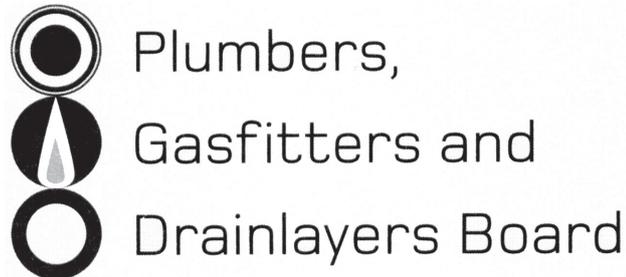


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9192



REGISTRATION EXAMINATION, NOVEMBER 2010

LICENSED 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 23–25 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 November 2010 were provided with the following documents:

- New Zealand Building Code clause G1 Personal Hygiene
- New Zealand Building Code clause G12 Water Supplies
- New Zealand Building Code clause G13 Foul Water

SECTION A

QUESTION 1

(a) State the common term used to describe water that has a high calcium carbonate content.

(1 mark)

(b) Describe a common complaint that results from the type of water in (a) being supplied to a house, and give a possible remedy.

Complaint: _____

Remedy: _____

(2 marks)

Total 3 marks

QUESTION 2

A smooth 90° bend is to be made in a 32 mm copper sparge pipe.

State TWO methods, other than using a set of pipe benders, that could be used to make the bend.

1 _____

2 _____

Total 1 mark

QUESTION 3

Copper pipe is installed with galvanised pipe clips.

- (a) Explain why it is necessary to insert rubber or similar insulators between the supports and the pipe.

(1 mark)

- (b) Explain what would happen if an insulator was not used.

(1 mark)

Total 2 marks

QUESTION 4

Describe what can happen to copper products if they are exposed to continual vibration.

Total 1 marks

QUESTION 5

A section of metal water pipe in an existing installation is being replaced with plastic pipe.

- (a) Describe a possible hazard that the removal of the section of metal pipe may create.

(1 mark)

- (b) Describe a remedy for the hazard in (a).

(1 mark)

Total 2 marks

QUESTION 6

State the meaning of the following terms as they relate to a water reticulation system.

(a) Hydrostatics

(1 mark)

(b) Hydraulics

(1 mark)

(c) Velocity

(1 mark)

(d) Erosion

(1 mark)

Total 4 marks

QUESTION 7

Give FIVE safety checks that should be carried out before starting work on a mobile scaffold.

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

Total 5 marks

QUESTION 8

A straight run of copper piping 25 metres long is to be installed.

The temperature at the time of installation is 15°C.

The pipework is being used for a hot supply with the water reaching a temperature of 59°C.

Using the information in the table below, calculate in millimetres how much space for expansion that would need to be allowed for the installation.

Formula:

Expansion = length × coeff. lin. exp. × temp. diff.

Coefficient of linear expansion

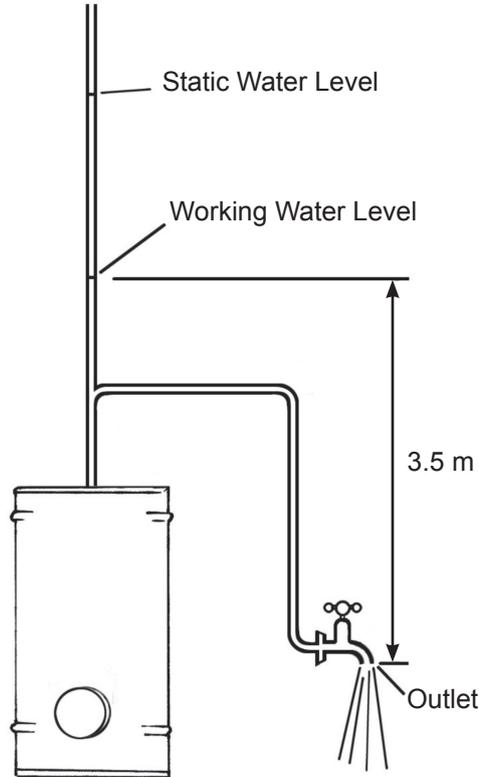
Material	Coefficient of linear expansion per degree K Note: One degree K = 1°C
Polyethylene— low density high density	0.00028 or 280×10^{-6} 0.00011 to 0.00013 or 110×10^{-6} to 130×10^{-6}
Polyvinyl chloride (uPVC)— normal impact high impact	0.00005 or 50×10^{-6} 0.000081 or 81×10^{-6}
Acrylonitrile butadiene styrene (ABS)	0.000083 to 0.000095 or 83×10^{-6} to 95×10^{-6}
Polypropylene Acrylics	0.00011 or 110×10^{-6} 0.00005 to 0.00009 or 50×10^{-6} to 90×10^{-6}
Nylon	0.00007 to 0.00001 or 70×10^{-6} to 100×10^{-6}
Lead	0.000029 or 29×10^{-6}
Zinc	0.000035 or 35×10^{-6}
Aluminium	0.000025 or 25×10^{-6}
Brass	0.000018 or 18×10^{-6}
Copper	0.0000166 or 16.6×10^{-6}
Steel	0.0000133 or 13.3×10^{-6}
Cast iron	0.0000106 or 10.6×10^{-6}
Tin	0.000020 or 20×10^{-6}

