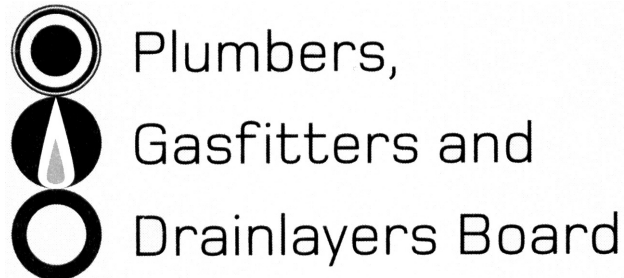


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9195



REGISTRATION EXAMINATION, NOVEMBER 2019

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.

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 17-21 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.

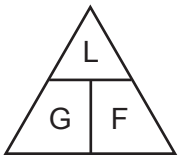
YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

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

Complete the table below to show the length of time each of the items must last to comply with New Zealand Building Code clause B2 Durability.

Item	Length of time (years)
Single lever mixer including flexible connections	
Under slab discharge pipework	
EDPM Rubber boot flashing sealing roof penetration	

Total 3 marks

QUESTION 2

The plan below shows the layout of sanitary fixtures for a dwelling.

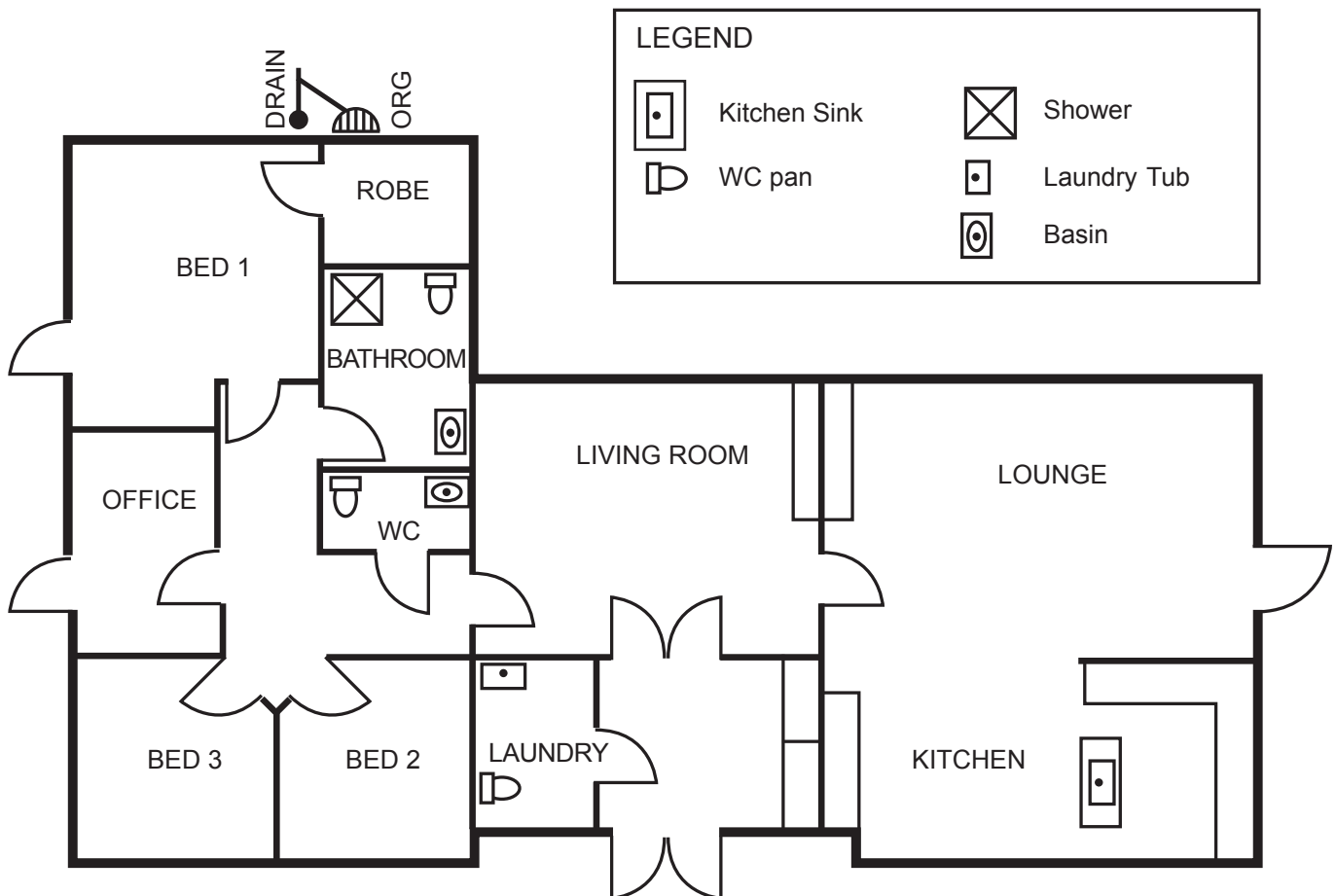
The plan is drawn to a scale of 1:100

The dwelling is to be built on a concrete pad foundation.

The drainage for the dwelling has been completed, and the connection point for the sanitary plumbing is as shown on the plan.

The sanitary plumbing system is to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

- (a) (i) On the plan, complete the underslab pipework to show all discharge pipes and vent connections that will be required to be installed before the concrete floor is poured.
