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

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No. 9195

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2021

CERTIFYING PLUMBER

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.

This exam booklet consists of 2 sections

Section A – Questions 1 to 10

Section B – Questions 1 to 18

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 29-30 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 32 pages in the correct order.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

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

A customer is in the process of designing a bathroom renovation.

(a) Give a situation in which a building consent for the related plumbing work would NOT be required.

_____

_____

(1 mark)

(b) Give a situation in which a building consent for the related plumbing work WILL be required.

_____

_____

(1 mark)

(c) State the period of time a building consent remains current if the project for which it was issued has not been started.

_____

(1 mark)

Total 3 marks

QUESTION 2

The plan on page 4 opposite shows the layout of sanitary fixtures and the completed foul water drainage system for a dwelling.

The plan is drawn to a scale of 1:100

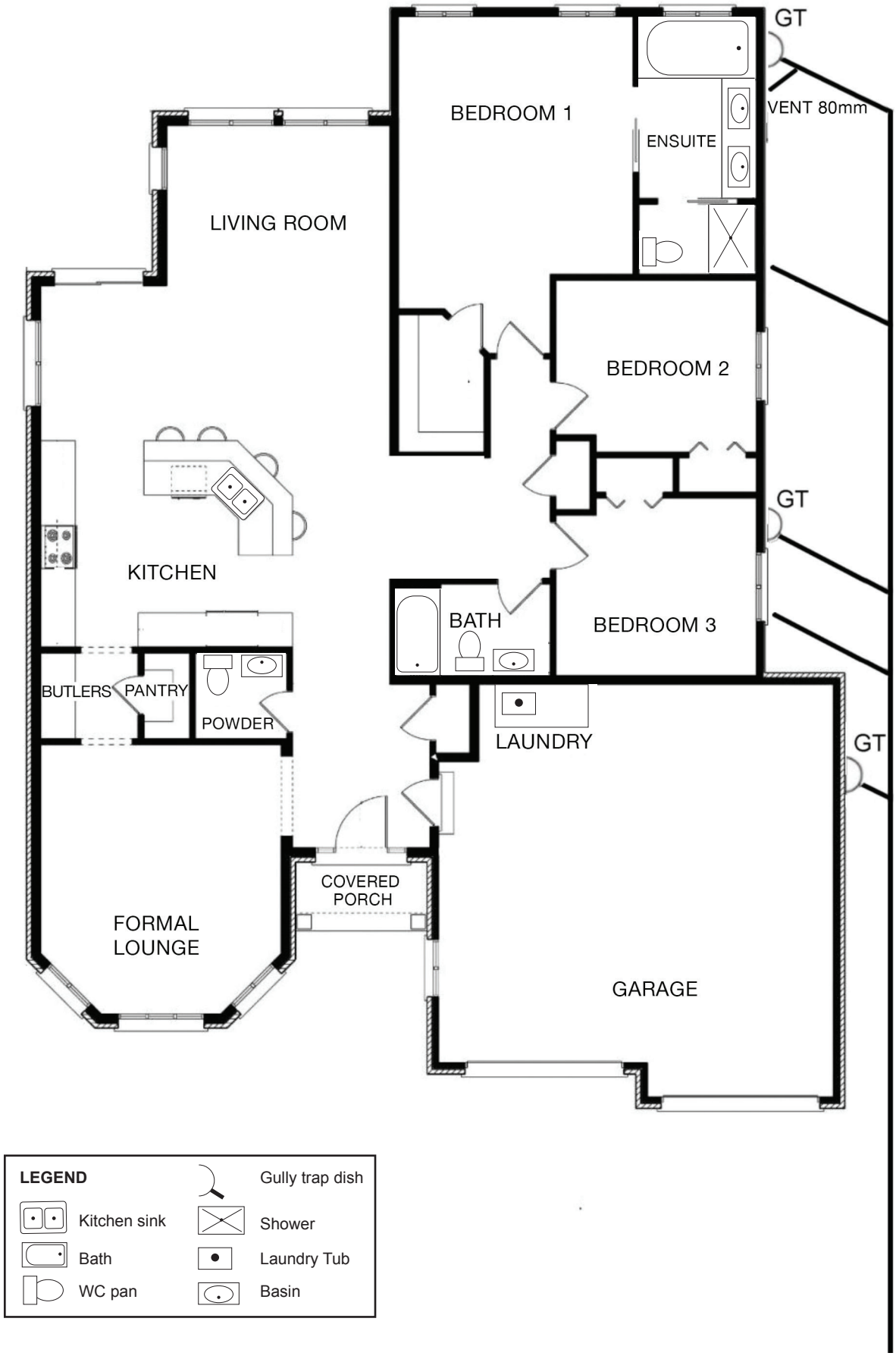
The sanitary plumbing system is to comply with the minimum requirements of New Zealand Building Code clause G13/AS1.

