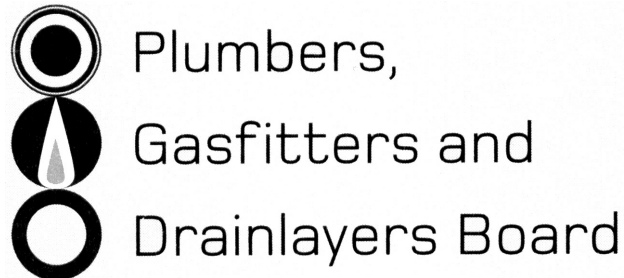


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9192



REGISTRATION EXAMINATION, NOVEMBER 2012

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 20–21 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 November 2012 were provided with the following documents:

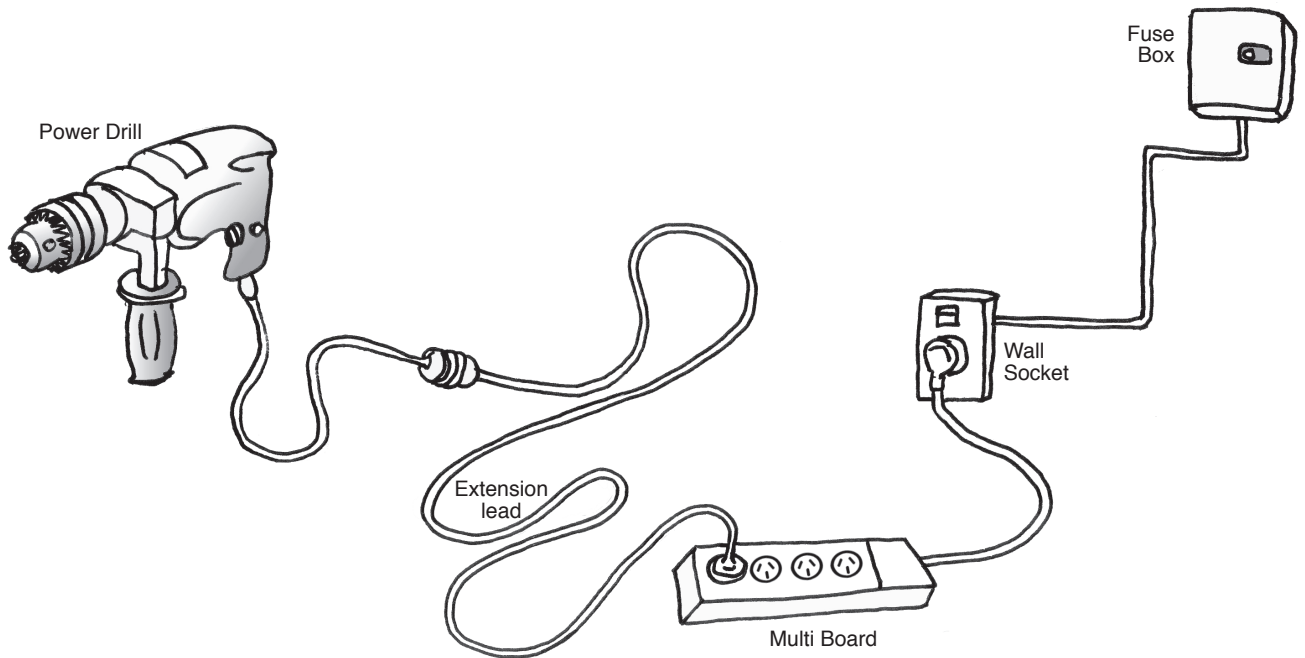
- New Zealand Building Code clause G13 Foul Water

SECTION A

QUESTION 1

- (a) The drawing below shows a power drill plugged into a wall socket via an extension lead and multi board.

Indicate with an arrow on the drawing where a residual current device (RCD) should be placed to protect the user from electric shock.



(1 mark)

- (b) Give THREE different types of damage that could occur to an electrical lead that is being used on a building site.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 4 marks

QUESTION 2

- (a) Give FOUR devices that can be used to determine the gradient at which a waste pipe has been laid.

