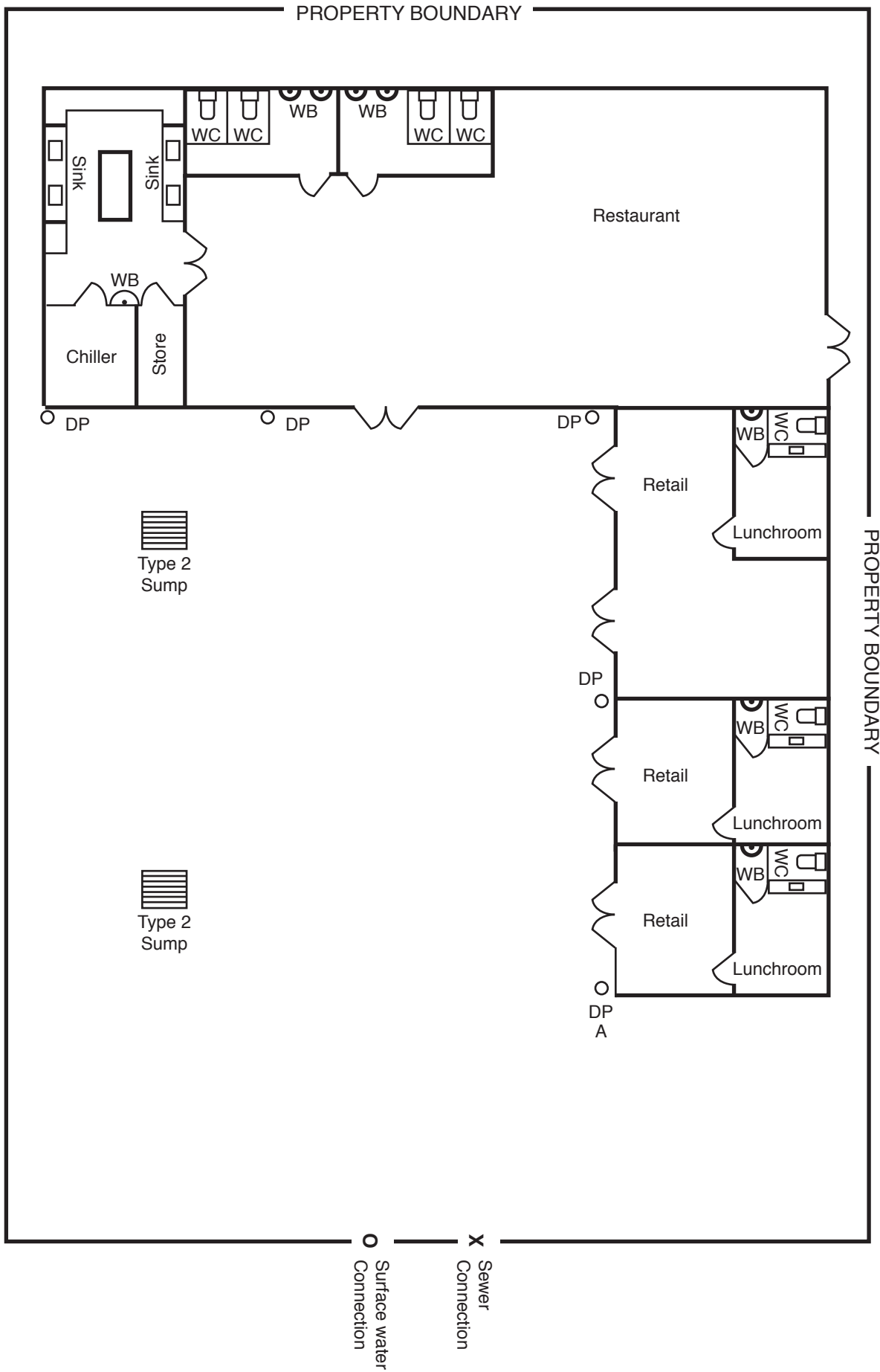The foul water sewer connection point is marked X.

The surface water connection point is marked O.

A drainage system is to be designed for the premises to meet the minimum requirements of New Zealand Building Code clauses E1/AS1 Surface Water and G13/AS2 Foul Water, and is to be economical.

(a) On the plan view, draw a plan for the layout of the foul water drains, including any required inspection openings.

