

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

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No. 9193



Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2014

LICENSED GASFITTER

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 November 2014 were provided with the following documents:

- AS/NZS 5601.2010 Part 1: General installations
- AS/NZS 5601.2010 Part 2: LP Gas installations in caravans and boats for non-propulsive purposes

USEFUL FORMULAE

Circumference of circle = $2 \times \pi \times R$ or Circumference of circle = $\pi \times D$

Area of circle = $\pi \times R^2$ or Area of circle = $0.7854 \times D^2$

Volume of cylinder = $\pi \times R^2 \times H$ or Volume of cylinder = $0.7854 \times D^2 \times H$

Heating time = $\frac{\text{mass of water (kg)} \times 4.2 \times \text{temp diff (}^\circ\text{C)} \times 100}{\text{heat energy input per hour in kJ} \times \text{efficiency (\%)}}$

Correction factor = $\frac{\text{atmospheric pressure} + \text{supply pressure}}{\text{atmospheric pressure}}$

Gas rate (m^3) = $\frac{\text{volume (m}^3\text{)} \times 3600}{\text{time (seconds)}}$

SECTION A

QUESTION 1

(a) Explain what a toxic gas is.

(1 mark)

(b) Name a toxic gas produced when natural gas or LPG is burnt.

(1 mark)

(c) Give TWO reasons why escaping non-toxic fuel gas can be dangerous.

1

2

(2 marks)

(d) Name TWO non-toxic combustion products produced when natural gas or LPG is burnt.

1

2

(2 marks)

Total 6 marks

QUESTION 2

- (a) The ignition in a gas space heater is generated by a push button piezo igniter.

The gas is no longer igniting and no spark is visible at the spark electrode when the button is pushed.

Give THREE likely causes for this fault.

- 1 _____
- 2 _____
- 3 _____

(3 mark)

- (b) Name THREE different ignition systems other than push button piezo that can be found on domestic gas appliances.

- 1 _____
- 2 _____
- 3 _____

(3 mark)

- (c) List FOUR different flame-failure devices and state an appliance that is likely to use each device.

Flame-failure device	Appliance where likely to be found

(4 marks)

QUESTION 2 (cont'd)

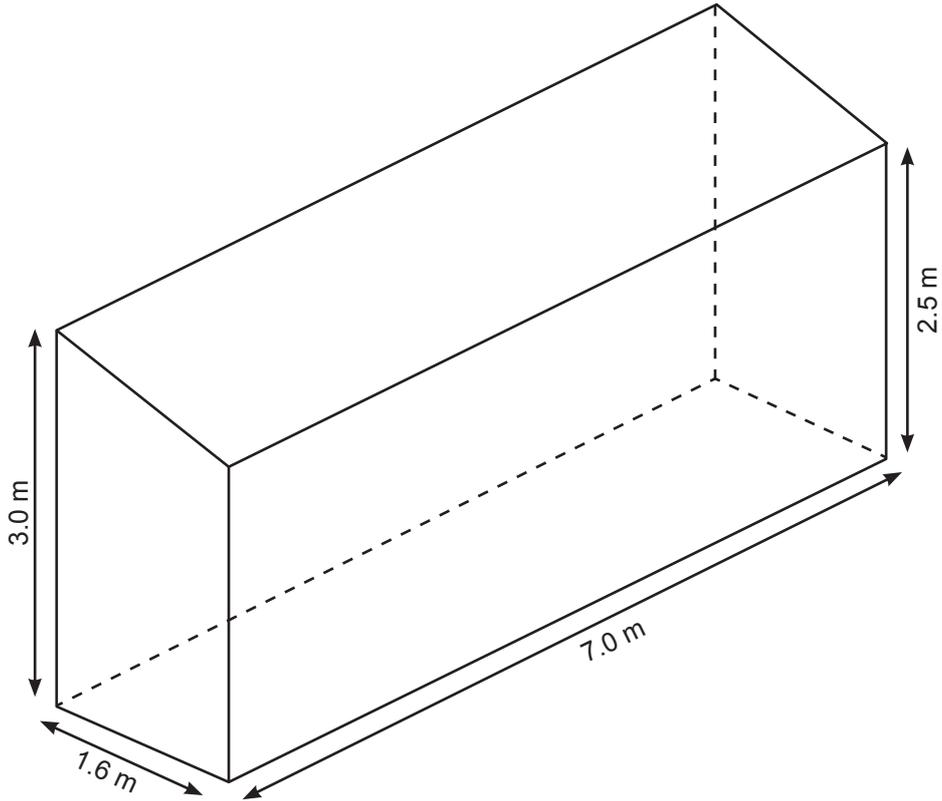
(d) Give FIVE individual components that are often incorporated into a multi-function combination gas control valve.

