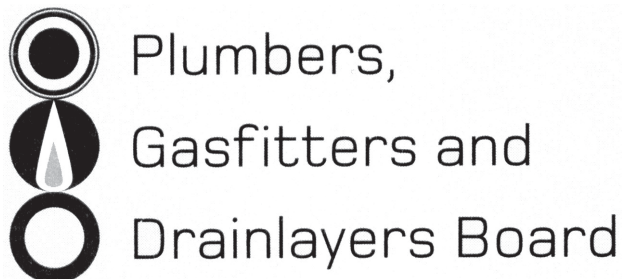


Affix label with Candidate Code  
Number here.  
If no label, enter candidate  
Number if known

.....

No. 9192



## REGISTRATION EXAMINATION, NOVEMBER 2011

# 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 22–25 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 2011 were provided with the following documents:

- New Zealand Building Code clause G12 Water Supplies
- New Zealand Building Code clause G13 Foul Water

## SECTION A

### QUESTION 1

(a) State FIVE practices that reduce the risk of falling when using a ladder.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_

(5 marks)

(b) A residual current device (RCD) can protect a worker from electrocution when using a power tool.

State where in the circuit the RCD should be placed.

\_\_\_\_\_

\_\_\_\_\_

(1 mark)

**QUESTION 1 (cont'd)**

(c) Give the meaning of the following terms in relation to workplace hazard management.

(i) Eliminate.

---

---

(1 mark)

(ii) Isolate.

---

---

(1 mark)

(iii) Minimise.

---

---

(1 mark)

**Total 9 marks**

**QUESTION 2**

(a) A commercial building has copper hot and cold water pipework.

Water supply pipework for an additional basin is to be installed.

List FIVE actions that should be taken before installing tees and water pipes to feed the additional fixtures.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_

(5 marks)

(b) The water supplied at the shower head from a low pressure hot water cylinder is insufficient for the customer's requirements.

Give FOUR solutions, other than changing the cylinder, that could be implemented to remedy this.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_

(4 marks)

(c) State THREE specific requirements that must be met when hot water pipework is installed under a concrete slab.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_

(3 marks)

**Total 12 marks**

### QUESTION 3

A 250 litre hot water cylinder is 1500 mm tall.

- (a) The following table lists the materials required to seismically restrain the cylinder.

Complete the table by entering the minimum required quantity of each item.

Material	Quantity
50 mm × 50 mm timber	
100 × 3.75 nail	
25 mm × 1 mm Strap	
8 mm coach screws	
30 mm × 2 mm thick washer	

(2½ marks)

- (b) State the maximum distance from the top of the cylinder at which the uppermost strap is allowed to be installed.

---

(½ mark)

**Total 3 marks**

**QUESTION 4**

Describe each of the following processes of heat transfer. You may use diagrams to help you.

(a) Convection.

---

---

---

---

---

(2 marks)

(b) Radiant heat.

---

---

---

---

---

(2 marks)

(c) Conduction.

---

---

---

---

---

(2 marks)

**Total 6 marks**

**QUESTION 5**

(a) Give an example of a manipulative joint on copper tube.

---

---

(1 mark)

(b) Give an example of a non-manipulative joint on copper tube.

---

---

(1 mark)

(c) The table below lists different types of plastic pipe material.

Complete the table by giving a jointing method that may be used for each type of material.

Pipe material	Jointing Method
Polypropylene	
Polybutylene	
Cross linked polyethylene	
Unplasticised polyvinyl chloride	
High density polyethylene	

(5 marks)

(d) Name the TWO materials that may be used to construct a urinal, as specified in the New Zealand Building Code Clause G1 Personal Hygiene.

1 

---

2 

---

(1 mark)

(e) Give TWO reasons the materials in (d) are used.

1 

---

2 

---

(1 mark)

**Total 9 marks**



**QUESTION 6**

(a) State when a safe tray must be installed under a hot water cylinder.

---

---

(1 mark)

(b) A safe tray is to be made from .55 gauge galvanised sheet metal.

The tray is to have a base of 800 mm × 600 mm, with a 50 mm high up-stand and a 10 mm safety edge.

Draw a 1:10 scale plan showing the cutting pattern for the safe tray.

Include measurements and indicate the folding sequence on your diagram.

(5 marks)

(c) Calculate the volume of the completed tray in (b).

