

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

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No. 9192



Plumbers,  
Gasfitters and  
Drainlayers Board

## REGISTRATION EXAMINATION, JUNE 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 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 June 2011 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

Give the meaning of the following terms.

(a) Grey water.

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(1 mark)

(b) Black water.

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(1 mark)

(c) Potable water.

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(1 mark)

(d) Surface water.

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(1 mark)

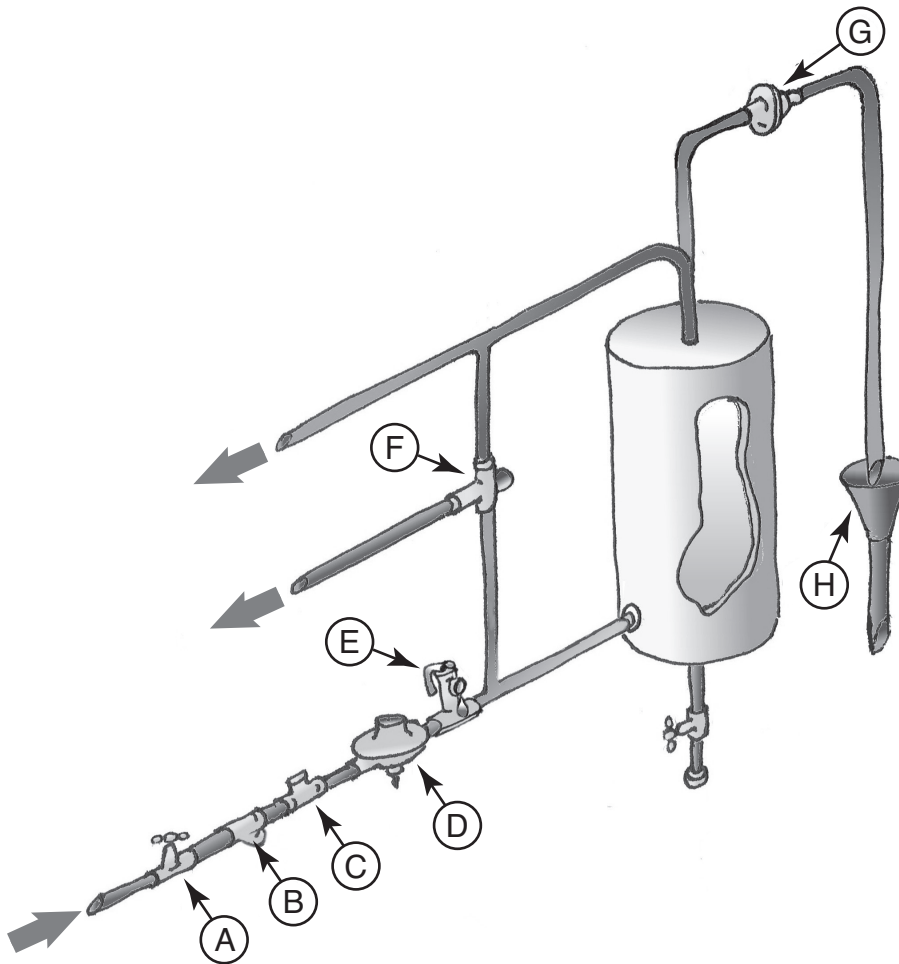
**Total 4 marks**

**QUESTION 2**

The diagram below shows a domestic hot water system.

(a) Name the type of system shown

(1 mark)



(b) Name and give the function of each component labelled A – H.

A Name: \_\_\_\_\_

Function: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

B Name: \_\_\_\_\_

Function: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**QUESTION 2 (cont'd)**

C Name: \_\_\_\_\_

Function: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

D Name: \_\_\_\_\_

Function: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

E Name: \_\_\_\_\_

Function: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

F Name: \_\_\_\_\_

Function: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

G Name: \_\_\_\_\_

Function: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

H Name: \_\_\_\_\_

Function: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(12 marks)

**Total 13 marks**

**QUESTION 3**

(a) Name THREE methods that may be used to flush a urinal.

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

(3 marks)

(b) State TWO requirements that must be met by a urinal flushing system.

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

(2 marks)

**Total 5 marks**

**QUESTION 4**

(a) (i) State FOUR factors that contribute to friction within a water pipework system.

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

(2 marks)

(ii) State TWO consequences of friction within a water pipework system.

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

(2 marks)

(b) (i) Name the process that occurs if a brass fitting is used to join steel water pipe.