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

(5 mark)

Total 15 marks

QUESTION 3



(a) A hallway in a residence has the dimensions shown in the diagram above.

A thermostatically controlled flueless gas space heater is to be installed in the hallway.

Referring to AS/NZS5601 Part 1, calculate the maximum permitted appliance input.

(4 marks)

QUESTION 3 (cont'd)

- (b) An appliance has been run on high and the meter shows that the appliance has consumed 0.125 m³ of natural gas in five minutes.

Calculate how many MJ the appliance will consume in an hour.

The heating value of natural gas is 40 MJ/m³.

(2 marks)

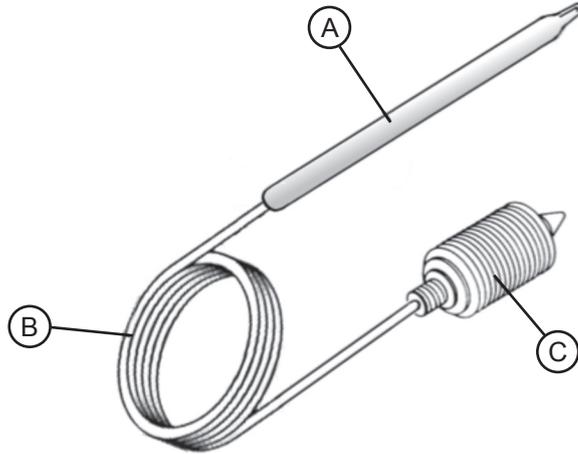
- (c) Calculate how much air is required for combustion when the appliance in (b) is run on high for two hours.

(2 marks)

Total 8 marks

QUESTION 4

(a) The diagram below shows a liquid expansion thermostat.



In the following table name each part labelled A, B, C.

A	
B	
C	

(3 marks)

(b) A liquid expansion thermostat on a space heater has become inaccurate at sensing the room temperature.

Give THREE possible causes of this fault.

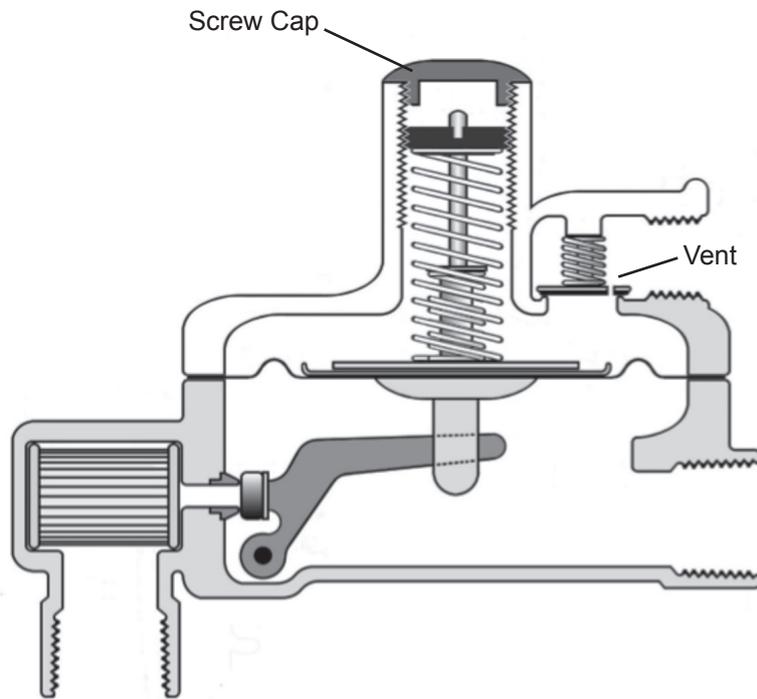
- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 6 marks

QUESTION 5

(a) Give TWO detrimental effects of the screw cap not being fitted to the regulator shown in the diagram below.