Total 4 marks

QUESTION 9

The diagram below shows an open-vented storage water heater.

A hot tap is situated 3.5 m below the working water level in the vent pipe.



Calculate the pressure in kPa that would be expected at the tap.

Total 2 marks

QUESTION 10

(a) State the function of a floor waste as stated in New Zealand Building Code Clause G13.

(1 mark)

(b) State TWO functions of a floor waste gully trap as stated in AS/NZS 3500.

1 _____

2 _____

(2 mark)

Total 3 marks

QUESTION 11

Under the New Zealand Building Code Clause G13, a 40 mm copper pipe is required for the vertical run of a waste pipe in a three-level building.

State the maximum distance apart the supports for the pipe can be.

Total 1 marks

QUESTION 12

Figure 1 below shows a plan of the fixtures in a house.

Figure 2 shows the hot water cylinder and associated valving.

Complete Figure 2 to show the hot and cold supply pipework to serve the fixtures of the installation.

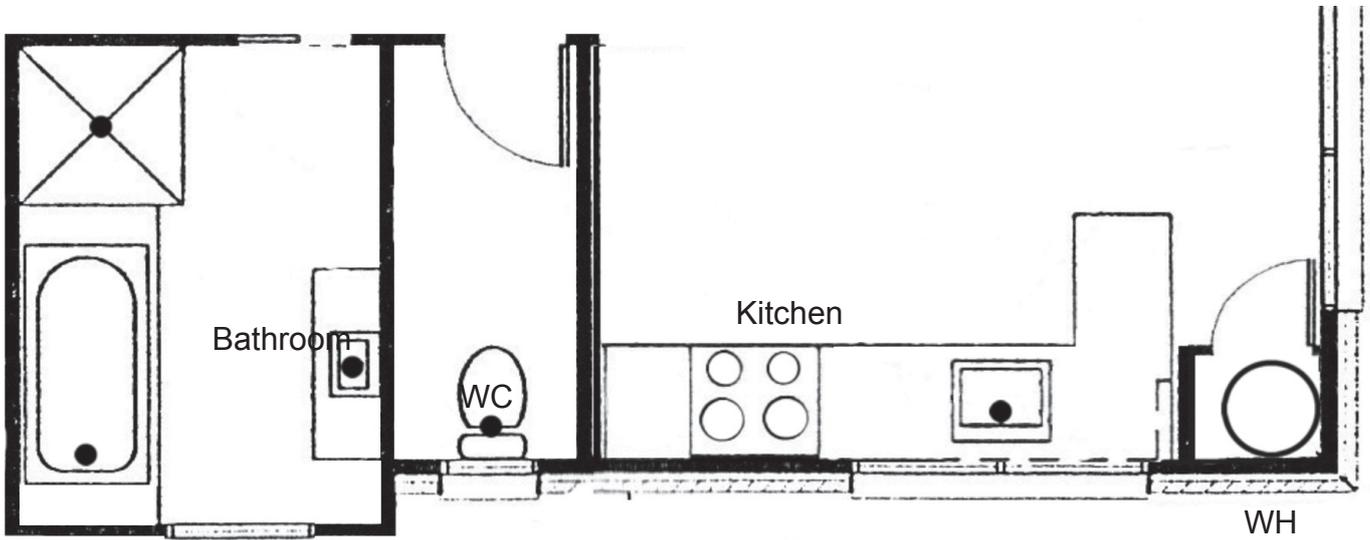


Figure 1

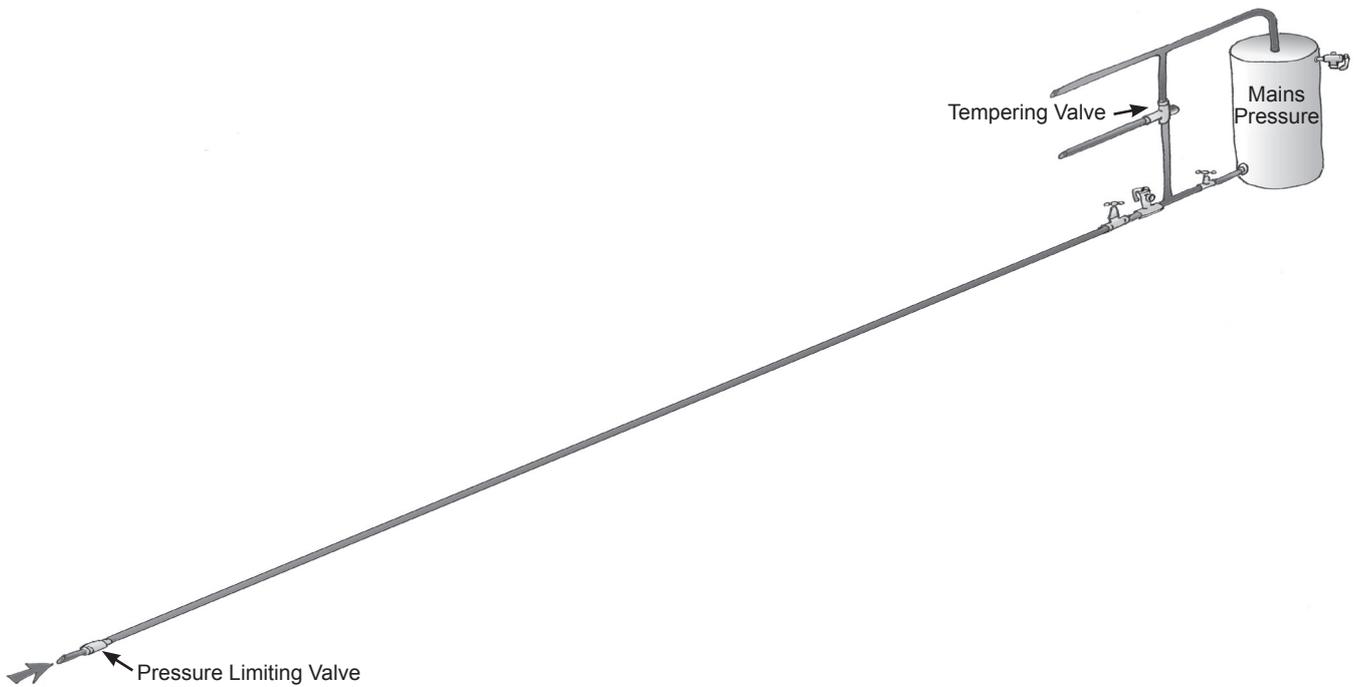


Figure 2

Total 5 marks

QUESTION 13

(a) Draw a diagram showing an indirect heating system. Label the key components,

(3 marks)

(b) Briefly explain how the system in (a) operates.

(2 marks)

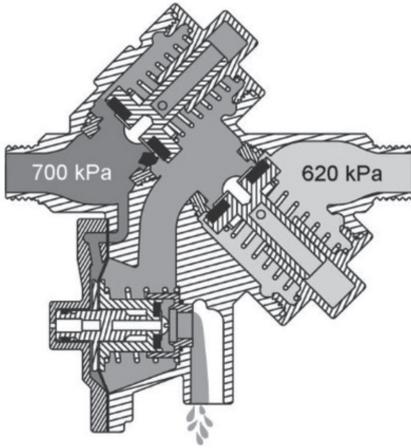
Total 5 marks

QUESTION 14

The diagrams below show some of the stages in the operation of a reduced pressure zone back flow prevention assembly.

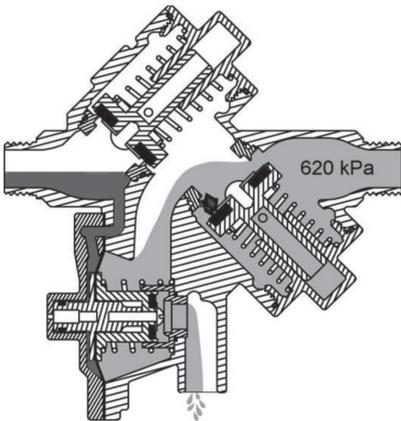
Describe what is occurring in each diagram.

