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, JUNE 2012

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 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 June 2012 were provided with the following documents:

- AS/NZS 3500 Part 1: Water services
- AS/NZS 3500 Part 2: Sanitary plumbing and drainage
- Guide for safety with underground services

SECTION A

QUESTION 1

Complete the following table by naming four different types of backflow prevention device and stating the highest hazard rating installation the device is suitable for.

Type of device	Highest hazard rating

Total 8 marks

QUESTION 2

The drawing opposite shows a range of sanitary fixtures connected to an offset discharge stack in a commercial building.

The WCs are cistern-flushed 'S' trap pans.

(a) Complete the drawing to show the ventilation requirements for a single stack modified system installed to comply with AS/NZS 3500.

(3 marks)

(b) State the minimum allowable size for the vent pipework.

_____

(1 mark)

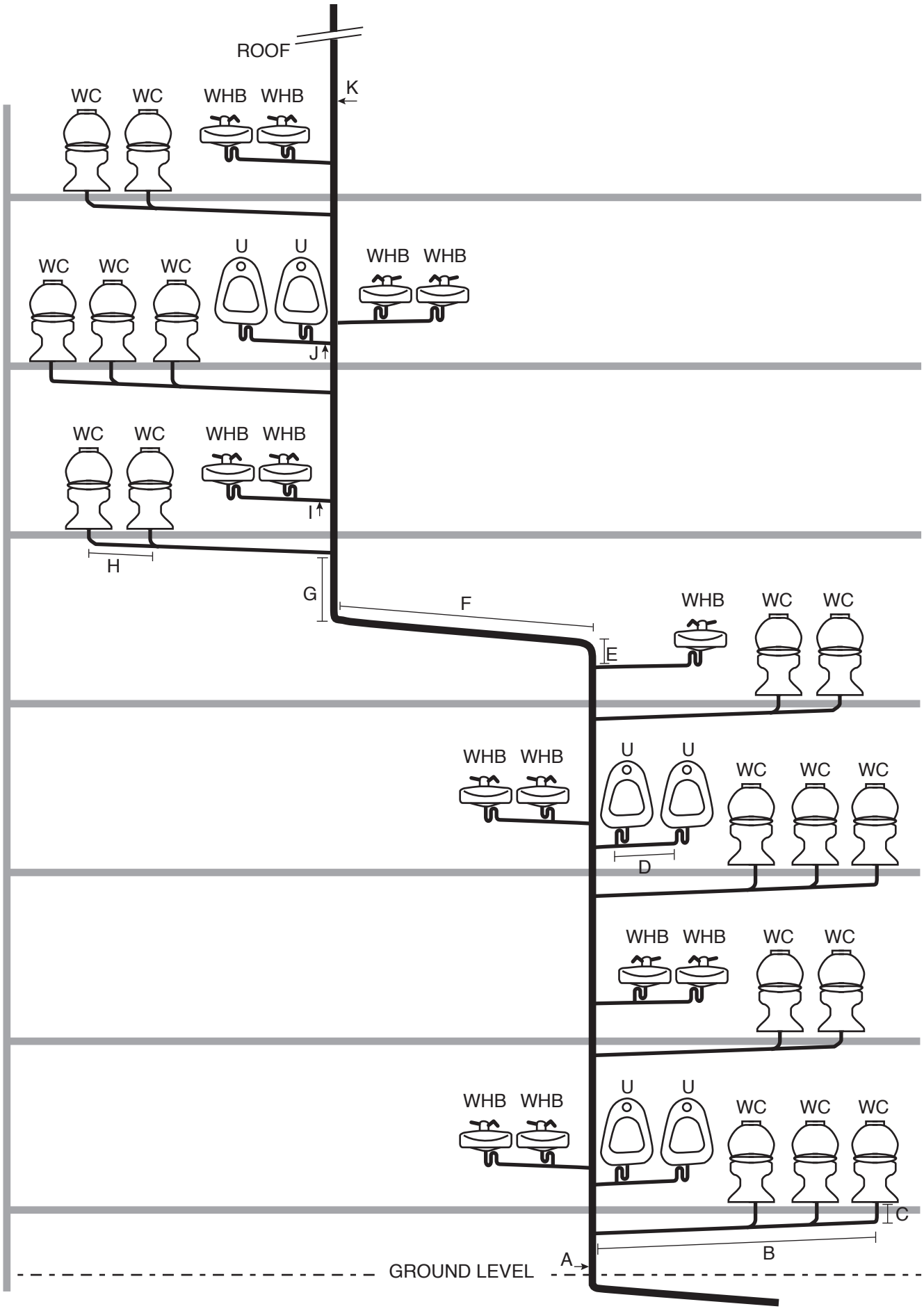
(c) Complete the table below to show the measurements indicated for the installation of the stack.