---

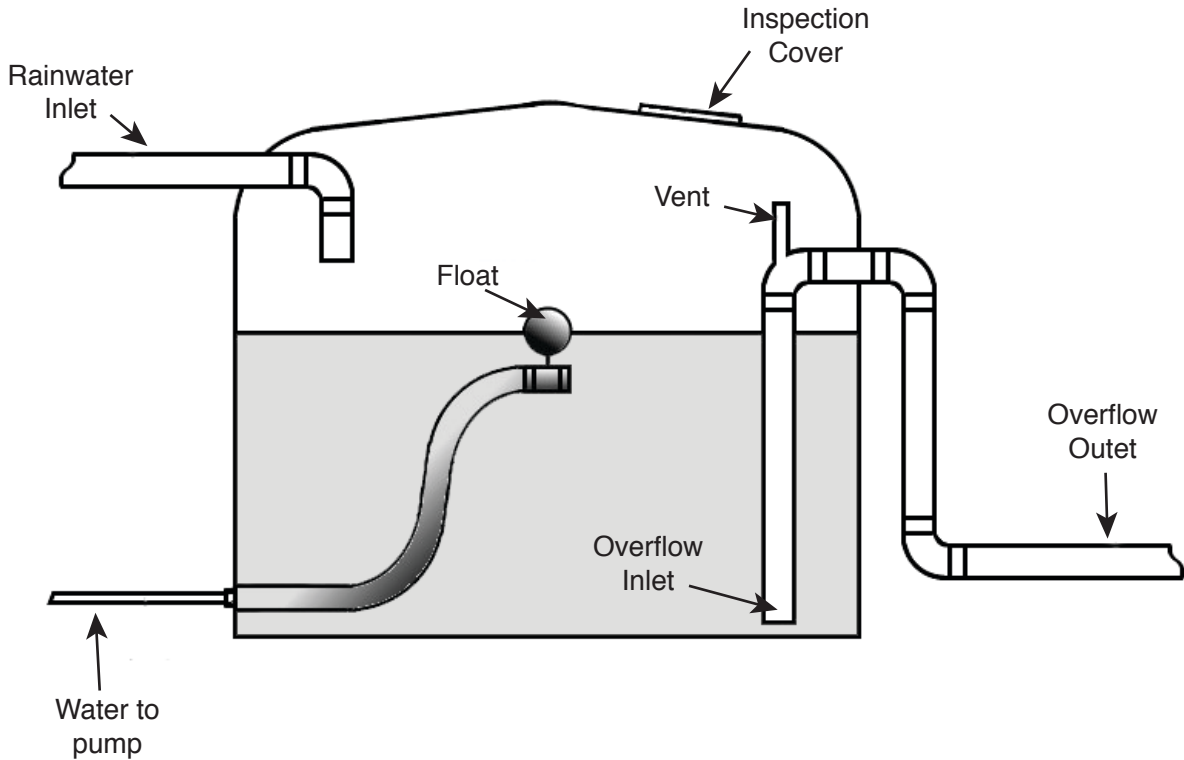
---

(2 marks)

**Total 8 marks**

### QUESTION 7

The drawing below shows a rain water storage tank with an overflow fitted.



(a) Give an advantage of the float holding the delivery pipe just below the surface of the water.

---

---

(1 mark)

(b) State the benefit of the overflow pipe extending to near the bottom of the tank.

---

---

(1 mark)

(c) Explain why a vent has been included on the overflow pipe.

---

---

(1 mark)

**Total 3 marks**

### QUESTION 8

Hot water stored at 65°C is to be mixed with cold water at 15°C to produce 350 litres of water at 55°C.

Calculate the number of litres of hot water required.

Formula:

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

where

L = number of litres of hot water

T<sub>1</sub> = temperature rise from cold to hot water

M = number of litres of mixed water

T<sub>2</sub> = temperature rise from cold to mixed water

---

---

---

---

---

---

---

---

---

---

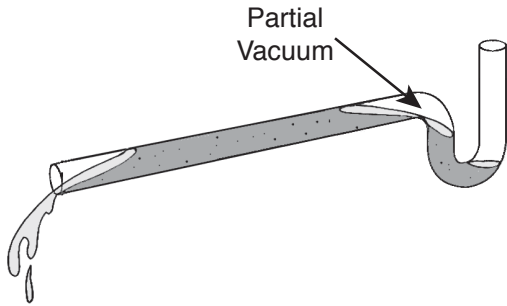
Total 4 marks

### QUESTION 9

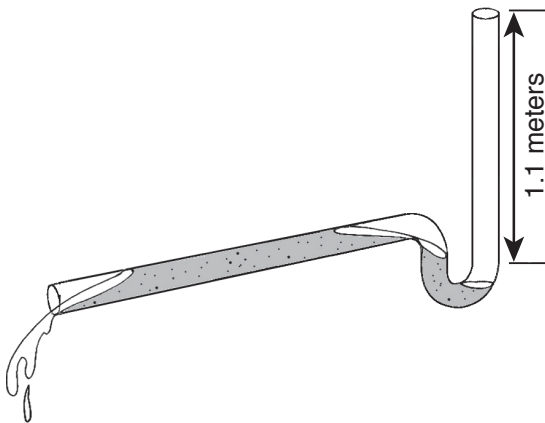
The drawings below show traps losing their water seal.