\_\_\_\_\_

(1 mark)

(ii) Fully describe the consequence of the situation in (i).

\_\_\_\_\_  
\_\_\_\_\_

(1 mark)

**Total 6 marks**



**QUESTION 5**

(a) State THREE hazards that should be avoided when using an electrical extension lead on a building site.

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

(3 marks)

(b) Give TWO devices that reduce the risk of electrocution when using a power tool.

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

(2 marks)

(c) Give FOUR actions that should be taken immediately after a worker has received a severe electric shock.

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

(4 marks)

**Total 9 marks**

## QUESTION 6

Answer the following questions in accordance with New Zealand Building Code clause G13 Foul Water.

- (a) State the TWO items of information that are required to select the required gradient for a sanitary fixture discharge pipe.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (b) (i) State THREE sanitary fixtures that may be installed in pairs and share a single water trap.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3 marks)

- (ii) State the maximum length of discharge pipe allowed from the fixture outlet to the trap water seal.

\_\_\_\_\_

(1 mark)

**Total 6 marks**

**QUESTION 7**

(a) State FOUR adjustments that can be made to obtain a satisfactory weld when using a GMAW (MIG) machine.

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

(2 marks)

(b) State the type of gas that is used for GMAW (MIG) welding and give a reason why this type of gas is used.

Type: \_\_\_\_\_  
Reason: \_\_\_\_\_  
\_\_\_\_\_

(2 marks)

(c) State FOUR types of injury that must be protected against when GMAW (MIG) welding.

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

(2 marks)

**Total 6 marks**

**QUESTION 8**

(a) Explain how a domestic fire sprinkler head operates.

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(2 marks)

(b) Give a reason why sprinkler heads must be installed at specific spacings.

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(2 marks)

**Total 4 marks**

**QUESTION 9**

A fan supplying air to a factory is installed on the factory roof.

State the minimum separation distance from the inlet of the fan that a terminal vent pipe may terminate.

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**Total 1 mark**

## QUESTION 10

(a) Draw a diagram showing the components of a pressure reducing valve.

Label the following parts.

Inlet

Outlet

Valve

Valve seat

Diaphragm

Adjusting screw

Adjusting spring

(7 marks)

**QUESTION 10 (cont'd)**

(b) Explain how a pressure reducing valve operates.

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(6 marks)

**Total 13 marks**

**QUESTION 11**

(a) Give the meaning of the term relative humidity.

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(1 mark)

(b) Explain how relative humidity is calculated.

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(3 marks)

**Total 4 marks**

**QUESTION 12**

A rectangular tank has been installed to supply water to a building.

The tank is 6.500 metres long, 1.750 metres wide and 1.250 metres high.

The inlet float valve has been adjusted to keep the tank 80% full.

(a) Calculate in cubic metres the volume of water available in the tank.

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(3 marks)

(b) Calculate in kilograms the mass of the water in the tank in (a).

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(1 mark)

**Total 4 marks**

**QUESTION 13**

(a) Give TWO pieces of information that are required when selecting a temperature/pressure relief valve for a mains pressure valve-vented hot water system.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

(b) (i) State the meaning of the term quick recovery in regards to hot water cylinders.

\_\_\_\_\_  
\_\_\_\_\_

(1 mark)

(ii) Give TWO methods in which quick recovery can be achieved.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

**Total 5 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. Under which circumstance is an isolating valve not required on the drain pipe from a storage hot water cylinder?

- A When the water heater is supplied from a ceiling tank.
- B When the storage hot water cylinder has a cold water expansion valve fitted.
- C When the drain terminates outside the building.
- D When the thermostat is set at or below 70°C.
- E When a wet back is connected to the cylinder.

2. What is the recommended ratio, horizontal distance to vertical distance, for adjusting a ladder to a safe angle?

- A 1:3
- B 1:4
- C 1:5
- D 2:5
- E 2:7

3. When using a ladder to access a roof, what is the minimum distance the ladder should extend above the roof edge?

- A 0.300 m.
- B 0.500 m.
- C 1.000 m.
- D 1.250 m.
- E 1.500 m.

4. A supply pipe to a ceiling tank is 32 mm copper tube.

What is the required air gap for the installation to comply with the New Zealand Building Code clause G12 Water Supplies?

- A 25 mm.
- B 32 mm.
- C 50 mm.
- D 64 mm.
- E 150 mm.

5. Why is there a restricted zone at the base of a discharge stack?

- A To prevent trap seal loss due to compression.
- B To prevent trap seal loss due to oscillation.
- C To prevent blockages in the drain.
- D To prevent blockages in the discharge stack.
- E To prevent blockages in the drain and discharge stack.