(a) On the plan, complete the plumbing pipework to show all discharge pipes and vent connections.

(b) On the plan, show the minimum allowable diameter for each section of the discharge and vent pipework.

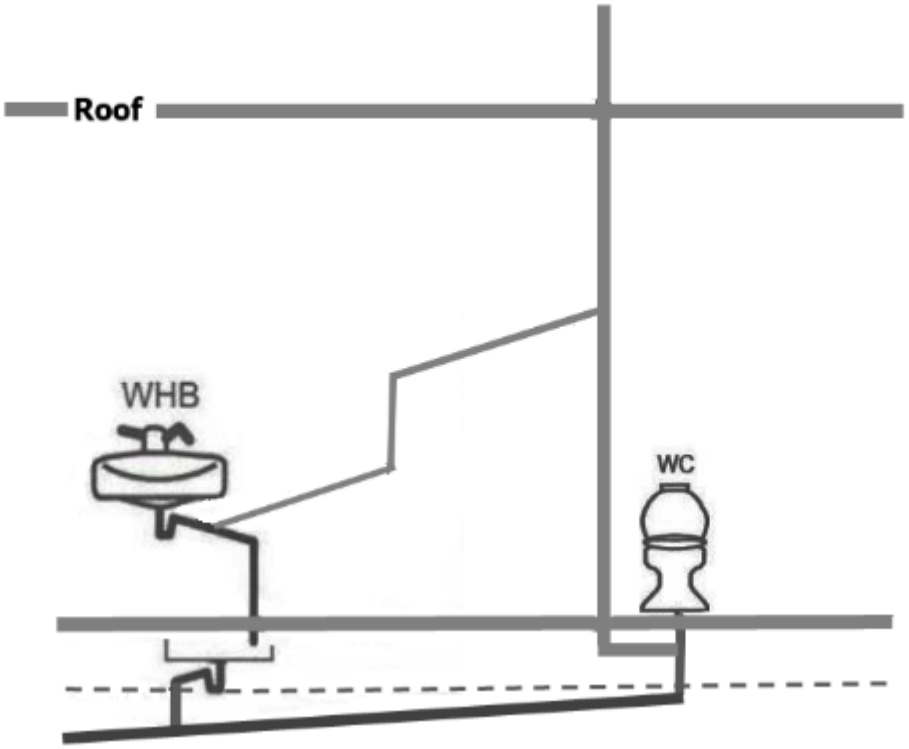
Total 11 marks

QUESTION 2 (cont'd)



QUESTION 3

(a) The diagram below shows the discharge and vent pipework for the installation of a WC Pan and a basin.