- (ii) On the plan, show the minimum allowable diameter for each section of discharge and vent pipework.



(9 marks)

QUESTION 2 (cont'd)

- (a) (iii) Give the requirements that must be met for hydrostatically testing the discharge pipework before backfilling.

(2 marks)

- (b) Hot and cold water pipework complying with AZ/NZS 3500 is to be installed in sleeves under the concrete pad to supply the kitchen sink.

- (i) Give the requirements that must be met for hydrostatically testing the water supply pipework before backfilling.

(2 marks)

- (ii) State THREE additional actions that should be taken regarding the pipework before the concrete slab is poured.

1

2

3

(3 marks)

Total 16 marks

QUESTION 3

(a) A 150 litre potable water storage tank is to be installed in the ceiling space of a dwelling.

Give THREE requirements that must be met relating to the support of the tank in the ceiling space.

- 1 _____

- 2 _____

- 3 _____

(3 marks)

(b) Give TWO reasons why a cover must be installed on a storage water tank installed in a ceiling space.

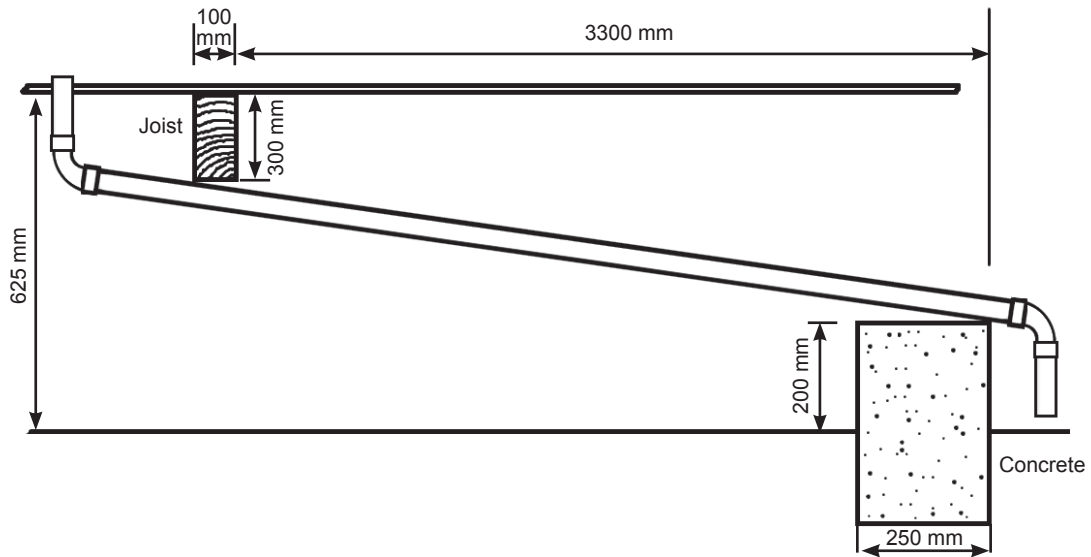
- 1 _____
- 2 _____

(2 marks)

QUESTION 3 (cont'd)

- (d) The diagram below shows an elevation of the proposed installation of the discharge pipe for the safe tray installed under a water storage tank.