(b) On the plan view, draw a plan for the layout of the surface water drains, and include the following information:
- •   the minimum allowable size for the branch drain serving downpipe A
- •   the minimum allowable size for the branch drains serving the Type 2 sumps
- •   the minimum allowable size for the main drain from the boundary to the surface water outfall.

Total 13 marks

PROPERTY BOUNDARY

Sink

Sink

WC | WC | WB | WB | WC | WC

WB

Restaurant

Chiller

Store

DP

DP

DP

Retail

WB | WC

Lunchroom

Type 2 Sump

DP

Retail

WB | WC

Lunchroom

Type 2 Sump

Retail

WB | WC

Lunchroom

DP
A

PROPERTY BOUNDARY

Surface water Connection

Sewer Connection

QUESTION 8

(a) The plan on the opposite page, which is not drawn 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 1.2 metres below ground level.

The gradient of the drain is 1:80, and the length of each section of pipework is as shown in the table below.

Length of pipe sections	
Pipe section	Distance
A - B	12 metres
B - C	9 metres
C - X	8 metres

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

(i) The ground levels.

(ii) The depth of the drain invert below the datum.

(iii) The depth of the drain invert below the ground.

A   B   C   Datum
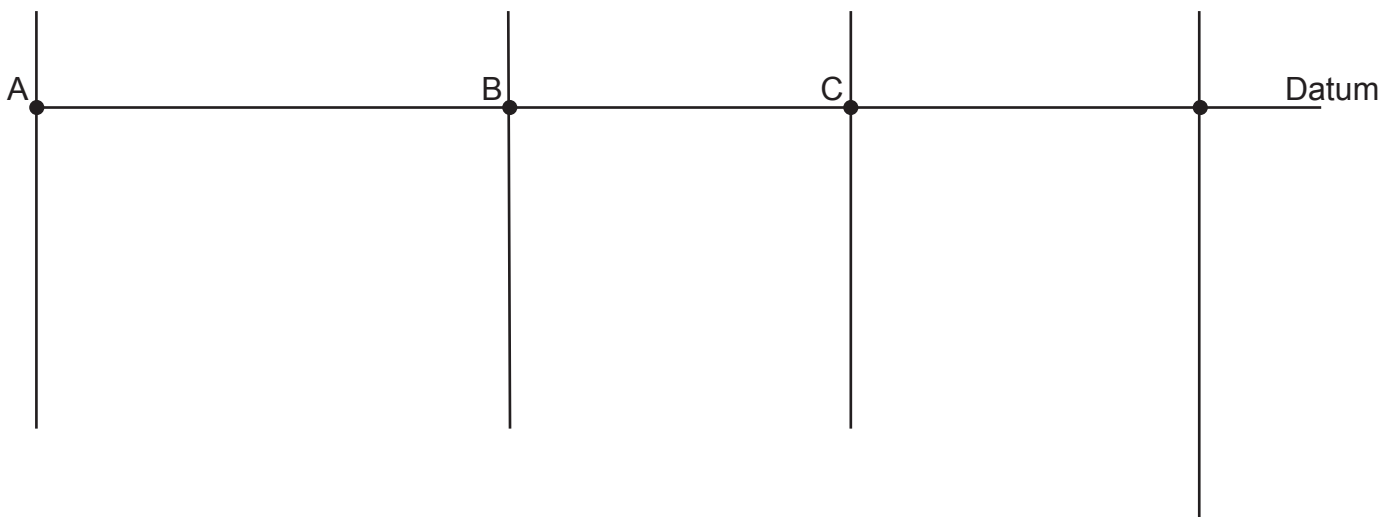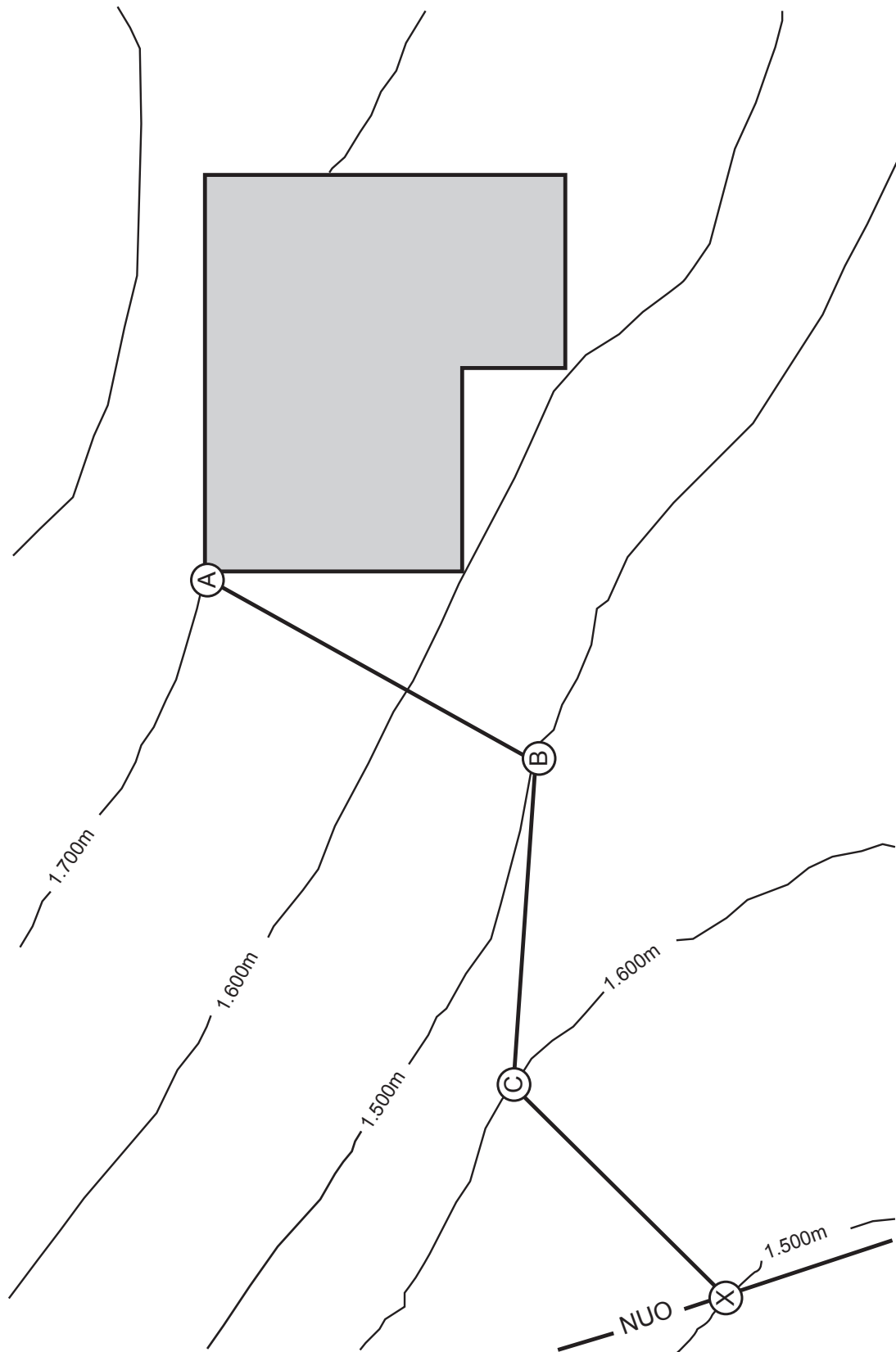
Total 12 marks

QUESTION 9

The fixtures discharging into an overflow relief gully have been removed.

(a)   State the effect this will have on the overflow relief gully.

_____

(1 mark)

(b)   Give TWO methods of managing the effect in (a).

1   _____

2   _____

(2 marks)

Total 3 marks

QUESTION 10

(a)   A dwelling has an on-site effluent disposal system.

Give TWO changes that could be made within the dwelling to reduce the amount of effluent produced and therefore reduce the area required for the disposal of effluent.

1   _____

2   _____

(2 marks)

(b)   A dosing system is required to deliver effluent to the disposal field. Due to the location, there is no power supply available to run a pump dosing system.

Give TWO systems that can be used in this situation.

1   _____

2   _____

(2 marks)

Total 4 marks

QUESTION 11

A wet well dual pumping system has been installed to convey surface water from a property.

The pumping system has different sensors which perform different tasks.

(a)   State what should occur when the low level sensor is activated.