Total discharge loading for stack	
Minimum diameter of pipe at point A	
Maximum length of section B	
Maximum length of section C	
Maximum length of section D	
Minimum height of section E	
Minimum length of section F	
Minimum gradient of section F	
Minimum height of section G	
Maximum length of section H	
Minimum diameter of pipe at point I	
Minimum diameter of pipe at point J	
Minimum diameter of pipe at point K	

(13 marks)

Total 17 marks

QUESTION 2 (cont'd)



QUESTION 3

Six houses are to be built down a right-of-way as shown in the plan on the opposite page.

The pressure available from the public water supply is 450 kPa.

The height of the highest outlet is 8 metres above the public water supply.

The minimum head required for the fixture outlets is 6 metres.

For this exercise a value of 10 kPa per metre head is to be used.

The length of consumer pipework from each toby to the furthest outlet is 11 metres.

The pipe material to be used is copper.

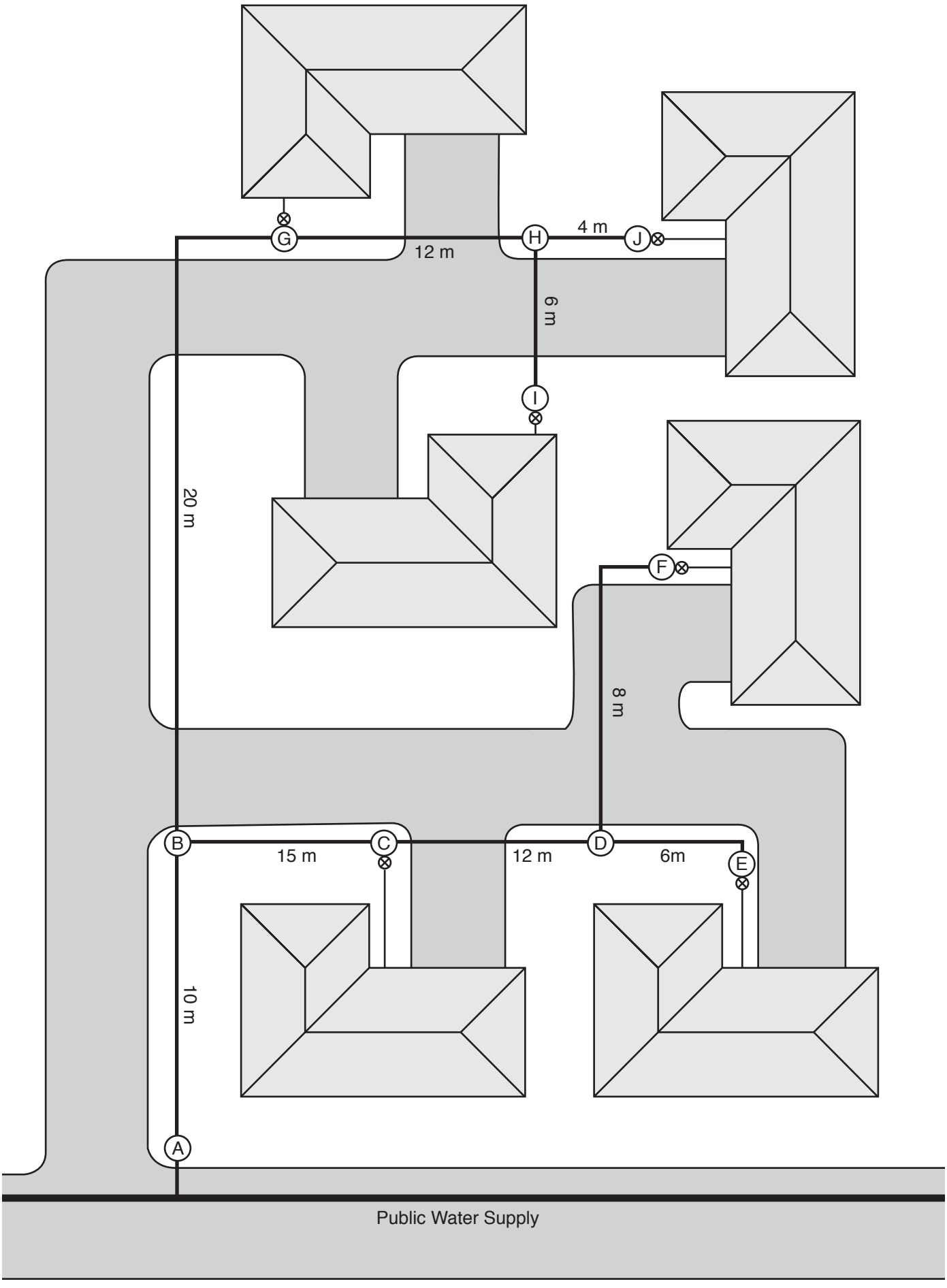
Using the procedure in AS/NZS 3500 Part 1: Water supplies, Appendix C, complete the tables below to size the pipework.