The discharge pipe is 43 mm OD.



Calculate the maximum gradient achievable for the pipe without cutting the joist or the concrete.

(3 marks)

Total 8 marks

QUESTION 4

The schematic diagram on the opposite page shows the layout of the sanitary fixtures in a commercial building.

- (a) Complete the drawing to show a single stack modified system to convey waste from the fixtures to the stack shown.

Include the venting requirements, and show the minimum allowable diameters of each section of pipework.

The completed design is to comply with the minimum requirements of AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

(10 marks)

- (b) If the stack is to be constructed from copper.

- (i) Give THREE waste products that are not permitted to be discharged into the stack.

1 _____
2 _____
3 _____

(3 marks)

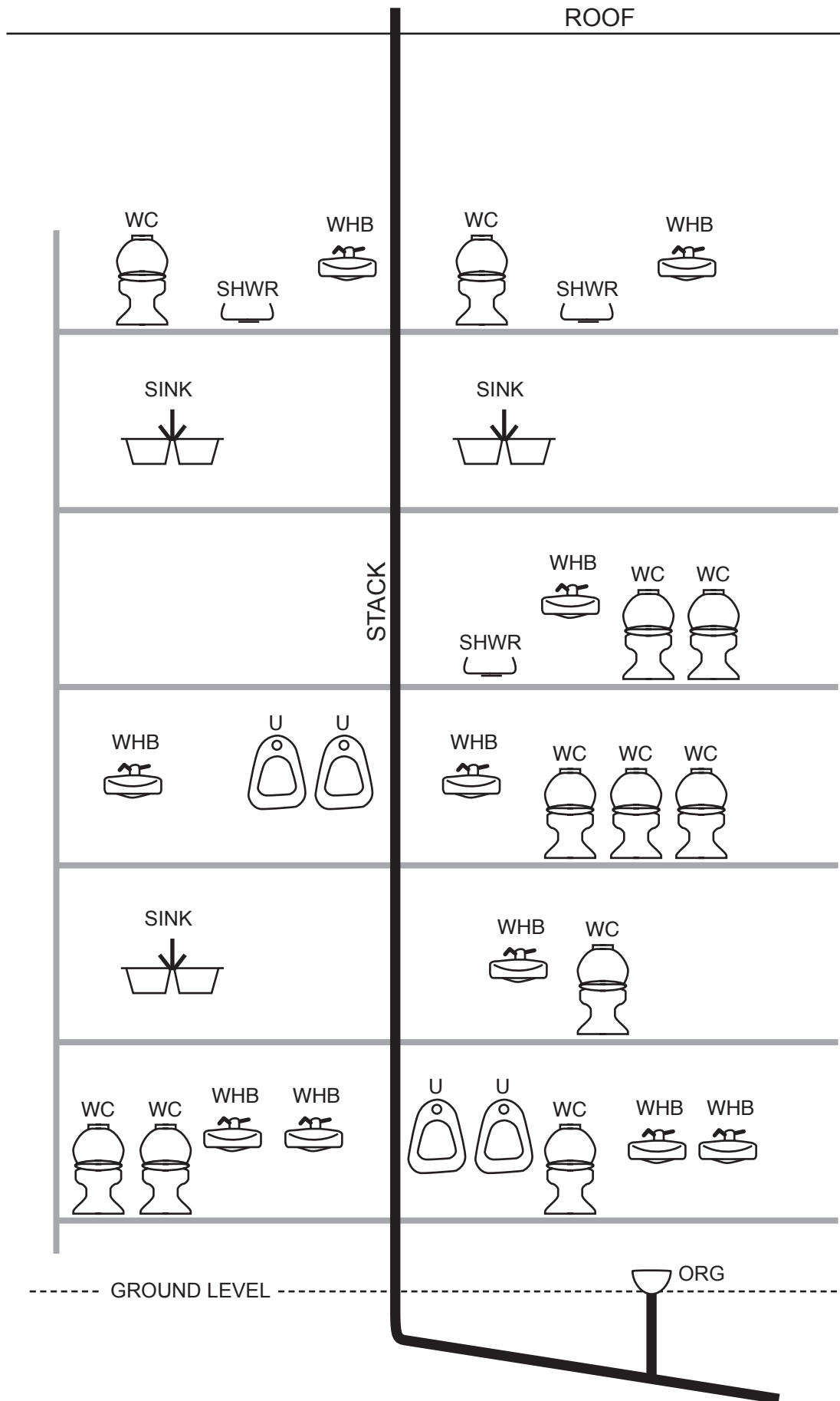
- (ii) State the THREE requirements that must be met regarding the location of an expansion joint in the stack so that the installation complies with AS/NZS 3500 Part 2: Sanitary plumbing and drainage.

