

Affix label with Candidate Code  
Number here.  
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Number if known

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No. 9196



Plumbers,  
Gasfitters and  
Drainlayers Board

## CRAFTSMAN EXAMINATION, NOVEMBER 2009

# GASFITTING

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 16–17 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

**The following are NOT permitted in the examination room:**

Any publications, Acts, Regulations, Codes of Practice, or Standards

Check that this booklet has all of 17 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**



**QUESTION 1**

(a) State THREE types of gasfitting work that, under the Gas Regulations, require certification.

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

(3 marks)

(b) When a craftsman gasfitter completes a Gasfitting Certification Certificate, he or she completes a description of the gasfitting and certifies three statements on the certificate about that gasfitting.

Outline the content of each of the three statements.

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

(6 marks)

**Total 9 marks**

**QUESTION 2**

(a) State FIVE factors that may affect the overall efficiency of a gas-fired storage hot water system.

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

(5 marks)

(b) A flueless instantaneous water heater is to be installed over the kitchen sink in an apartment with a separate kitchen.

Give the specific conditions that apply to this installation.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

(4 marks)

**Total 9 marks**

### QUESTION 3

A five-storey high rise apartment building has internal gas riser pipes supplying gas to individual apartments. Specific requirements for this type of installation must be met before the gas installations can be certified as compliant with NZS 5261.

Give FIVE of these requirements.

1 \_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_

5 \_\_\_\_\_  
\_\_\_\_\_

Total 5 marks

#### QUESTION 4

The diagram opposite shows the proposed layout of an LPG installation.

The piping material is to be copper.

Table 1 below shows the input rating for each appliance in the installation.

Table 2 below provides pipe lengths for the installation.

The available pressure is 3.3kPa.

1kWh = 3.6MJ

**Table 1**

Appliance		Input Rating
A	Space heater	7.8kW
B	Central heating unit	75.6MJ/hr
E	Cooker	88.2MJ/hr
G	Continuous flow water heater	56kW

Using the graph opposite, complete Table 2 below. Show your working.

**Table 2**

Pipe Run	Length (m)	Gas Rate (MJ/hr)	Pipe Size (mm)
A-C	1		
B-C	3.5		
C-D	2		
E-D	1.75		
D-F	5		
G-F	2.5		
F-H	1.75		

Total 8 marks



### QUESTION 5

The gas pressure within an industrial complex is to be reduced from 200kPa to 5kPa.

Two regulators are to be installed in a series for over-pressure protection.

The maximum allowable operating pressure of the pipework system downstream of the second regulator is 35kPa.

Using the correct symbols, draw a line diagram showing the regulators and their impulse lines.

Show the pressure in each section of pipework and indicate the direction of gas flow.

**Total 5 marks**

**QUESTION 6**

(a) A new LPG domestic gas installation comprising three appliances has been installed.

State EIGHT actions that must be carried out when conducting the final installation test.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_
- 7 \_\_\_\_\_
- 8 \_\_\_\_\_

(4 marks)

(b) A manual shut off valve is to be fitted on the inlet to a domestic gas appliance.

State SIX features of the valve that should be considered when selecting the valve.

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

(3 marks)

**Total 7 marks**

## QUESTION 7

A new domestic gas installation consisting of an open-flued natural gas space heater has just been completed. The appliance does not have a fan. The work was done by a registered gasfitter working under a craftsman gasfitter's supervision.

- (a) After the installation pressure test has been completed, several aspects of the operation of the heater should be checked by the craftsman prior to certifying the installation.

Give SIX of these aspects.

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

(3 marks)

- (b) Give SIX matters that must be brought to the attention of the consumer at the completion of commissioning.

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

(3 marks)

**Total 6 marks**

## QUESTION 8

A kitchen is being renovated and a gas hob is to be fitted in the kitchen bench.

The wall behind the kitchen bench has timber framing and will be lined with Gibraltar board.

- (a) (i) State the minimum clearance distance there must be between the hob and the wall if the wall is lined with Gibraltar board only.

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(1 mark)

- (ii) Specify the point on the hob where the minimum clearance in (i) must be measured from.

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(1 mark)

- (b) Give TWO methods of protecting the wall if it is possible to have only 100mm clearance.

1 

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2 

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(4 marks)

- (c) State the minimum height for the wall protection if the clearance is 100mm.

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(1 mark)

**Total 7 marks**

**QUESTION 9**

- (a) A gas fired automatic commercial laundry dryer has an input rating of 30MJ/h, and is fitted with an exhaust fan.

State THREE requirements the flue for the dryer must meet.

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

(3 marks)

- (b) An industrial boiler has a maximum heat output rating of 5000MJ/h.

The heating value of the gas is 42MJ/m<sup>3</sup> and the boiler efficiency is 60%.

Calculate the gas input flow rate for the boiler.

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(2 marks)

**Total 5 marks**

**QUESTION 10**

A bank of 4 x 45kg LPG cylinders is to supply an installation.

List EIGHT factors to be considered when selecting the location for the cylinders.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_
- 7 \_\_\_\_\_
- 8 \_\_\_\_\_

**Total 4 marks**

## QUESTION 11

(a) An air curtain is to be mounted above an external door of a warehouse.

Give THREE specific conditions that must be met relating to clearances and positioning of the air curtain.

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

(3 marks)

(b) An overhead radiant tube heater is to be positioned in a warehouse.

Give TWO distinct requirements regarding clearances that must be met to avoid damage to the heater.

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

(2 marks)

**Total 5 marks**

**QUESTION 12**

(a) An industrial automatic gas burner may develop the faults listed below.

Give THREE likely causes for each fault.

(i) No ignition

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3 marks)

(ii) No pilot flame

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3 marks)

(b) A boiler situated in the basement of a multi-storey office block is to be fitted with a power flue.

Give TWO advantages of the power flue compared with a conventional flue.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

(2 marks)

**Total 8 marks**

**QUESTION 13**

A forced draught package burner fitted with a double block valve assembly is to be installed.

Explain what occurs during each of the following periods in the start sequence of the burner.

(a) Pre-purge period: \_\_\_\_\_

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

(b) Start gas flame ignition period: \_\_\_\_\_

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

(c) Start gas flame proving period: \_\_\_\_\_

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

(d) Main flame ignition period: \_\_\_\_\_

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

(e) Main burner run period: \_\_\_\_\_

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

**Total 10 marks**

**QUESTION 14**

(a) A flue is being designed for a natural draught appliance.

Give SIX factors that should be taken into account when determining the size of the flue.

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

(3 marks)

(b) A flue is to be concealed in a wall.

State FOUR specific installation requirements that the flue must meet so that it complies with NZS 5261.

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

(4 marks)

(c) An LPG continuous flow fan-assisted water heater is to be positioned on an outside wall. The appliance has an input rating of 130MJ/hr.

Give FIVE requirements that must be met to ensure adequate ventilation and disposal of products of combustion. Include minimum distances if any clearances are given.

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

(5 marks)

**Total 12 marks**





For Examiner's use only

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