Index length of installation	Pressure drop

Pipe Section	Probable simultaneous demand (L/s)	Nominal pipe size (DN)
A-B		
B-C		
C-D		
D-E		
D-F		
B-G		
G-H		
H-I		

Total 13 marks

QUESTION 3 (cont'd)



QUESTION 4

Foul water is to be pumped to a sewer. The pump is capable of reaching 60 kPa pressure.

Complete the table below by naming the two methods that comply with AS/NZS 3500 Part 2: Sanitary plumbing and drainage for testing the pipe between the pump and the sewer for leaks.

For each method, include the pressure to which each test must be performed.

Method	Pressure

Total 4 marks

QUESTION 5

The Health and Safety in Employment Act requires that employers take practicable steps to ensure the safety of employees while at work.

List FIVE general duties of an employer in relation to this Act.

1 _____

2 _____

3 _____

4 _____

5 _____

Total 5 marks

QUESTION 6

A fire collar is to be fitted to a uPVC water pipe that passes through the concrete wall of a plant room.

(a) Explain the purpose of the fire collar.

_____

_____

(2 marks)

(b) Explain how the fire collar achieves its intended purpose.

_____

_____

(2 marks)

(c) The fire rating of the plant room is higher than the adjacent room.

State how the rating of the fire collar is determined.

_____

(1 mark)

Total 5 marks

QUESTION 7

(a) The Guide for Safety with Underground Services states that underground telecommunications ducts are commonly coloured green, purple or light blue.

List THREE other colours that telecommunications have used for ducting in the past and that may still be found underground.

1 _____

2 _____

3 _____

(3 marks) ☐

(b) List FIVE steps according to the Guide for Safety with Underground Services that should be taken before starting excavation work near underground services.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks) ☐

(c) List FIVE trenchless or partial excavation techniques for the installation of mains or service pipes as stated in The Guide for Safety with Underground Services.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks) ☐

QUESTION 7 (cont'd)

(d) A water main is to be installed adjacent to an overhead electric line support.

List the THREE conditions where consent is required from the power pole owner before any excavation can be carried out as stated in Appendix 5 of the Guide for Safety with Underground Services.