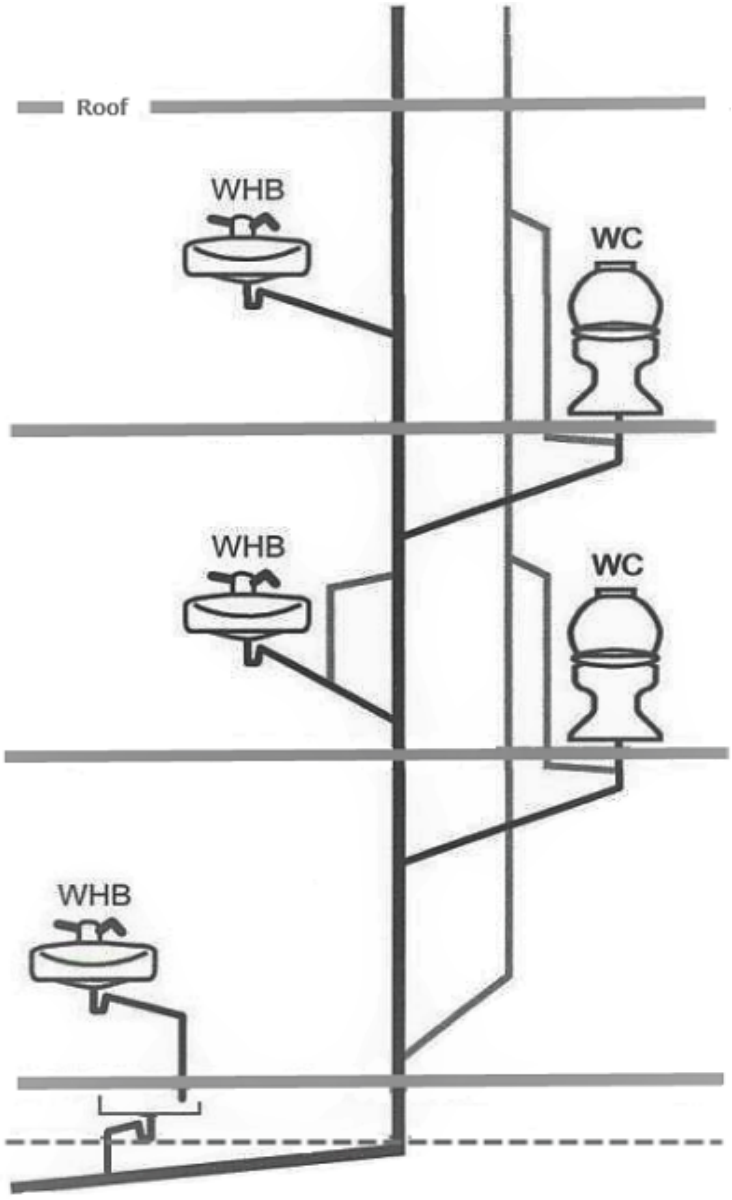


Explain the error that has been made and the possible consequence that may result.

(2 marks)

QUESTION 3 (cont'd)

(b) The diagram below shows the discharge and vent pipework for the installation of WC Pans and basins.



Explain the error that has been made and the possible consequence that may result.

(2 marks)

Total 4 marks

INTENTIONALLY BLANK

QUESTION 4

(a) Give the purpose of a Producer Statement Construction (PS3).

_____

(1 mark)

(b) Name the organisation to which a PS3 is to be provided.

_____

(1 mark)