_____

(1 mark) ☐

(b)   State what should occur when the high level sensor is activated.

_____

(1 mark) ☐

(c)   Explain how the system ensures that one pump does not do all of the work.

_____

(1 mark) ☐

(d)   State what should occur if one of the pumps should fail to start.

_____

(1 mark) ☐

Total 4 marks ☐

QUESTION 12

Sketch a diagram showing a petrol trap suitable for use on the forecourt of a surface station, and label its main features.

Total 6 marks

QUESTION 13

(a)   A concrete pipe has fallen from a sling into a trench. It is resting end-on (vertically) in the trench.

   Give a method by which the pipe could be safely retrieved.

   _____

   _____

   (1 mark) ☐

(b)   A rubber ring jointed concrete pipe with a diameter of 600 mm has been laid in a trench.

   (i)   Give the TWO actions that should be taken prior to the trench being back-filled.

   1   _____

   2   _____

   (1 mark) ☐

   (ii)   State the type of back-fill that is suitable for back-filling the trench.

   _____

   (1 mark) ☐

   Total 3 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. For what length of time should a ceramic surface water drain be soaked before a leakage test complying with New Zealand Building Code clause E1/VM1 Surface Water is carried out?

    A   15 minutes.

    B   30 minutes.

    C   4 hours.

    D   12 hours.

    E   24 hours.

2. How many ml per m of pipe length is it acceptable for a 100 mm surface water drain pipe to lose per hour during a water test carried out to comply with New Zealand Building Code clause E1/VM1 Surface Water?

    A   20

    B   200

    C   220

    D   1200

    E   2000

3. A uPVC drain is to be installed to comply with AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

    What is the minimum depth of cover that must be provided in an area that is subject to vehicular traffic.

    A   350 mm.

    B   400 mm.

    C   450 mm.

    D   500 mm.

    E   550 mm.

4. Which of the following excavations is classified as particular hazardous work?

A   A trench that is 1200 mm deep and 1000 mm wide.

B   A trench that is 1200 mm deep and 1500 mm wide.

C   A trench that is 1200 mm deep and 1750 mm wide.

D   A trench that is 1500 mm deep and 1000 mm wide.

E   A trench that is 1500 mm deep and 1750 mm wide.

5. How much notice 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. The sides of a trench have been cut back to a safe slope.

What is the minimum distance from the top edge of the trench that any vehicles can be permitted to drive?

A   800 mm.

B   850 mm.

C   900 mm.

D   950 mm.

E   1000 mm.

7. Drainlayer A has requested the assistance of a tradesman drainlayer employed by Drainlayer B.

    Who is responsible for ensuring that the tradesman drainlayer is capable of completing the proposed work competently?

    A   Drainlayer A.

    B   Drainlayer B.

    C   The licensed employee drainlayer.

    D   The Ministry of Business, Innovation and Employment.

    E   WorkSafe New Zealand.

8. The location of an underground electrical cable has been marked on a paved surface. A hand held power tool is used to break up the paved surface.

    To avoid damage to the electrical cable, the tool should not be used within what distance of the marked location?

    A   200 mm.

    B   300 mm.

    C   400 mm.

    D   500 mm.

    E   600 mm.

9. Who has a duty to ensure the health and safety of all people on a work site?

    A   The person conducting a business undertaking (PCBU).

    B   The site's health and safety representative.

    C   The owner of the site.

    D   The workers.

    E   The Ministry of Business, Innovation and Employment.

10. Approved Codes of Practice give details of how work could be carried out.

    Why is following these recommendations beneficial?

    A   The approved Code of Practice ensures the work will comply with the Building Act.

    B   If the work is carried out according to the Code of Practice, a particular hazardous work form does not have to be completed.

    C   If an accident occurred, the Code of Practice is used as an example of good work practice and if not followed could indicate negligence.

    D   The Ministry of Business, Innovation and Employment can issue an infringement notice or a fine if work is not completed according to the Code of Practice.

    E   Approved Codes of Practice must be followed to prevent accidents occurring.

11. A pipe 45 m long falls 900 mm.

    What gradient has it been laid at?

    A   1:50 (2.00%).

    B   1:45 (2.25%).

    C   1:40 (2.50%).

    D   1.30 (3.35%).

    E   1:20 (5.00%).

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		
Section B		
Total		