1 _____

2 _____

(2 marks)

(b) Give the purpose of the hole in the regulator vent in the diagram above.

(1 mark)

(c) Describe what can occur if the hole in (b) were to be blocked.

(1 mark)

Total 4 marks

QUESTION 6

The New Zealand Building Code contains several clauses.

Complete the table below by giving the title of each clause listed.

Clause	Title
B2	
E2	
G4	

Total 3 marks

QUESTION 7

State how brazing differs from fusion welding.

Total 2 marks

QUESTION 8

- (a) An existing gas installation has pipework with a volume of 15 litres.

The installation is to be pressure tested to ensure that the installation is gastight before work is done to it.

- (i) State the name of the test that is to be performed.

(1 mark)

- (ii) Give the purpose of the stabilisation period prior to the test.

(1 mark)

- (iii) State the pressure at which the test is to be performed.

(2 marks)

- (iv) The test results show that there is a small pressure drop.

State the maximum acceptable pressure drop permitted.

(1 mark)

- (b) An installation of new gas pipework is being pressure tested to ensure it is gastight.

List SIX items of information related to the test that should be recorded for future reference.

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

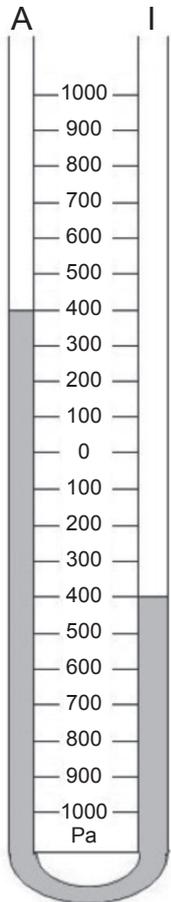
(6 marks)

QUESTION 8 (cont'd)

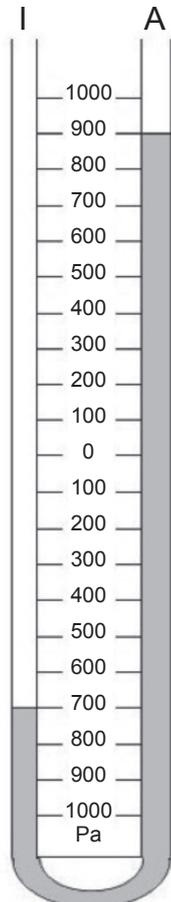
(c) Give in kPa the readings shown on each of the water filled manometers shown below.

I indicates which side of each manometer is connected to an installation.

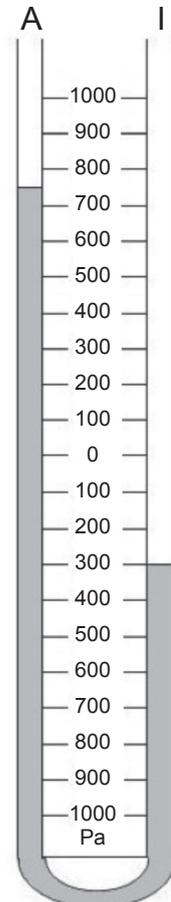
A indicates which side of each manometer is open to atmosphere.



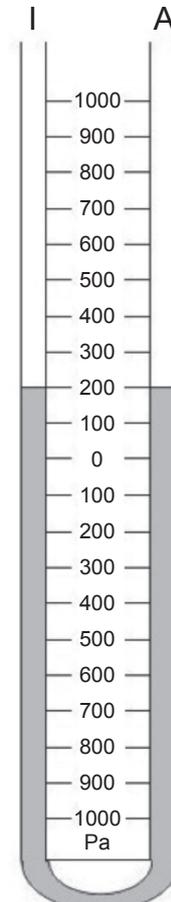
(i) _____ kPa



(ii) _____ kPa



(iii) _____ kPa



(iv) _____ kPa

(4 marks)

(d) State the maximum pressure in kPa that any of the gauges shown in (c) can measure.