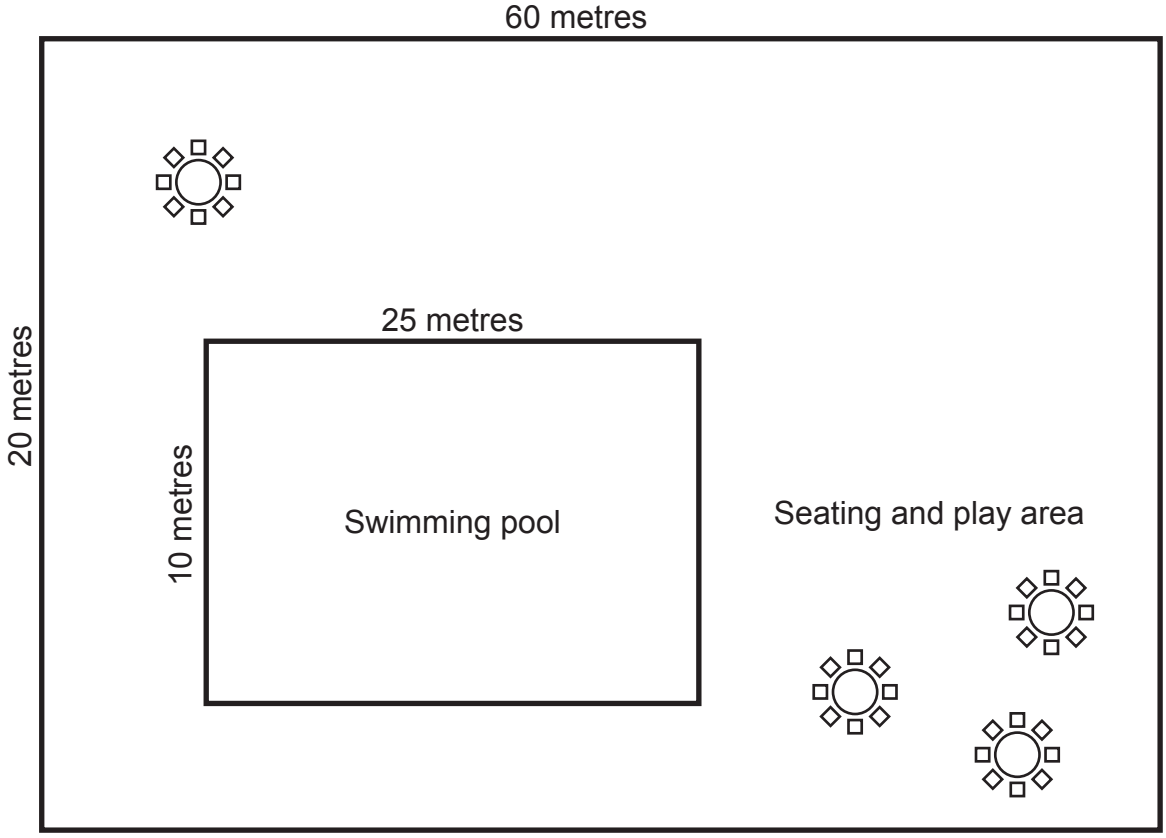
Total 2 marks

QUESTION 5

The plan below shows a swimming pool surrounded by seating and an open play area.

Separate male and female toilet facilities are to be provided.

Using the procedure in New Zealand Building Code clause G1/AS1 Personal Hygiene, complete the tables on page 10 opposite to show the minimum number of sanitary fixtures that must be provided for the complex.



QUESTION 5 (cont'd)

Minimum number of people facilities must be provided for	
Minimum number of females	
Minimum number of males	

	Basins	WC Pans	Urinals
Male			
Female			

Disabled access facilities	
WC Pans	Basins

Total 13 marks

QUESTION 6

(a) The Health and Safety at Work Regulations provide for health monitoring of workers.

(i) Give TWO common injuries or hazards in the plumbing industry that may require a worker's health to be monitored.

1 _____

2 _____

(2 marks)

(ii) If employees need to have their health monitored, they should be given specific relevant information.

Give FOUR of the pieces of information employees need to be given.

1 _____

2 _____

3 _____

4 _____

(4 marks)

(b) Give TWO duties a worker has in relation to personal protective equipment.

1 _____

2 _____

(2 marks)

(c) State the condition provided by the Health and Safety in Employment Act in which an employee is permitted to refuse to do work.

_____

(1 mark)

QUESTION 6 (cont'd)

(d) Complete the table below to show whether or not each of the following situations is particular hazardous work that must be notified to WorkSafe.

	Particular hazardous work Yes/No
Lifting a 580 kg water tank into place on the top of a 5 metre high tank stand with a block and tackle.	
Working in a contaminated area requiring compressed air breathing equipment.	
Cutting a stone bench top to install a sink and tapware.	
Working in a trench that is 1.8 metres deep and 2 metres wide.	
Installing a soaker flashing on the roof of a 12 metre high commercial building.	
Climbing a 6 metre high ladder to clear blocked spouting.	

(6 marks)

(e) State how much notice must be given to WorkSafe before particular hazardous work starts.

_____

(1 mark)

Total 16 marks

INTENTIONALLY BLANK

QUESTION 7

Two hot water cylinders provide hot water to 10 showers.

It is expected there will be one peak load period per day, where 80% of the showers will be in use.

The incoming cold water temperature is 16ºC.

The average shower temperature is expected to be 42ºC.

The estimated average shower time is 10.5 minutes.

The thermostats on the cylinders are set to maintain a temperature of 70ºC.

The required flow rate at each shower is 0.1 litres per second.

Calculate the required capacity for each of the hot water cylinders.

Formula:

$$\text{Total storage required} = \frac{\text{Time (seconds)} \times \text{Flow rate (l/s)} \times \text{Number of showers} \times T_1}{T_2 \times \text{Peak load}}$$

where
T_1 = temperature increase from cold to average shower temperature.
T_2 = temperature increase from cold to hot stored temperature.

Total 5 marks

QUESTION 8

Answer the following in relation to the New Zealand Building Code acceptable solution G13/AS1 Foul Water.

(a) Give FOUR situations in which a vent must be fitted to a fixture discharge pipe.

1 _____

2 _____

3 _____

4 _____

(4 marks)

(b) (i) State when a relief vent must be installed on a discharge stack.