1 _____

2 _____

3 _____

4 _____

(2 marks)

- (b) Draw a cross-sectional view of a bolted flange joint.

(2 marks)

QUESTION 2 (cont'd)

(c) (i) Name the two metals that are used to make soft solder for galvanised steel sheet metal.

1 _____

2 _____

(1 mark)

(ii) Name the flux that is used when soldering galvanised steel sheet metal.

(1 mark)

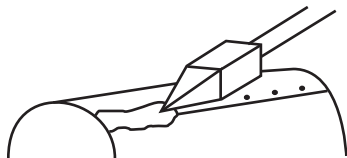
(iii) State the purpose of a flux used when soldering galvanised steel sheet metal.

(1 mark)

(iv) Give the reason galvanised steel sheet metal should be rinsed with water after being soldered.

(1 mark)

(v) The diagram below shows a soldering bolt being used to solder a lap joint between two sections of galvanised steel sheet metal.



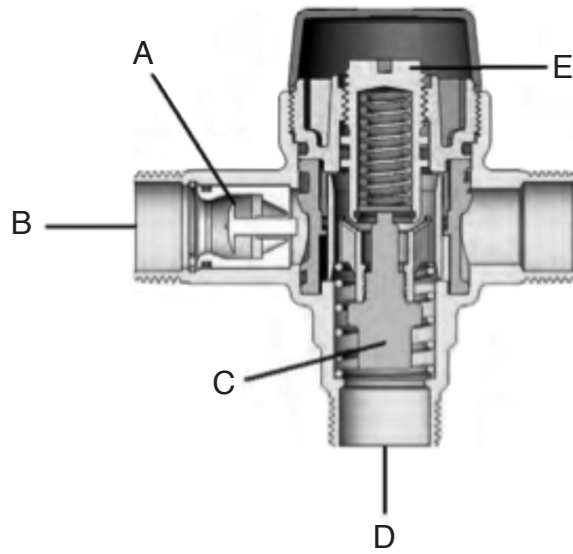
Explain why the position of the bolt as shown is used to achieve an effective seal.

(2 marks)

Total 10 marks

QUESTION 3

The diagram below shows a tempering valve.



(a) Name each part labelled A - E

- A _____
- B _____
- C _____
- D _____
- E _____

(5 marks)

(b) Explain how a tempering valve operates.

(4 marks)

(c) State when a tempering valve is required to be installed.

(1 mark)

Total 10 marks

QUESTION 4

(a) Give a metric unit that each of the following may be measured in.

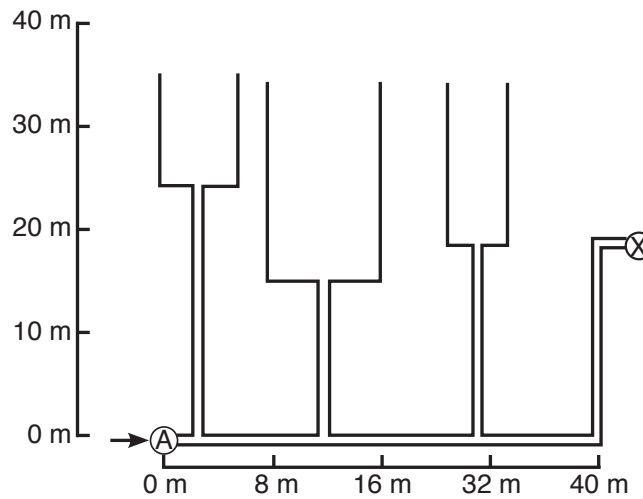
Length _____ Area _____
 Volume _____ Velocity _____
 Capacity _____ Pressure _____

(3 marks)

(b) The diagram below shows part of a water supply system, including three storage tanks and an outlet (X).

The available water pressure at point A is 275 kPa.

Indicate on the diagram the expected static water level for each tank.



(3 marks)

(c) Water can be referred to as either soft or hard.