(1 mark)

Total 16 marks

QUESTION 9

A new internal gas-fired storage water heater is to be added to an existing gas installation.

- (a) Give FOUR factors with regard to the gas supply that need to be established before the appliance can be installed.

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

(4 marks)

- (b) List FOUR factors other than gas supply that should be considered when selecting the position for the heater to be installed.

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

(4 marks)

Total 8 marks

QUESTION 10

(a) Give THREE characteristics of each of the following in relation to gas appliances.

(i) Balanced flue

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(ii) Open flue

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(iii) Flueless

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) After a gas appliance has not been used for a while, steam is often visible coming from the appliance flue for the first few minutes of use.

Explain how this visible steam is created and why it usually only appears for a short time.

(3 marks)

Total 12 marks

QUESTION 11

(a) Name FOUR situations where asbestos could be found in relation to gasfitting.

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

(4 marks)

(b) Explain how exposure to asbestos may cause harm to people.

- _____
- _____
- _____

(2 marks)

(c) Under the Health and Safety in Employment Act, construction related work with asbestos is classed as notifiable work.

List FOUR types of notifiable work other than working with asbestos.

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

(4 marks)

Total 10 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 mark will be awarded for that question.

1. According to AS/NZS5601 Part 1, what is the maximum length of a restraint chain on an appliance that is designed to be slid out for servicing?

- A 70% of the length of the hose assembly.
- B 80% of the length of the hose assembly.
- C 85% of the length of the hose assembly.
- D 90% of the length of the hose assembly.
- E 95% of the length of the hose assembly.

2. Which of the following situations would be most likely to activate the high limit switch on a laundry dryer?

- A A blockage in the lint trap.
- B Fluctuation of the gas supply.
- C Flame failure.
- D Lack of combustion air.
- E Blocked burner injector.

3. Which of the following safety devices will shut off the gas supply in the event of mechanical ventilation failing to operate?

- A Flame rectification.
- B Fire damper.
- C Carbon monoxide detector.
- D Fan interlock.
- E Under pressure shut off device.

4. Which of the following best describes the term vitiation?
- A The contamination of the air supply by products of combustion.
 - B The fluctuation of gas supply due to a highly sensitive regulator spring.
 - C The flow of combustion products as they enter a flue.
 - D Irregular flame due to an object protruding into the outer cone of the flame.
 - E The flame of a burner lighting back to the injector.

Answer questions 5–10 in accordance with AS/NZS5601 Part 2.

5. If a combustible gas detection system is required to be installed on a boat, what is the minimum number of sensors required to be fitted?

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

6. An appliance with a continuously burning flame has been installed bellow the upper deck of a petrol-fuelled boat. There is a possibility of petrol vapour entering the space where the appliance is mounted.

What is the minimum height above the deck on which the appliance is mounted that the air intake for the appliance must be?

- A 100 mm.
- B 200 mm.
- C 400 mm.
- D 500 mm.
- E 600 mm.

7. Which of the following is not permitted to be used for gas piping in a caravan?

- A Stainless steel.
- B Copper.
- C Multilayer proprietary systems.
- D Proprietary stainless steel.
- E Non-metallic hose assemblies.

8. What is the minimum distance gas piping can be installed from an electrical service in a boat?

- A 25 mm.
- B 50 mm.
- C 75 mm.
- D 100 mm.
- E 125 mm.

9. What is the minimum length a flexible connection is permitted to be if it is being used for the high pressure piping between an LPG cylinder and a regulator?

- A 100 mm.
- B 200 mm.
- C 250 mm.
- D 500 mm.
- E 600 mm.

10. Which of the following is not permitted to be located inside a caravan?

- A Quick connect device.
- B LPG cylinder.
- C Room sealed appliance.
- D Gas water heater.
- E Flueless space heater.

Total 10 marks

For Examiner's use only

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