1 _____
2 _____
3 _____

(3 marks)

Total 16 marks

QUESTION 4 (cont'd)

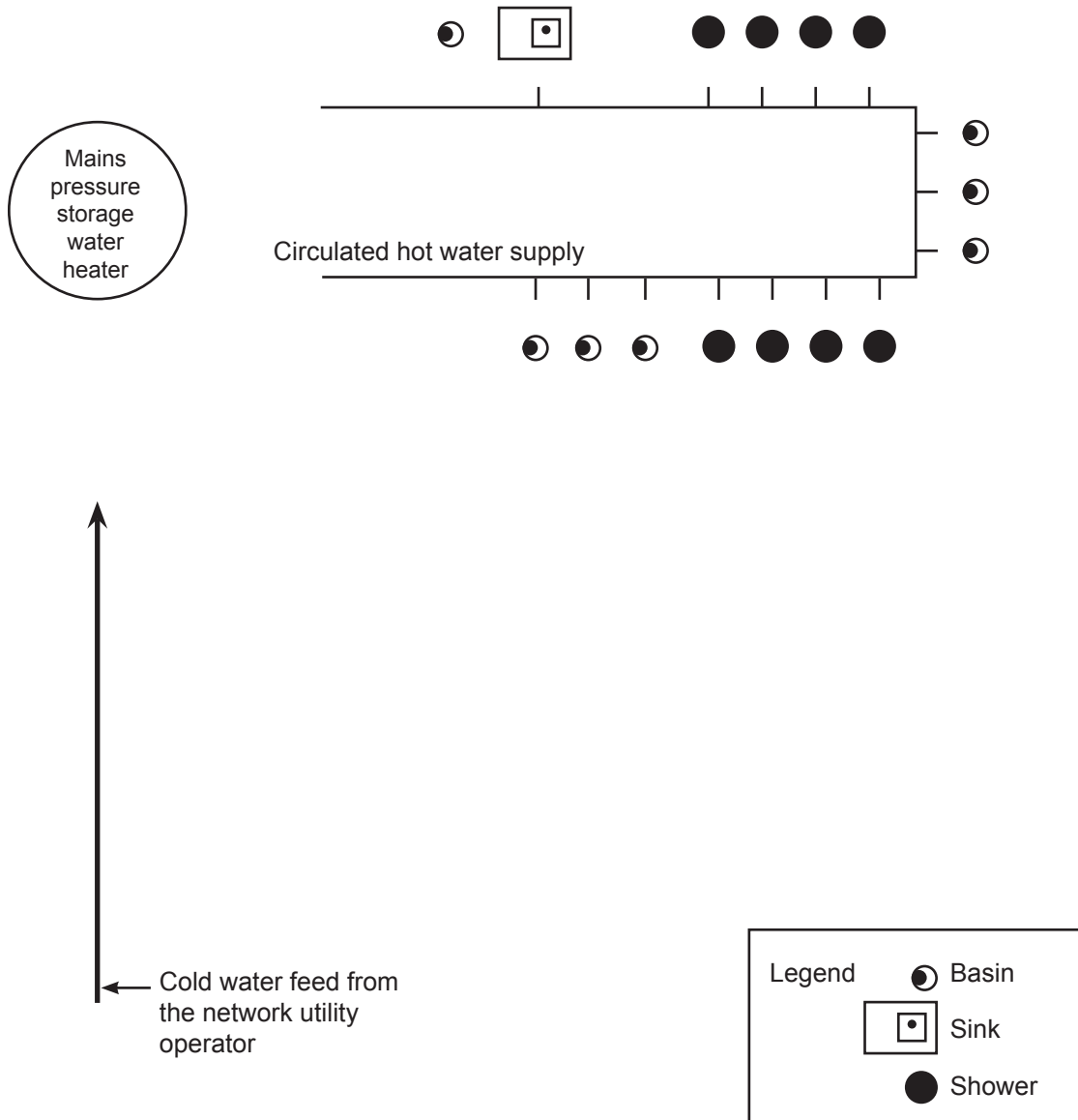


QUESTION 5

The starter diagram below shows the plan view of part of a hot water system, including a circulated hot water system with branches to supply the fixtures shown.