_____

(1 mark)

(ii) A discharge stack is receiving 12 discharge units and requires a relief vent. Give the minimum allowable diameter for the relief vent.

_____

(1 mark)

(iii) Give the TWO requirements that must be met relating to the connection of the relief vent to the base of the discharge stack.

1 _____

2 _____

(2 marks)

(iv) Give TWO reasons why a relief vent is fitted to a soil or waste stack.

1 _____

2 _____

(2 marks)

QUESTION 8 (cont'd)

(c) (i) State the minimum allowable gradient for the installation of a vent pipe.

_____

(1 mark)

(ii) Give the TWO outcomes that installing a vent at gradient achieves.

1 _____

2 _____

(2 marks)

Total 13 marks

INTENTIONALLY BLANK

QUESTION 9

(a) A rural property has been supplied by bore water. The bore supply is no longer suitable. The owner has decided to install a tank to collect rain water from a roof to supply the property.

Give SIX factors regarding the catchment area that need to be checked to prevent contamination of the rain water.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(3 marks)

(b) Give TWO different components that could be included in the installation to help maintain the water quality before the water enters the tank.

1 _____

2 _____

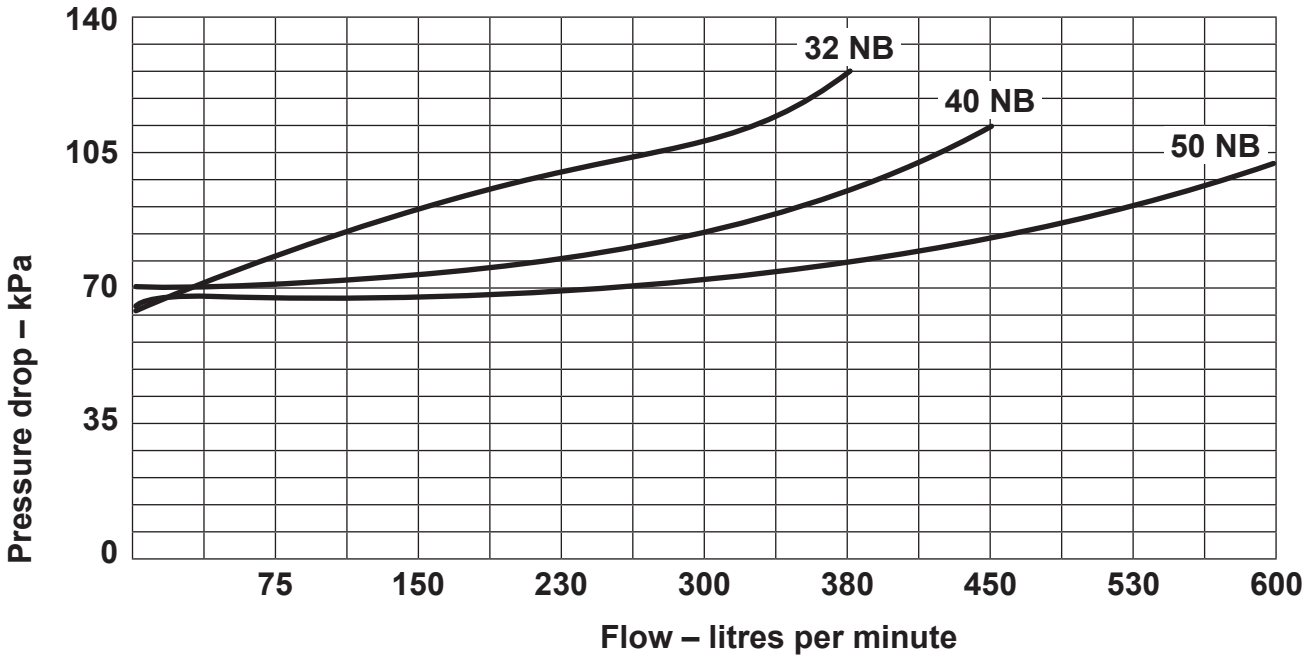
(2 marks)

QUESTION 9 (cont'd)

(c) A reduced pressure zone backflow prevention device (RPZD) is required to protect the water in the tank from contamination.

The graph below shows the pressure drop that will occur across the device installed in a water supply for different flow rates.

Size 32 NB, 40 NB, 50 NB.



A water supply system is required to deliver 340 litres of water per minute.

Using the graph, determine the expected pressure drop when an RPZD is installed with each diameter listed below.