1 _____

2 _____

3 _____

(3 marks)

Total 16 marks

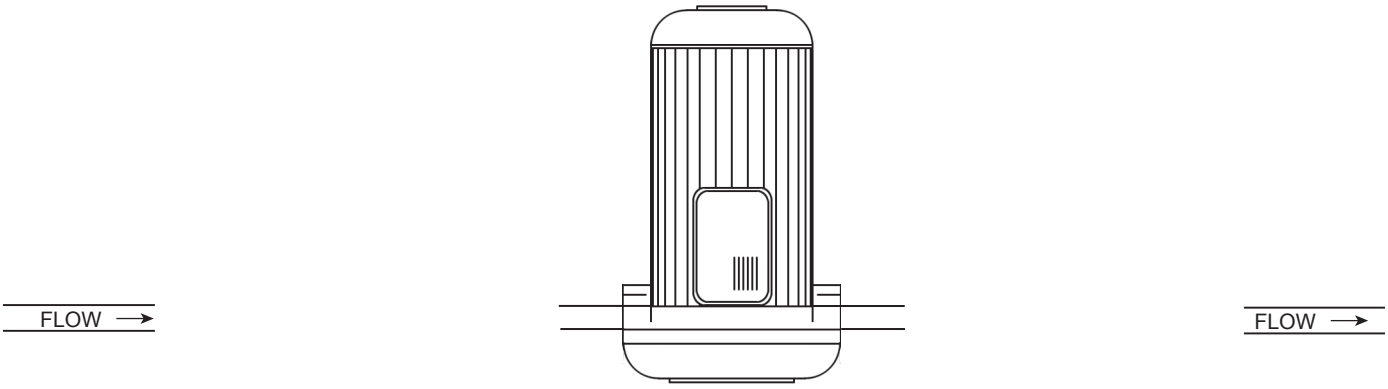
QUESTION 8

The starter drawing below shows a pump and inlet and outlet water supply pipes.

Complete the drawing to show the required fittings to connect the pump to the suction and delivery lines.

Label all fittings drawn.

The installation is to comply with AS/NZS 3500.



Total 4 marks

QUESTION 9

A potable water storage tank is installed to comply with AS/NZS 3500.

(a) Give TWO instances when the water storage tank must be cleaned and disinfected.

1 _____

2 _____

(2 marks)

(b) List the requirements that must be met when performing an acceptable method of disinfecting the water storage tank.

_____

_____

_____

_____

_____

_____

(4 marks)

(c) Give TWO factors that must be taken into account when calculating the amount of chlorine that will be required per litre for disinfecting the water storage tank.

1 _____

2 _____

(2 marks)

Total 8 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. When must a water service installation be flushed?

   A Immediately before the building is made available to the occupiers.

   B When the installation is complete, before hydrostatic testing.

   C After hydrostatic testing has been completed and the installation is sound.

   D At the completion of pipework on each level of a multi-story building.

   E As soon as possible after any brazing or welding work has been completed.

   ☐

2. What diameter polybutylene pipe is the equivalent of 20 mm diameter copper pipe?

   A 15 mm.

   B 18 mm.

   C 20 mm.

   D 22 mm.

   E 28 mm.

   ☐

3. Where should the circulating pump be installed on an indirectly heated hot water circuit feeding radiators?

   A On the return line between the heat exchanger and the primary circuit.

   B On the flow line between the heat exchanger and the primary circuit.

   C On the return line between the heat exchanger and the secondary circuit.

   D On the flow line between the heat exchanger and the secondary circuit.

   E Between the second to last and the last radiator installed on the heating circuit.

   ☐

4. Which of the following must be avoided when designing water supply pipework that feeds both sanitary fixtures and fire hose reels?

   A Short radius bends or elbows.

   B Installing pipework in the ceiling space.

   C Installing pipework near electrical switch boards.

   D Long branches feeding the fire hose reels.

   E Long branches feeding the sanitary fixtures.

   ☐

5. Which of the following determines the inclination that a solar panel must be installed at to gain maximum efficiency?

   A The pitch of the roof.