(a)



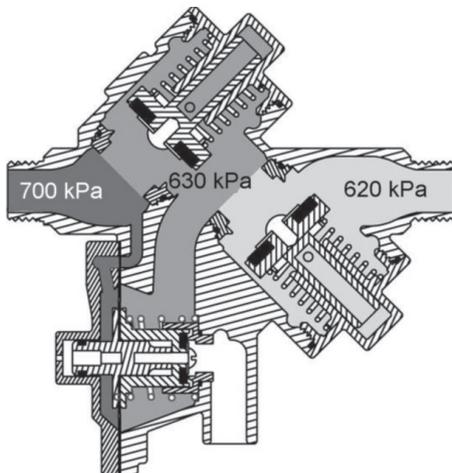
(2 marks)

(b)



(2 marks)

(c)



(2 marks)

Total 6 marks

QUESTION 15

(a) Give the cross connection hazard ratings for the following fixtures.

(i) Dental spittoon

(1 mark)

(ii) Non-carbonated drink dispenser

(1 mark)

(iii) Swimming pool

(1 mark)

(b) State the environment in which an air gap is not suitable to prevent backflow.

(1 mark)

(c) State the TWO requirements that must be met under the New Zealand Building Code Clause G12/AS1 for positioning any type of backflow prevention device.

1 _____

2 _____

(2 marks)

Total 6 marks

QUESTION 16

Five causes of trap seal loss in foul water systems are given below.

Briefly describe how each situation arises.

(a) Self siphonage

(2 marks)

(b) Induced siphonage

(2 marks)

(c) Compression

(2 marks)

(d) Momentum

(2 marks)

(e) Oscillation

(2 marks)

Total 10 marks

QUESTION 17

A vent is being connected to the discharge pipe of a WC.

State TWO restrictions that apply for the installation to comply with New Zealand Building Code Clause G13.

- 1 _____
- 2 _____

Total 2 marks

QUESTION 18

Answer the following questions in relation to New Zealand Building Code Clause G12.

A tempering valve is to be installed on a low pressure hot water system feeding a shower.

(a) Give the THREE specific requirements regarding the installation that must be met

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) State the minimum distance from the water heater outlet at which a tempering valve is permitted to be installed.

(1 mark)

Total 4 marks

QUESTION 19

A pump is being selected to supply water to a building.

State THREE factors regarding the installation that should be taken into account in order to select the appropriate pump.

- 1 _____
- 2 _____
- 3 _____

Total 3 marks

QUESTION 20

State THREE minimum clearance measurements that must be achieved when installing a basin intended for use by people with disabilities.

- 1 _____
- 2 _____
- 3 _____

Total 3 marks

QUESTION 21

(a) A 50 mm trap and vent has been installed on a commercial sink waste.

During building alterations, an air admittance valve replaces the vent pipe.

State the minimum size the air admittance valve can be.

(1 mark)

(b) Give THREE design restrictions on installing the air admittance valve.

1

2

3

(3 marks)

Total 4 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. How many litres of water per person need to be stored in the event that the water supply to a community care facility is interrupted?

- A 20 litres.
- B 30 litres.
- C 40 litres.
- D 50 litres.
- E 60 litres.

2. What is the maximum allowable temperature at which the hot water in a childcare centre can be supplied?

- A 35°C.
- B 40°C.
- C 45°C.
- D 50°C.
- E 55°C.

3. When adjusting temperature for the hot water supply in a retirement home, where should the temperature be measured to ensure it is correct?

- A At the thermostat.
- B At the tempering valve outlet.
- C At the basin tap outlet.
- D At the drain port of the temperature and pressure relief (TPR) valve.
- E At the top of the hot water cylinder.

4. When installed in a location that may be subjected to freezing, how high above the standing level should a vent pipe on an open vented hot water cylinder be insulated?
- A 250 mm.
 - B 300 mm.
 - C 350 mm.
 - D 400 mm.
 - E 450 mm.

5. What is the minimum allowable size for a combined relief drain that is fitted to a valve vented hot water cylinder?
- A 15 mm.
 - B 20 mm.
 - C 25 mm.
 - D 32 mm.
 - E 40 mm.

6. A relief drain is serving both the 20 mm outlet from a cold water expansion valve and the 15 mm outlet from the temperature and pressure relief valve (TPR).