(i) 32 mm NB RPZD.

_____

(ii) 50 mm NB RPZD.

_____

(1 mark)

QUESTION 9 (cont'd)

(d) A factory requires water to be supplied that gives a flow rate of 75 litres per minute at a pressure of 520 kPa at the outlets.

The supply pressure is 600 kPa.

Give the minimum diameter of the RPZD that can be installed to meet these requirements.

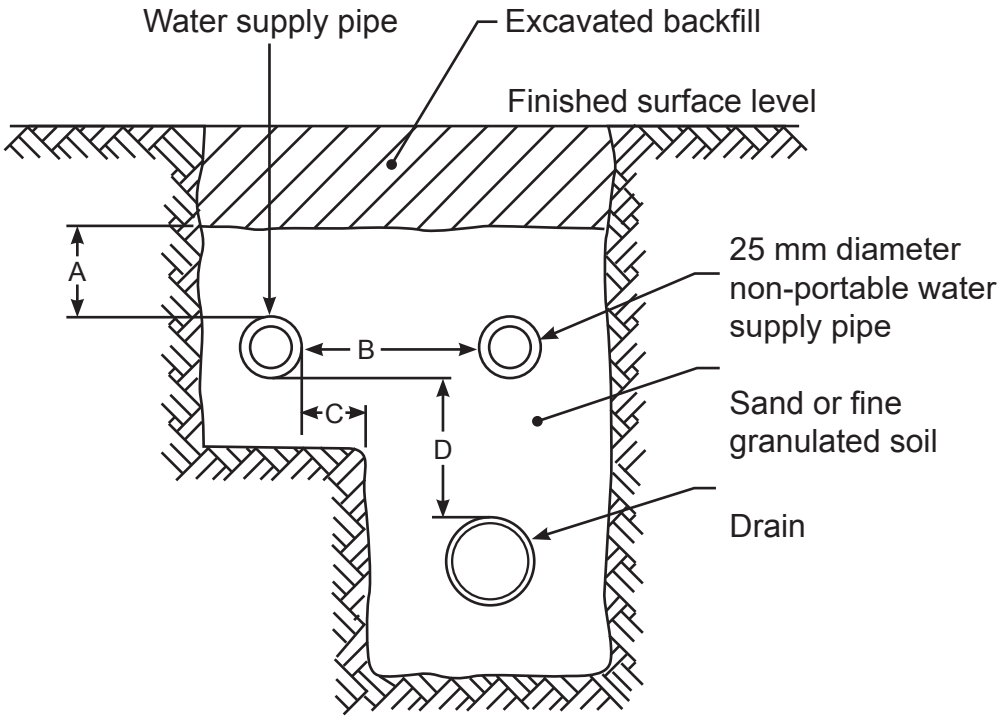
(2 marks)

Total 8 marks

QUESTION 10

A water supply pipe is to be installed to comply with AS/NZS 3500 Part 1: Water services.

(a) The diagram below shows potable and non-potable water supply pipes laid in a trench with a drain.



(i) Give the minimum measurement required for each of the distances marked A, B, C and D.

A _____

B _____

C _____

D _____

(4 marks)

(ii) Before entering a building, the potable water supply pipe must cross over a telecommunications cable.

Give TWO requirements in addition to the minimum allowable separation distance that must be met in relation to the cross-over.

1 _____

2 _____

(2 marks)

QUESTION 10 (cont'd)

(b) The potable water supply pipe will exit the ground near the electrical earthing electrode for the building. The electricity supply is less than 1000 V.

State the minimum allowable distance between the pipe and the electrode.

_____

(1 mark)

Total 7 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. Which of the following is a building compliance schedule?

   A A calendar showing dates for which building consent authority inspection has been organised.

   B A list of specified systems installed within a building and their performance standards.

   C The Building Act 2004.

   D New Zealand Building Code acceptable solution G12/AS1.

   E An alternative solution that has been approved by the building consent authority.

   ☐

2. Which of the following is a specified system in relation to the Building Act?

   A An automatic back-flow preventer connected to the potable water supply.

   B Tanking or waterproofing of wet-floor tiled showers.

   C A break tank installed to limit water pressure in multi-storey buildings.

   D A discharge stack system installed to comply with AS/NZS 3500.2.

   E A grease convertor with an automatic dosing system.