6. Which of the following correctly describes the cause of induced siphonage trap seal loss?

- A The ambient temperature within the room causes the trap seal to be lost into the atmosphere.
- B Air movement over the vent terminal causes the water seal to spill over the trap weir.
- C The waste pipe from the fixture outlet drops vertically for some distance before the trap and insufficient water is left in the trap to form a seal.
- D A fixture waste pipe runs full bore and pressure differences causes the water to drain out of the trap.
- E The discharge from an adjacent fixture on a branch discharge pipe runs full bore and pressure differences causes the water to drain out of another fixture.

7. Which of the following correctly describes the cause of evaporation trap seal loss?
- A The ambient temperature within the room causes the trap seal to be lost into the atmosphere.
  - B Air movement over the vent terminal causes the water seal to spill over the trap weir.
  - C The waste pipe from the fixture outlet drops vertically for some distance before the trap and insufficient water is left in the trap to form a seal.
  - D A fixture waste pipe runs full bore and pressure differences causes the water to drain out of the trap.
  - E The discharge from an adjacent fixture on a branch discharge pipe runs full bore and pressure differences causes the water to drain out of another fixture.

8. Which of the following correctly describes the cause of oscillation trap seal loss?
- A The ambient temperature within the room causes the trap seal to be lost into the atmosphere.
  - B The discharge from an adjacent fixture on a branch discharge pipe runs full bore and pressure differences causes the water to drain out of another fixture.
  - C The waste pipe from the fixture outlet drops vertically for some distance before the trap and insufficient water is left in the trap to form a seal.
  - D A fixture waste pipe runs full bore and pressure differences causes the water to drain out of the trap.
  - E Air movement over the vent terminal causes the water seal to spill over the trap weir.

9. A 150 mm uPVC vertical discharge stack is to be installed in a two story building.  
How far apart can the supports for the stack be spaced?

- A 1.000 m.
- B 1.200 m.
- C 1.800 m.
- D 3.000 m.
- E 3.500 m.

10. What is a wet vent?

- A A vent that is designed to allow rain water to enter and flush a waste system.
- B A vent that is connected to a floor waste gully in a wet floor bathroom.
- C A vent that is connected to a discharge pipe before the last fixture.
- D A vent that allows water to be relieved during in an excess pressure situation.
- E A vent that allows water to be relieved during excess pressure or temperature situations.

11. What is the minimum distance below a gully trap grate that a waste pipe should discharge?

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

12. What is the minimum diameter trap that may be used on a 1800 mm wide slab type urinal?

- A 40 mm.
- B 50 mm.
- C 65 mm.
- D 80 mm.
- E 100 mm.

13. What is the total number of discharge units for a laundry having a double tub and clothes washing machine?

- A 2
- B 3
- C 4
- D 5
- E 6

14. At what distance above a gully trap grate should a trapped floor waste discharge?

A 10 mm.

B 20 mm.

C 30 mm.

D 40 mm.

E 50 mm.

15. Which of the following materials is the most malleable?

A Copper.

B Steel.

C Polybutylene.

D Lead.

E Galvanised Iron.

16. Which of the following materials has the best heat conductivity?

A Copper.

B Steel.

C Brass.

D Lead.

E Galvanised iron.

17. What is the name of the process used to join polyethylene pipe?

A Crimp fittings.

B Electrofusion.

C Solvent welding.

D Compression joints.

E Flared fittings.

18. Which of the following is an indirect heating system?

- A A wetback that heats water that is piped to hot outlets.
- B A central heating system.
- C A heat transfer system to move warm air from one room to another.
- D A solar water heater which uses a heat transfer fluid to heat water that is circulated through a radiator system.
- E A solid fuel fire with a flue that extends through a second story room to heat that area.

19. Which of the following are the three main components of a heat pump?

- A Radiator, condenser and fan.
- B Condenser, compressor and heat exchanger.
- C Heat exchanger, fan and reversing valve.
- D Compressor, fan and radiator.
- E Fan, heat exchanger and radiator.

20. Which of the following describes a split system air conditioner?

- A An air conditioner that is capable of servicing two rooms.
- B An air conditioner in which the two main components are installed in separate areas.
- C An air conditioner that is installed through a window.
- D An air conditioner that is capable of heating and cooling.
- E An air conditioner that can use both pre-treated air from within the room or fresh air from outside.

**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		
Section B		
Total		