What is the minimum size for the relief drain?

- A 15 mm.
- B 20 mm.
- C 25 mm.
- D 32 mm.
- E 40 mm.

7. What are the minimum requirements that must be met when a new water pipework installation is being tested for soundness?

- A 15 minutes at 1500 kPa.
- B 15 minutes at 2000 kPa.
- C 20 minutes at 2000 kPa.
- D 30 minutes at 1500 kPa.
- E 30 minutes at 2000 kPa.

8. What is the recommended temperature for hot water to be stored at to prevent the growth of legionella bacteria?

- A 45°C.
- B 50°C.
- C 55°C.
- D 60°C.
- E 70°C.

9. When installing a water pipe below a driveway, how much coverage must the pipe have?

- A 450 mm.
- B 500 mm.
- C 550 mm.
- D 600 mm.
- E 650 mm.

10. A water pipe is to be installed under the concrete floor of a new building.
How many years must the pipe be able to last?

- A 5 years.
- B 10 years.
- C 15 years.
- D 30 years.
- E 50 years.

11. A new kitchen will have two sink bowls, a dishwasher and a waste disposal unit installed. All of these fixtures and appliances are to connect to a single trap and discharge pipe. What is the minimum size trap and discharge pipe that must be used?

- A 32 mm.
- B 40 mm.
- C 50 mm.
- D 65 mm.
- E 80 mm.

12. What is the minimum distance above a gully dish grate at which an untrapped floor waste must discharge?

- A 25 mm.
- B 32 mm.
- C 40 mm.
- D 50 mm.
- E 65 mm.

13. What is the main purpose of a trap vent?

- A To allow foul smells to escape.
- B To prevent foul odours entering the building.
- C To prevent the loss of water seals.
- D To provide a quicker discharge rate.
- E To allow oscillation within the waste system.

14. What is the maximum length a single waste pipe to a gully can be before a vent pipe must be fitted?
- A 3.5 m.
 - B 3.8 m.
 - C 4.2 m.
 - D 4.5 m.
 - E 4.8 m.
-

15. Why are traps fitted to waste pipes?
- A To prevent vermin entering the building.
 - B To reduce the velocity of discharge.
 - C To prevent foul gases entering the building.
 - D To exclude sewer gases from the waste pipe.
 - E To intercept foreign matter before it enters the sewer system.
-

16. What is a drinking fountain classed as?
- A A sanitary fixture.
 - B A sanitary appliance.
 - C A public facility.
 - D A soil fixture.
 - E A trade waste fixture.
-

17. What is the minimum diameter a vent pipe that connects to a 50 mm urinal waste can have?

A 20 mm.

B 25 mm.

C 32 mm.

D 40 mm.

E 50 mm.

18. What is the minimum diameter a soil pipe connected to a WC pan can have?

A 65 mm.

B 75 mm.

C 80 mm.

D 85 mm.

E 100 mm.

19. What is the minimum permissible gradient of a 50 mm diameter waste pipe?

A 1 in 20.

B 1 in 25.

C 1 in 30.

D 1 in 40.

E 1 in 60.

20. A wash hand basin is being installed for use by people with disabilities.

Where must the hot tap be installed?

A Most distant from the doorway.

B Closest to the doorway.

C 75 mm away from the cold tap.

D On the left side of the cold tap.

E Separate from the cold tap.

21. A wash hand basin is being installed for use by people with disabilities.
What is the maximum distance the front of the basin can protrude into the room?

- A 250 mm.
- B 300 mm.
- C 350 mm.
- D 375 mm.
- E 400 mm.

22. What is a thermostatic valve?

- A A valve that increases hot water temperature.
- B A valve that relieves excess pressure.
- C A valve that delivers water at a set temperature.
- D A valve that controls the thermostat on a continuous flow water heater.
- E A valve that controls the element on an autoclave.

23. Which statement best describes oxidising flame?

- A A luminous flame used when welding iron or steel.
- B A noisy flame with a pointed, blue inner cone.
- C A carburising flame with a feathered intermediate cone.
- D A flame that has equal proportions of oxygen and acetylene.
- E An ideal flame to use when lead burning.

24. Which of the following is the flux used when soldering galvanised iron?

- A Killed spirit.
- B Sal-ammoniac.
- C Spirits of salt.
- D Borax.
- E Resin.

Total 24 marks

For Examiner's use only

Question number	Marks	Marks
1		
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