

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 2007

# 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, ask the Supervisor for extra sheets. Write your Candidate Code Number and the number 9193 on any extra sheets used, and attach them to this booklet. **NO SEPARATE ANSWER BOOKLET IS TO BE USED.** Write the number of extra sheets used in the box on the last page of this booklet. Write NIL if you have not used any.

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 18 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 2

(a) Give TWO reasons why gas appliances have their own regulator.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

(b) State what is meant by lock-up pressure in relation to a gas regulator.

\_\_\_\_\_

\_\_\_\_\_

(1 mark)

**Total 3 marks**

**QUESTION 3**

(a) Explain how the efficiency of a gas appliance is calculated.

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(2 marks)

(b) An appliance has a input rate of  $2\text{m}^3/\text{hr}$  and is 70% efficient. Calculate its heat output, given that the gas has a heating value of  $40\text{MJ}/\text{m}^3$ .

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(2 marks)

(c) State what is meant by working pressure.

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(2 marks)

(d) State the purpose of flash tubes on a cooker hob.

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(2 marks)

(e) State the flammability limits for natural gas.

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(2 marks)

**QUESTION 3 (cont'd)**

- (f) (i) State where the gas disperses to when a Liquefied Petroleum Gas (LPG) leak occurs.

\_\_\_\_\_

- (ii) State where the gas disperses to when a natural gas leak occurs.

\_\_\_\_\_

(2 marks)

- (g) (i) Define the term vitiation.

\_\_\_\_\_

\_\_\_\_\_

- (ii) State THREE effects of vitiation in relation to a gas appliance.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(4 marks)

**Total 16 marks**

#### QUESTION 4

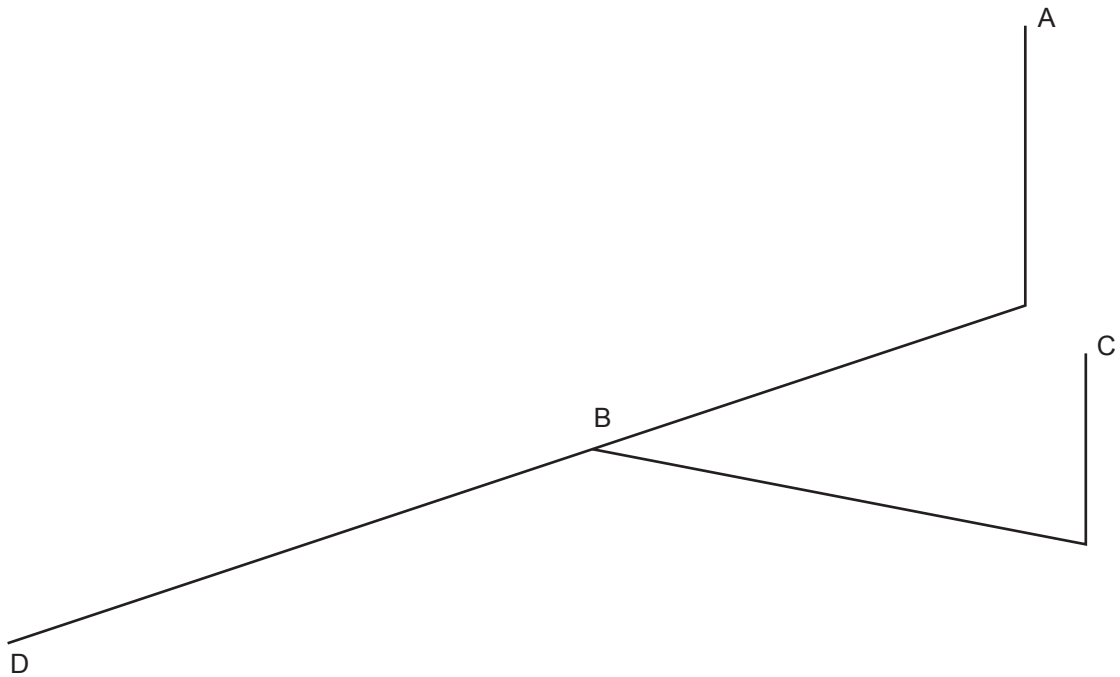
List FIVE factors that should be considered when selecting a suitable position for two 100kg LPG cylinders for a commercial kitchen.