(i) Explain what hard water is.

(1 mark)

(ii) Describe a situation that can result in hard water.

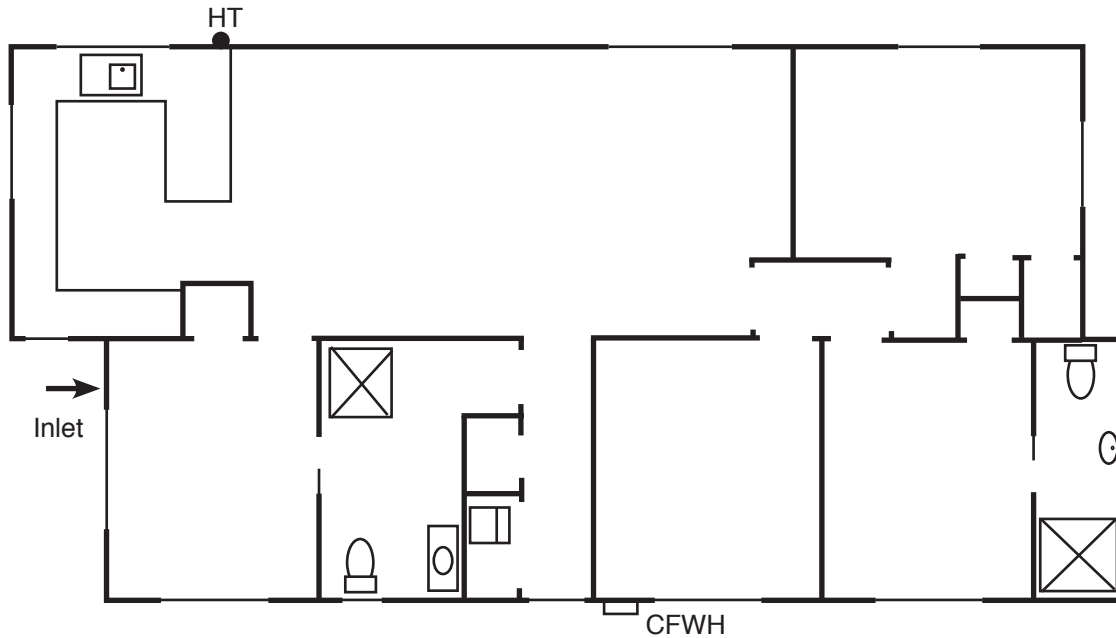
(1 mark)

Total 8 marks

QUESTION 5

The diagram below shows a floor plan of a dwelling with the layout of the sanitary fixtures.

Key: HT = Hose tap
CFWH = Continuous flow water heater



- (a) Complete the table below to show the number of tees required for the hot pipework and the number of tees required for the cold pipework.

Number of tees required for hot pipework	Number of tees required for cold pipework

(2 marks)

- (b) The pipework is to be tested to comply with New Zealand Building Code Clause G12/AS1 Water Supplies.

State the minimum pressure and the time required for a hydrostatic test of the pre-line pipework.

Minimum pressure: _____

Time: _____

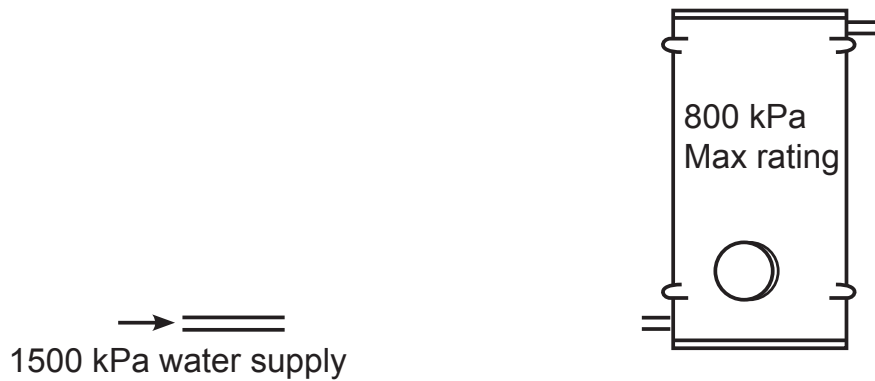
(2 marks)

QUESTION 5 (cont'd)

- (c) The dwelling's owner is considering installing a mains pressure valve-vented storage hot water cylinder.