- (a) Complete the diagram to show all the pipework, the required valves and the components for the system to operate effectively and safely. Label all valves and components drawn.

Do not include fittings such as nipples and crox nuts.



(9 marks)

QUESTION 5 (cont'd)

(b) It is expected that there will be one peak load period per day, where 75% of the showers will be in use.

The incoming cold water temperature is 13°C.

The average shower temperature is expected to be 40°C.

The estimated average shower time is 8.5 minutes.

The showers use a maximum of 9 litres of hot water per minute.

The thermostat on the cylinder is set to maintain a temperature of 65°C.

Calculate the required capacity for the hot water cylinder to meet the demand of the showers.

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

T₁ = Temperature increase from cold to average shower temperature.

T₂ = Temperature increase from cold to hot stored temperature.

(5 marks)

Total 14 marks

QUESTION 6

A plan view of a domestic dwelling, drawn to a scale of 1:100, is shown on the opposite page.

The plan shows the proposed layout for the cold water pipework for the dwelling.

The water main supply can provide 500 kPa water pressure, and is situated 15 lineal metres away from the entry point to the dwelling.

The shower is the highest outlet, and is 3 vertical metres above the water main.

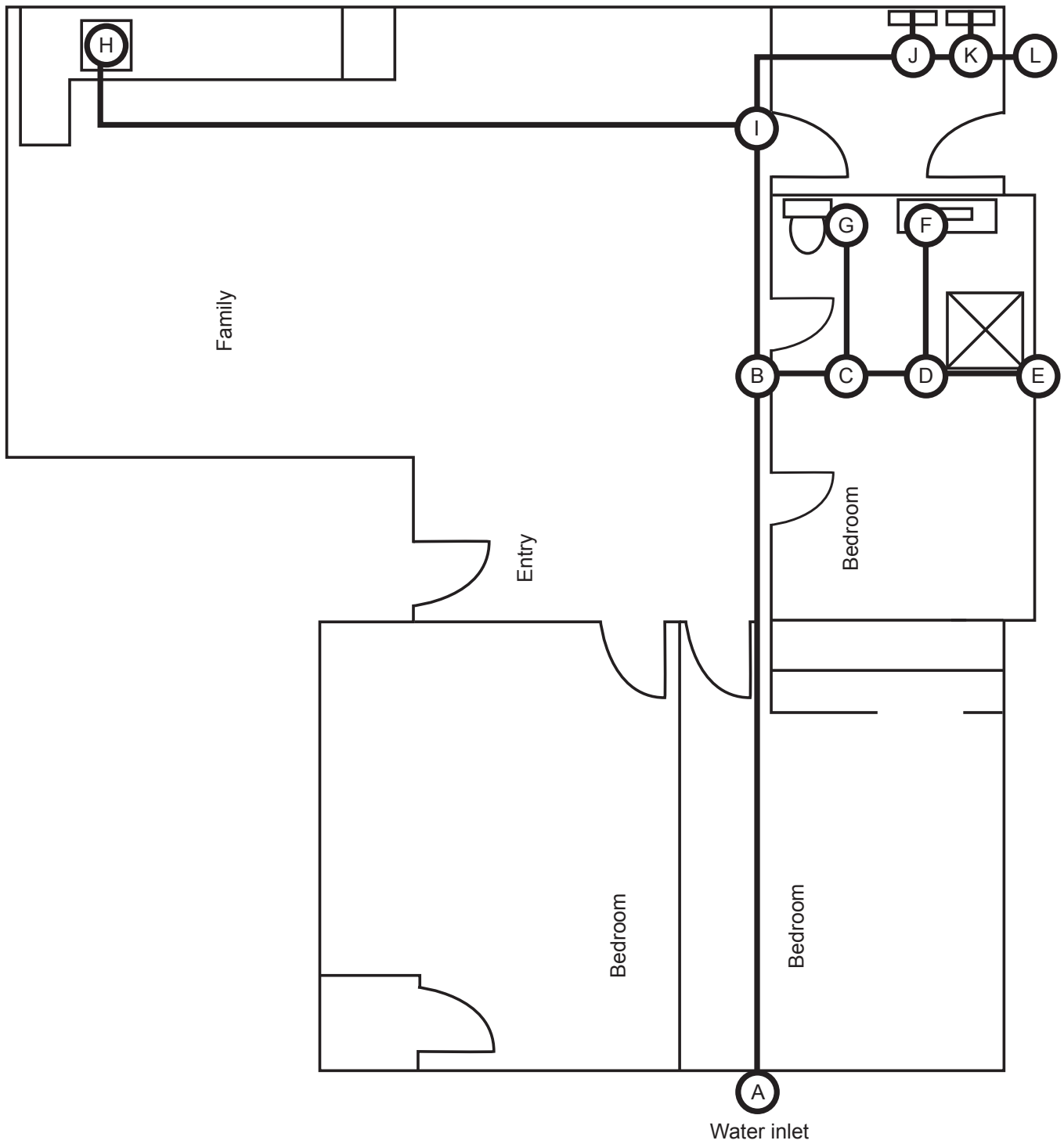
Using the procedure given in AS/NZS 3500 Part 1: Water services Appendix D, complete the tables below.