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

**Total 5 marks**

## QUESTION 5

The diagram below shows a line diagram for an LPG (propane) gas installation using copper tube.



Referring to the diagram, Figure E7 opposite, and Table 1 below, complete Table 2 for the gas flows and the pipe sizing.

Allow for a pressure drop of 0.01 kPa/m.

1 kW = 3.6 MJ/hr

Table 1

Appliance	Input Rating
A Instantaneous Water Heater	42 kW
C Cooker	75.6 MJ/h
D Cylinder location	

Table 2

Pipe Run	Length	Gas Flows	Size (mm)
A-B	8m		
B-C	6m		
B-D	8m		

Total 7 marks



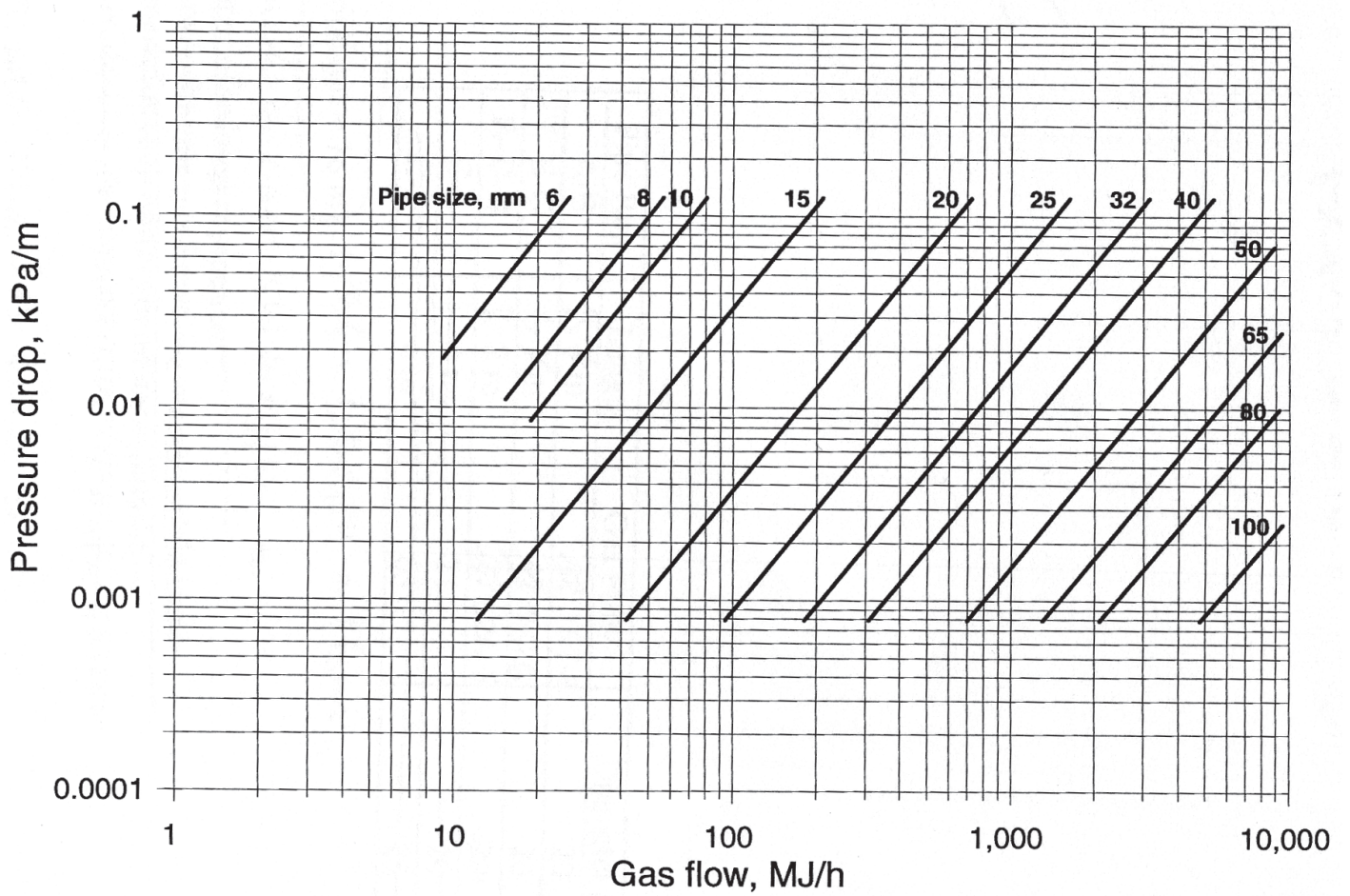
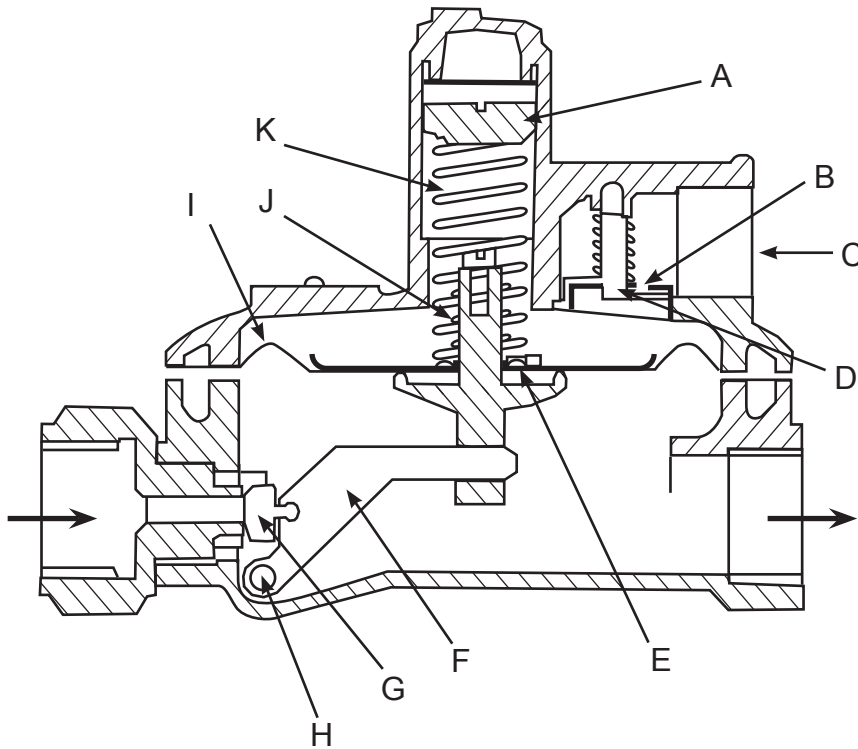