   ☐

3. How often must a specified system be checked or tested for the building to maintain its warrant of fitness?

   A Every 6 months.

   B Every 12 months.

   C Every 18 months.

   D Every 24 months.

   E Every 36 months.

   ☐

4. Who is permitted to test a building specified system as part of the building warrant of fitness process?

A A trainee, tradesman or certifying plumber.

B A tradesman or certifying plumber.

C A certifying plumber.

D An Independently Qualified Person.

E A Plumbers, Gasfitters and Drainlayers Board investigator.

☐

5. Where in a floor joist does NZS 3604: Timber-Framed Buildings recommend a hole be drilled?

A In the top third.

B In the top half.

C In the middle third.

D In the bottom half.

E In the bottom third.

☐

6. What is the minimum length of time pipework that will be concealed behind wall linings must last in order to meet the durability requirements of the New Zealand Building Code?

A 1 year.

B 2 years.

C 5 years.

D 15 years.

E 50 years.

☐

7. What is the minimum length of time a hot water cylinder relief drain installed under a concrete slab must last in order to meet the durability requirements of the New Zealand Building Code?

A 1 year.

B 2 years.

C 5 years.

D 15 years.

E 50 years

☐

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

A To recover plant and equipment from the site.

B To provide help to an injured person.

C To remove a deceased person.

D When directed by a police officer.

E To make the site safe.

☐

9. What is the name of the legislation that governs workplace health and safety requirements?

A Health and Safety in Employment Act.

B WorkSafe New Zealand Guidelines.

C Health and Safety at Work Act.

D Department of Labour Code of Practice.

E Plumbers, Gasfitters and Drainlayers Act.

☐

10. Under which of the following circumstances can an employee choose not to wear the personal protective equipment gear supplied?

    A When the ambient temperature is above 32°C.

    B When the total weight of the PPE gear exceeds 16 kg.

    C When the employee provides his/her own suitable PPE gear.

    D When it is agreed the PPE gear makes a task more difficult to complete.

    E When the employee signs a waiver safeguarding the employer from prosecution if an injury should occur.

    ☐

11. By which of the following dates does a registered plumber's licence expire?

    A 31 March.

    B 1 April.

    C 20 May.

    D 30 June.

    E 31 December.

    ☐

12. A water service carrying non-potable water is to be installed.

    Which colour pipe or marking should be used to enable future identification of the pipe?

    A Lilac.

    B Orange.

    C Pink.

    D Red.

    E Yellow.

    ☐

13. Which of the following statements is correct for a bypass fitted to a backflow prevention installation?

A The bypass must be larger in diameter than the main.

B The bypass must be smaller in diameter than the main.

C The bypass must be the same diameter as the main.

D The bypass must be constructed of the same material as the main.

E The bypass must provide the same protection as the main.

☐

14. Which of the following must a person be in order to be able to test and certify a backflow prevention device?

A Backflow Testing Licence holder (BTL).

B Water Supply Certifier (WSC).

C Professional Water Engineer (PWE).

D Supplies Control Technician (SCT).

E Independently Qualified Person (IQP).

☐

15. What is the MAXIMUM allowable flow rate to a kitchen sink when it has been installed to comply with AS/NZS 3500 Part 1: Water services?

A 5 litres per minute.

B 9 litres per minute.

C 12 litres per minute.

D 15 litres per minute.

E 20 litres per minute.

☐

16. What is the maximum allowable water velocity in piping according to AS/NZS 3500 Part 1: Water services?

A 3 m/s.

B 5 m/s.

C 7 m/s.

D 10 m/s.

E 15 m/s.

☐

17. Potable and non potable water supply pipework is to be installed parallel through a building.

What is the minimum distance apart the pipes can be to comply with AS/NZS 3500 Part 1 Water services?

A 50 mm.

B 100 mm.

C 150 mm.

D 200 mm.

E 250 mm.

☐

18. When multiple mains pressure storage cylinders are being installed, which cylinders need to be fitted with temperature and pressure relief valves?

A Only the first cylinder in the installation.

B Only the last cylinder in the installation.

C The first cylinder in the installation and every second cylinder thereafter.

D Every cylinder in the installation.

E Only the first and the last cylinders in the installation.

☐

Total 18 marks ☐

This page is available for additional working or answers

Question number _____

This page is available for additional working or answers

Question number _____

For Examiner’s use only

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