Index Length	Pressure Drop

Pipe section	Total loading units	Probable simultaneous flow rate (L/S)	Pipe size (DN)
A – B			
B – C			
C – D			
D – E			
D – F			
C – G			
B – I			
I – H			
I – J			
J – K			
K – L			

Total 16 marks

QUESTION 6 (cont'd)



Legend

- E = Shower mixer
- F = Basin tap
- G = WC cistern
- H = Sink with aerated faucet
- J = Branch take off to laundry tub tap
- K = Branch take off to mains pressure hot water cylinder
- L = 15 mm hose tap

QUESTION 7

(a) (i) Name FOUR types of hazardous dust that a plumber may come in contact with on a worksite.

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

(4 marks)

(ii) Give TWO ways in which a dust hazard can be managed.

- 1 _____

- 2 _____

(2 marks)

(b) A plumber is to train a work colleague to use a piece of machinery that the colleague is not familiar with.

Give FOUR aspects regarding safety that should be covered in the training.

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

(4 marks)

QUESTION 7 (cont'd)

(c) A PCBU is to undertake some work that is categorised as particular hazardous work.

(i) Give THREE examples of construction work that would fall into this category.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(ii) State who the PCBU must notify before the work starts.

(1 mark)

(iii) State how much notice must be given before the work starts.

(1 mark)

(iv) Give FOUR items of information that must be provided when completing a Particular Hazardous Work Notification Form.

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

(4 marks)

Total 19 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. To provide backflow protection, what is the minimum size for an air gap?

- A 20 mm.
- B 40 mm.
- C Equal in size to the inlet pipe diameter.
- D $2 \times$ the inlet diameter or 25 mm, whichever is greater.
- E $3 \times$ the inlet diameter or 30 mm, whichever is greater.

2. 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 size as the main.
- D The bypass must be constructed of the same material as the main.
- E The bypass must provide the same level of protection as the main.

3. What is the minimum distance above the highest outlet at which an atmospheric vacuum breaker can be installed?

- A 100 mm.
- B 150 mm.
- C 200 mm.
- D 250 mm.
- E 300 mm.

4. How often must a backflow prevention device be tested?

- A Once a month.
- B Once every 6 months.
- C Once every year.
- D Once every 2 years.
- E Once every 5 years.

5. Who is responsible for organising the periodic testing of a backflow prevention assembly?

- A The local territorial authority.
- B The installing plumber.
- C The architect.
- D The building owner.
- E An independently qualified person.

6. What is the minimum allowable separation distance between parallel potable and non-potable water supplies underground so that they installed to comply with AS/NZS 3500 Part 1: Water services?

- A 100 mm.
- B 150 mm.
- C 200 mm.
- D 250 mm.
- E 300 mm.

7. Potable and non-potable water supply pipework is to be installed parallel through a building. What is the minimum allowable distance that must be maintained for the installation 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.

8. How many litres of water per person must be stored for use when the water supply to a community care building is interrupted?

- A 50
- B 75
- C 100
- D 125
- E 150

Total 8 marks

For Examiner's use only

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