Figure E7 – Pipe sizing for LPG (propane) in copper pipe

## QUESTION 6

The diagram below shows a gas regulator.



(a) Name the type of regulator.

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(½ mark)

**QUESTION 6 (cont'd)**

(b) Name each of the parts A to K.

- A \_\_\_\_\_
- B \_\_\_\_\_
- C \_\_\_\_\_
- D \_\_\_\_\_
- E \_\_\_\_\_
- F \_\_\_\_\_
- G \_\_\_\_\_
- H \_\_\_\_\_
- I \_\_\_\_\_
- J \_\_\_\_\_
- K \_\_\_\_\_

(5½ marks)

**Total 6 marks**

## QUESTION 7

A householder has had a gas fired warm air central heating system installed. The Gas Regulations and NZS 5261 require the installer to provide an explanation of the operation of the appliance to the householder.

(a) Give a description of the operation of the installation for the information of the householder, with respect to each of the following.

1 Air heating

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2 Circulation

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3 Temperature and airflow

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(6 marks)

**QUESTION 7 (cont'd)**

(b) List FOUR requirements for the furnace for the system in (a) if it has been installed in a roof space.

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

(2 marks)

(c) After the installation of the system has been completed, the consumer complains of the following problems. Identify the likely cause of each.

(i) Cooking smells emerging from outlets

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

(ii) Bedrooms too warm

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

(iii) Draughts

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

(iv) Fan shuts down before rooms are up to temperature

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

(4 marks)

**Total 12 marks**

### QUESTION 8

A new gas fired storage water heater has been installed in a cupboard and commissioned.  
List FIVE points the gasfitter should identify to the consumer relating to safety.