The starter drawing below shows the water supply and the cylinder.

Complete the diagram to show valve train requirements for connecting the water supply to the cylinder.



(3 marks)

Total 7 marks

QUESTION 6

(a) Describe what is meant by the term central heating.

(1 mark)

(b) Give TWO methods/systems by which a dwelling can be centrally heated.

1

2

(2 marks)

(c) A free standing solid fuel heater is to be installed in a living area.

Give FIVE installation requirements that must be met to protect the surrounding structure from fire.

1

2

3

4

5

(5 marks)

Total 8 marks

QUESTION 7

A pump is installed at ground level to lift water from a well.

- (a) State the maximum vertical height in theory from the pump to the surface of the water to which the pump will be able to lift water.

(1 mark)

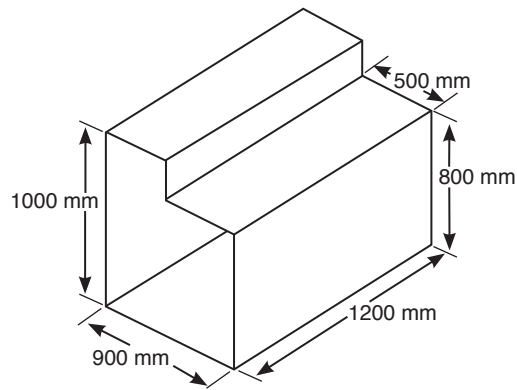
- (b) Explain why there is a maximum height in theory to which the pump can lift water.

(2 marks)

Total 3 marks

QUESTION 8

The diagram below shows a section of open ended sheet metal ducting. The diagram is not to scale.



- (a) Calculate the area of sheet metal required to construct the ducting. Make no allowance for laps.

(3 marks)

- (b) Calculate the volume of the ducting.

(3 marks)

QUESTION 8 (cont'd)

(c) Draw a diagram to a scale of 1:20 showing an elevation of the end of the ducting.

(3 marks)

Total 9 marks

QUESTION 9

(a) State the purpose of an access point on a sanitary plumbing discharge pipe system.

(1 mark)

(b) Give FOUR areas where access points must be included in a sanitary plumbing discharge pipe system to comply with the New Zealand Building Code Clause G13/AS1 Foul Water.

1

2

3

4

(4 marks)

(c) Give FOUR restrictions that apply to the location of the terminal of a discharge system vent pipe according to the New Zealand Building Code Clause G13/AS1 Foul Water.

1

2

3

4

(4 marks)

Total 9 marks

QUESTION 10

A rain water harvesting system is to be installed.

(a) List THREE different ways in which a rain water harvesting system could become contaminated.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Give TWO ways in which the risk of contaminants entering the storage tank can be reduced.

- 1 _____
- 2 _____

(2 marks)

(c) Give TWO ways of supplying potable water to a household when the rain water supply has not met the demand.

- 1 _____
- 2 _____

(1 mark)

(d) The rainwater in an area is not suitable for use as potable water.

Give THREE outlets within a household that the rainwater could safely be used to supply.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 9 marks

QUESTION 11

(a) Explain how a carburising flame is obtained when oxy-acetylene welding.

(1 mark)

(b) Draw and label a diagram showing a carburising flame used when welding with oxy-acetylene.

(3 marks)

Total 4 marks

QUESTION 12

Calculate how many litres of water at 55°C can be achieved when 180 litres of hot water at 70°C is mixed with cold water at 14°C.

Formula:

$$L \times T_1 = M \times T_2$$

where

L = number of litres of hot water

T₁ = temperature rise from cold to hot water

M = number of litres of mixed water

T₂ = temperature rise from cold to mixed water

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 no marks will be awarded for that question.