   B The latitude of the installation.

   C The longitude of the installation.

   D The type of solar collector installed.

   E The pressure rating of the pump installed.

   ☐

6. In a solar water heating system which part is known as the collector?

   A The water storage cylinder

   B The drain tundish.

   C The circulating pump.

   D The solar panel.

   E The solar panel manifold system.

   ☐

7. Which of the following is a solar preheater?

   A A solar water heating system that feeds an electric storage water cylinder.

   B A pump that circulates warm water when panel temperatures drop to near freezing.

   C An electric element that raises the water temperature slightly to start a thermo-syphon current.

   D A water heating system that relies solely on solar energy to reach the desired temperature.

   E The selective surface coating that directs rays to the solar tubes.

   ☐

8. Which of the following is an advantage of using an indirect heating system?

A Higher temperatures can be achieved.

B The temperature can be maintained at a more stable level.

C One heat source can be used for both potable and non-potable hot water supplies.

D The pressure rating of the circulating pump can be increased.

E A tempering valve is not required on the installation.

☐

9. Which of the following is the common name for hydraulic shock?

A Hydraulic jump.

B Shock absorbers.

C Equipotential bonding.

D Static water pressure.

E Water hammer.

☐

10. Which of the following is a fixture pair?

A A washing machine discharging into a laundry tub.

B A double-bowl kitchen sink unit where each bowl has its own trap and the discharge pipes are combined.

C A double-bowl vanity where the two bowls share one trap.

D A dishwasher connected to a supplementary trap on a sink.

E A WC pan and basin installed in the same room.

☐

11. Which of the following is the minimum requirement for a storage water heating system to prevent the growth of legionella bacteria?

A The temperature must reach 60°C or higher once a week for not less than 1 hour.

B The temperature must reach 55°C for 2 hours once a day.

C The temperature must reach 100°C every two days.

D The temperature must be kept above 60° at all times.

E The temperature must be kept above 70°C at all times.

☐

12. Which of the following is the recommended minimum distance that a mechanical excavator should be used next to a cable or pipe, according to the Guide for Safety with Underground Services?

A 500 mm.

B 600 mm.

C 800 mm.

D 1000 mm.

E 1200 mm.

☐

13. Which of the following is the recommended minimum distance between any live overhead electric line and any part of any mobile plant or load carried, according to the Guide for Safety with Underground Services?

A 2 m.

B 4 m.

C 5 m.

D 6 m.

E 10 m.

☐

14. Two 50 mm holes are to be drilled through the side of a 200 mm joist.

What is the minimum allowable distance between the two holes as stated in AS/NZS 3500 Part 1 Water Services?

A 600 mm.

B 800 mm.

C 1000 mm.

D 1200 mm.

E 1800 mm.

☐

15. Two 10 mm holes are to be drilled down through a 200 mm × 50 mm joist.

What is the minimum allowable distance between the centres of the two holes as stated in AS/NZS 3500 Part 1 Water Services?

A 200 mm.

B 300 mm.

C 400 mm.

D 500 mm.

E 600 mm.

☐

16. What is the maximum roof pitch on which an EDPM rubber boot flashing is permitted to be used to seal a roof penetration?

A 10°

B 15°

C 20°

D 30°

E 45°

☐

17. What is the minimum time a EDPM rubber boot flashing sealing a roof penetration must last to be compliant with the New Zealand Building Code?

A 1 year.

B 2 years.

C 5 years.

D 15 years.

E 50 years.

☐

18. What is the minimum time a hot water cylinder drain pipe installed under a concrete slab must last to be compliant with the New Zealand Building Code?

A 1 year.

B 2 years.

C 5 years.

D 15 years.

E 50 years.

☐

19. 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.

☐

20. Which of the following New Zealand Building Code Clauses provides an acceptable solution for designing and installing roof flashings?

A B2

B E2

C G1

D G12

E G13

Total 20 marks ☐

For Examiner's use only

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