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

Total 5 marks

## QUESTION 9

The Gas Installation Standard NZS 5261 states that open flued gas appliances in a room or enclosure with less than 3MJ per hour input per cubic metre of room volume require no specific provision for ventilation. Give the reason for this.

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Total 2 marks

## QUESTION 10

- (a) Sketch a gas fired radiant tube heater that is suitable for commercial use, and explain how it operates.

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(6 marks)

- (b) State where a gas fired radiant tube heater would usually be positioned in a warehouse, and give a reason for this.

Position

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Reason

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(2 marks)



**QUESTION 10 (cont'd)**

- (c) A commercial kitchen contains several gas fired cookers and ovens. State how the products of combustion are disposed of.

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(2 marks)

- (d) Name TWO safety devices that must be installed on a direct gas fired air heater used to heat air in a workshop.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (e) State the purpose of the purge period for a direct fired gas heater.

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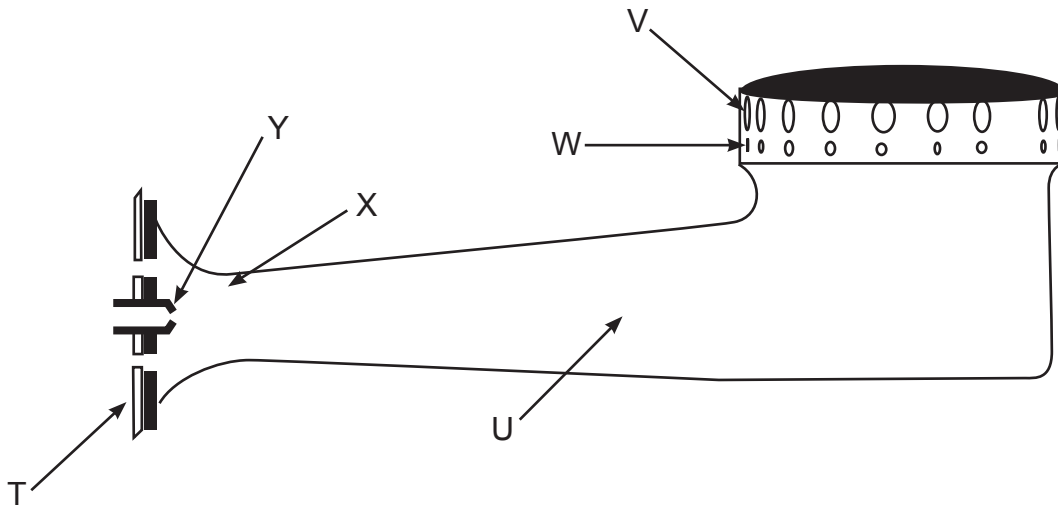
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(2 marks)

**Total 14 marks**

### QUESTION 11

The following diagram shows a gas burner.



(a) Name this type of burner.

\_\_\_\_\_

(1 mark)

(b) Name the parts of the burner labelled T to Y.

T \_\_\_\_\_

U \_\_\_\_\_

V \_\_\_\_\_

W \_\_\_\_\_

X \_\_\_\_\_

Y \_\_\_\_\_

(3 marks)

(c) Explain how primary air enters this type of burner.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2 marks)

**QUESTION 11 (cont'd)**

(d) Describe what will happen to the appearance of the flame if the primary air intake in this type of is restricted.

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(2 marks)

(e) Describe what happens if flame impingement occurs in this type of burner.

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(1 mark)

**Total 9 marks**

**QUESTION 12**

(a) List SIX steps required to carry out a gas pipework test on a new domestic dwelling.

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

(6 marks)

(b) State which valves are opened and which valves are closed when a gas installation test is carried out on a new domestic gas installation.

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

(3 marks)

(c) A domestic installation has a working pressure of 1.5 kPa. State the minimum test pressure for each of the following:

- 1 a pipework test  
\_\_\_\_\_
- 2 an installation test  
\_\_\_\_\_
- 3 a leakage test.  
\_\_\_\_\_

(3 marks)

**Total 12 marks**







For Candidate's use

Number of EXTRA sheets used (write NIL if none have been used).	
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For Examiner's use only

Questions Answered	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Total		