1. Which of the following materials would expand the most as its temperature increases?

- A Lead.
- B uPVC.
- C Copper.
- D Steel.
- E Polypropylene.

2. Which of the following materials would expand the least as its temperature increases?

- A uPVC.
- B Lead.
- C Copper.
- D Steel.
- E Polypropylene.

3. Which of the following statements best describes convection heat transfer?

- A Heat that is transferred molecule to molecule by direct contact.
- B Heat that is obtained from a non-potable liquid and transferred to potable water.
- C Heat that is transferred with the assistance of a fan.
- D Heat that can travel through a vacuum.
- E Heat that is circulated through air or liquid due to differing densities.

4. Which of the following statements best describes radiation heat transfer?

- A Heat that is transferred molecule to molecule by direct contact.
- B Heat that is obtained from a non-potable liquid and transferred to potable water.
- C Heat that is transferred with the assistance of a fan.
- D Heat that can travel through a vacuum.
- E Heat that is circulated through air or liquid due to differing densities.

5. Which of the following statements best describes conduction heat transfer?
- A Heat that is transferred molecule to molecule by direct contact.
 - B Heat that is obtained from a non-potable liquid and transferred to potable water.
 - C Heat that is transferred with the assistance of a fan.
 - D Heat that can travel through a vacuum.
 - E Heat that is circulated through air or liquid due to differing densities.

6. What is the minimum allowable diameter of a trap installed on the outlet of a commercial kitchen sink?
- A 32 mm.
 - B 40 mm.
 - C 50 mm.
 - D 65 mm.
 - E 80 mm.

7. What is the minimum allowable distance below the grate of a gully trap that a waste pipe outlet can terminate?
- A 10 mm.
 - B 20 mm.
 - C 30 mm.
 - D 40 mm.
 - E 50 mm.

8. Which of the following installations must have two traps fitted?
- A Two adjacent domestic kitchen sinks.
 - B A domestic kitchen sink and a dishwasher.
 - C Two adjacent laundry tubs.
 - D A domestic sink and a waste disposal unit.
 - E Two adjacent commercial sinks.

9. What is the maximum length for an untrapped charge pipe discharging into a trapped floor waste?
- A 1.2 metres.
 - B 2.5 metres.
 - C 3.0 metres.
 - D 6.0 metres.
 - E 10.0 metres.

10. What is the minimum gradient for a waste system vent pipe?
- A 1:20
 - B 1:40
 - C 1:60
 - D 1:80
 - E 1:100

11. Which of the following sanitary fixtures is NOT permitted to discharge to a floor waste gully?
- A Basin.
 - B Bath.
 - C Shower.
 - D Bidet.
 - E Urinal.

12. Which of the following is a manipulative joint used on copper pipe?
- A Olive/ferrule fitting.
 - B Brazing socket.
 - C Crox fitting.
 - D Female to male threaded fitting.
 - E Tapered thread fitting.

13. What is the purpose of installing a foot valve on a pump installation?
- A To prevent the pump suction line from emptying.
 - B To prevent the pump delivery line from emptying.
 - C To allow air to be released from the pressure chamber on the pump.
 - D To allow the pressure chamber of the pump to be recharged with air.
 - E To provide a disconnection point for the pump for servicing or removal.

14. Which of the following may occur if a low pressure water pipe rises above the hydraulic gradient of the installation?
- A The velocity of the water may increase.
 - B The pressure may increase at the lowest outlet
 - C An air lock may occur at the high point of the pipework.
 - D The velocity of the water may decrease.
 - E The vent pipe may overflow.

15. How does a quick recovery hot water cylinder differ from a standard hot water cylinder?
- A It operates at higher pressures.
 - B It has a second element located higher in the cylinder.
 - C The element has a higher kilowatt rating.
 - D The thermostat is set to a higher temperature.
 - E It is fitted with higher grade insulation.

Total 15 marks

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Section B		
Total		