Give the name of each method shown.

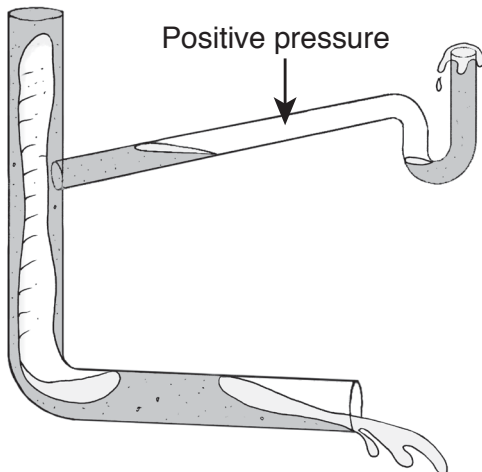
(a)



(b)

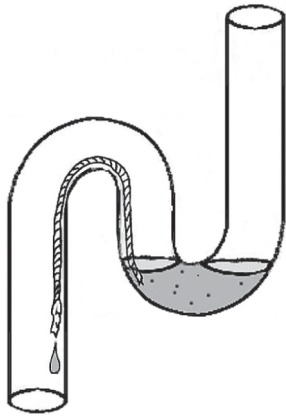


(c)

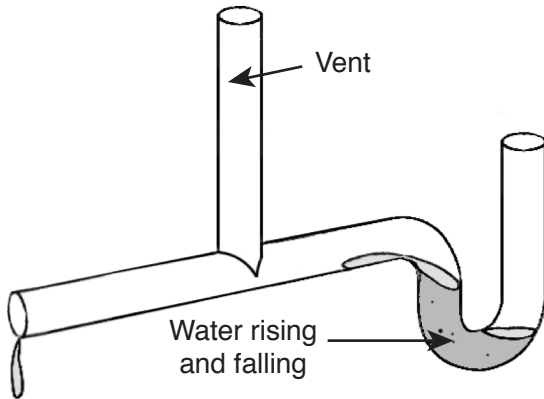


**QUESTION 9 (cont'd)**

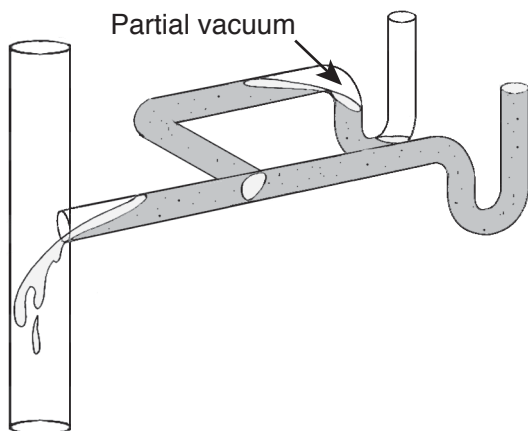
(d)



(e)



(f)



**Total 6 marks**

### QUESTION 10

(a) Name THREE different sanitary fixtures that are not permitted to discharge to a floor waste gully.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3 marks)

(b) Give TWO reasons why a minimum gradient is required for vent pipes.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

**Total 5 marks**

### QUESTION 11

Give TWO factors that should be checked before lead flashings are installed on a roof.

1 \_\_\_\_\_

2 \_\_\_\_\_

**Total 2 marks**

**QUESTION 12**

(a) Give the meaning of the term positive displacement in relation to pumps.

---

---

(1 mark)

(b) Complete the following table to show if each type of pump is a positive displacement or a non-displacement type.

Pump	Type
Hydraulic ram	
Gear pump	
Reciprocating pump	
Centrifugal	

(2 marks)

(c) A centrifugal pump is being used to pump water.

The pump is running and the water reservoir situated below the pump is full.

Give THREE possible causes of NO water flowing at the discharge point of the pipeline.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3 marks)

**Total 6 marks**

**QUESTION 13**

The fixture discharge pipe from a waste disposal unit is regularly blocking.

Give THREE possible causes of this.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_

**Total 3 marks**



## QUESTION 14

The following statements give steps in the operational sequence of a pressure reducing valve.

- A The pressure at the outlet is regulated by the diaphragm.
- B The downstream pressure overcomes the inlet pressure and spring tension.
- C A hot outlet is opened.
- D The hot outlet is closed.
- E The pressure downstream from the valve decreases.
- F Water flows through the valve to the hot outlet.
- G The valve washer is pushed off the seat by the incoming water pressure.
- H The diaphragm pulls the washer onto the seat.

Starting from a static position, write the letters A – H in the spaces below to put the steps in the correct order.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

6 \_\_\_\_\_

7 \_\_\_\_\_

8 \_\_\_\_\_

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 is the correct unit of measurement for volume?

- A Litre.
- B Metre.
- C Square metre.
- D Cubic metre.
- E Kilogram.

2. How many litres of water can be contained in 1 cubic metre at 4°C?

- A 10.
- B 100.
- C 1000.
- D 10 000.
- E 100 000.

3. Which of the following describes the effect increasing the pressure has on water?

- A Decreases the volume.
- B Increases the volume.
- C Lowers the boiling point.
- D Raises the boiling point.
- E Increases the pH level (hard water).

4. Which of the following materials is most suitable as a sacrificial anode on a hot water system?

A Magnesium.

B Zinc.

C Copper.

D Lead.

E Iron.

5. How much coverage must be provided for a water pipe installed under a lawn?

A 450 mm.

B 500 mm.

C 550 mm.

D 600 mm.

E 650 mm.

6. What is the maximum distance from a hot water cylinder at which a pressure relief valve is permitted to be installed?

A 250 mm.

B 500 mm.

C 750 mm.

D 1000 mm.

E 1250 mm.

7. A 20 mm copper water pipe is to be installed under the joists of a wooden floored house.

What is the maximum distance allowed between clips on the pipe?

A 750 mm.

B 1000 mm.

C 1500 mm.

D 2000 mm.

E 2500 mm.

8. Which of the following has a high cross-connection hazard in relation to backflow?

- A Carbonated drink dispensers.
- B Cooling equipment.
- C Swimming pools.
- D Untreated water storage tanks.
- E Bed pan washers.

9. What is the minimum trap size permitted for a commercial kitchen sink?

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

10. What is the minimum size permitted for a charge pipe used to maintain the water seal on a trapped floor waste?

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

11. What is the minimum size air gap permitted for a 20 mm diameter relief valve drain that is discharging over a tundish?

- A 20 mm.
- B 25 mm.
- C 32 mm.
- D 40 mm.
- E 50 mm.

12. Which of the following is a requirement when a fixture vent pipe is being connected to a discharge stack vent?
- A The connection point must be at least 50 mm above the overflow level of the fixture.
  - B The connection point must be at least 50 mm above the overflow level of the highest fixture connected to the discharge stack.
  - C The fixture discharge pipe must connect to the discharge stack vent within 1200 mm of the fixture trap.
  - D The connection must be made with 2 × 45° bends or 1 × 45° bend and a Y junction.
  - E The fixture vent pipe must have a diameter of at least 40 mm.

13. What is the minimum distance from the crown of a trap at which a fixture vent pipe can be connected to the discharge pipe?
- A 25 mm.
  - B 40 mm.
  - C 50 mm.
  - D 65 mm.
  - E 75 mm.

14. What is the minimum height above ground level at which a terminal vent must terminate?
- A 2.0 m.
  - B 2.5 m.
  - C 3.0 m.
  - D 4.0 m.
  - E 5.0 m.

15. What is the minimum distance above the weir of a fixture trap at which an air admittance valve is permitted to be installed?
- A 32 mm.
  - B 40 mm.
  - C 50 mm.
  - D 65 mm.
  - E 100 mm.

16. Which statement best describes a forced hot water central heating system?
- A A system that must be vented through a temperature/pressure relief (TPR) valve.
  - B A system where the water is circulated by a pump.
  - C A system that uses thermosiphon currents to circulate the water.
  - D A system where the water is heated by a high pressure gas burner.
  - E A system that uses a high output fan to blow air over a heat exchanger filled with hot water.

17. Which of the following is an advantage of a two pipe central heating system over a one pipe heating system?
- A The system pipework does not require lagging.
  - B The system can be zoned.
  - C The system does not require balancing.
  - D The system heats the building more quickly.
  - E The system can have more radiators installed on it.

18. When ducting for a warm air central heating unit is being installed, where should the return air grille be situated?
- A At low level near the middle of the building.
  - B At high level as close as possible to the heating unit.
  - C In the living area, near a window but away from curtains and furniture.
  - D Adjacent to the room thermostat.
  - E At the opposite end of the building from the heating unit.

19. Which statement best describes a registered break tank?
- A A supply tank for a low pressure hot water cylinder.
  - B A water tank with an air gap which must be checked annually.
  - C A tank used on multi-level buildings to prevent high pressures.
  - D A cistern used on siphonic urinal flushing system.
  - E A water storage tank required in community care facilities.

20. Which of the following backflow devices does NOT require an isolating valve on the outlet of the device?
- A Pressure type vacuum breaker.
  - B Reduced pressure zone device.
  - C Double check valve assembly.
  - D Atmospheric vacuum breaker.
  - E Double check valve detector assembly.

**Total 20 marks**

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
Section B		
Total		