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

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No. 9196

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2013

CERTIFYING 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 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, 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 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

Candidates that sat this examination in June 2013 were provided with the following documents:

- AS/NZS 5601 Part 1: General installations

SECTION A

QUESTION 1

List THREE types of movement which should be allowed for when designing support for gas pipework across a workshop roof space.

1 _____

2 _____

3 _____

Total 3 marks ☐

QUESTION 2

State FOUR factors that must be considered when a soaker flashing is being designed for a flue penetration through a corrugated metal roof.

1 _____

2 _____

3 _____

4 _____

Total 2 marks ☐

QUESTION 3

Some brass fittings have the markings DR or CR stamped on them.

(a) State what the DR or CR stamp means in regard to the fitting.

_____

(1 mark) ☐

(b) State where these fittings must be used according to AS/NZS 5601 Part 1.

_____

(1 mark) ☐

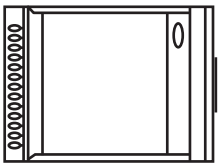
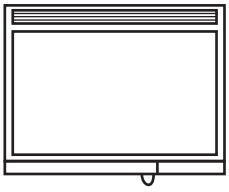
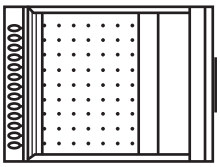
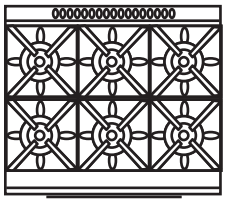
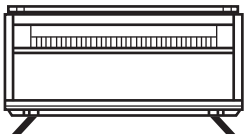
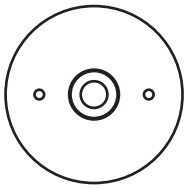
Total 2 marks ☐

QUESTION 4

The diagram on the page opposite shows the pipework and appliances for a gas installation.

Installation details are as follows:

- LPG
- Copper pipe (NZS 3501)
- The underground pipe between points A and B has an operating pressure of 70 kPa.
- The installation supply pressure downstream from point B is 2.75 kPa

		
Griddle	Combi-Steamer	Deep Fryer
62 MJ/h	98 MJ/h	160 MJ/h
		
Oven	Salamander	Water Heater
204 MJ/h	34 MJ/h	64 MJ/h

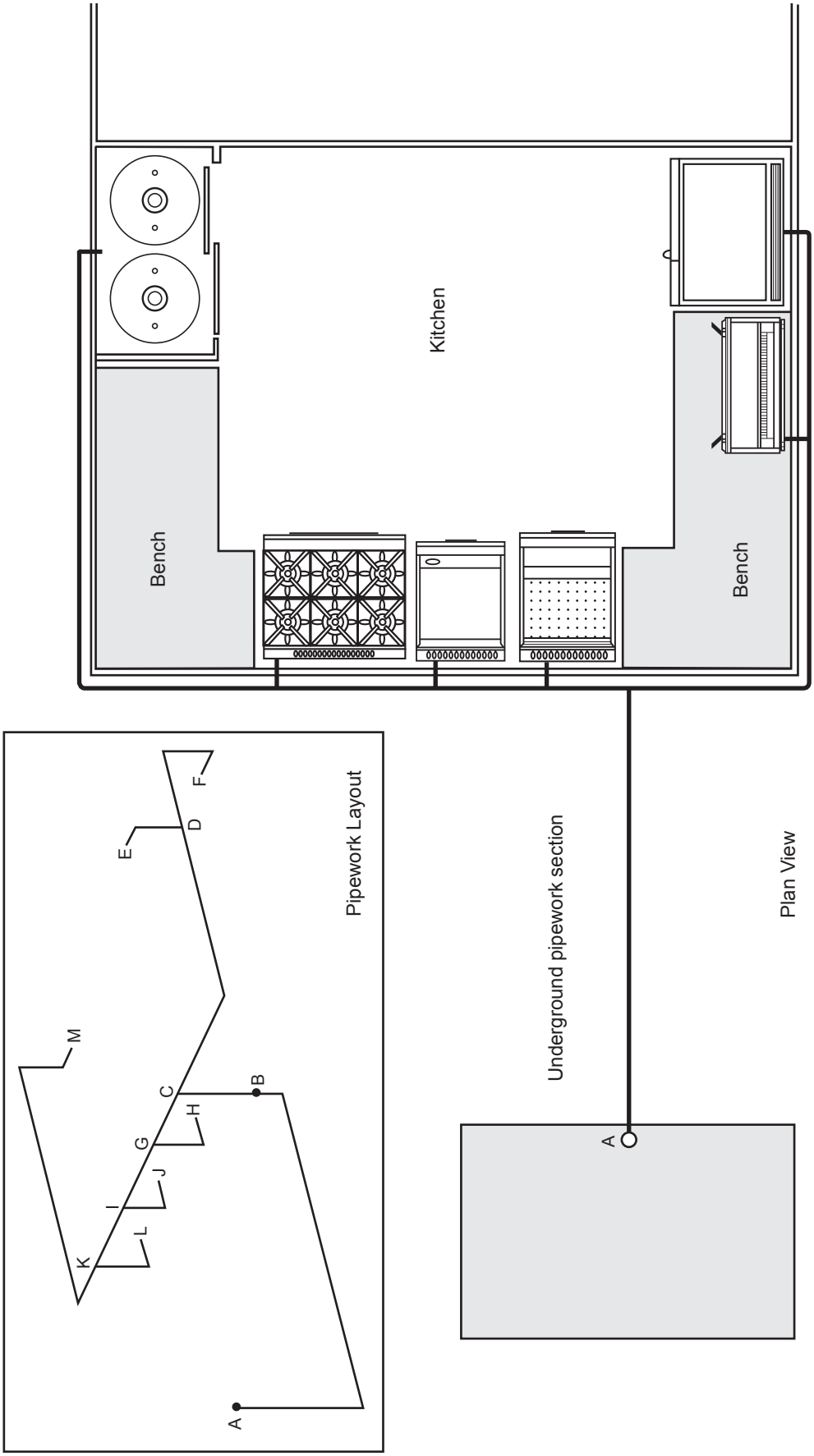
Using the Pipe Sizing Tables from AS/NZS 5601 Part 1 Appendix F starting on page 140, complete the tables below to pipe size the installation. Use the sizing tables and not the sizing graphs to answer this question.

Main run section points A – B	
Main run from point B downstream	

Pipe Section	Length Metres	Main Run m (from above)	Gas Flow MJ/h	Nominal Size
A – B	12			
B – C	1			
C – D	6			
D – E	1.5			
D – F	2			
C – G	1			
G – H	1.2			
G – I	1.5			
I – J	1.2			
I – K	1			
K – L	1.5			
K – M	7			

Total 26 marks

QUESTION 4 (cont'd)



QUESTION 5

The kitchen in Question 4 is to have natural ventilation directly to outside installed to allow for the gas burning equipment. Exclude the two water heaters that are installed in the cupboard.

(a) State the number of vents required and where they should be located.

(1 mark)

(b) Calculate the minimum free area of each vent required.

(3 marks)

(c) State what could affect the air supply for the kitchen area, requiring larger natural ventilation to be installed.

(1 mark)

Total 5 marks

QUESTION 6

The installation in Question 4 requires 45 kg LPG cylinders to suit the situation.

(a) Use the vaporisation capacity of gas cylinder table in Appendix J of AS/NZS 5601 Part 1 to calculate the number of cylinders that are required to supply the installation. Allow for typical winter conditions as per the appendix.

(4 marks)

(b) In-situ filling is not available at the site.

State the number of cylinders required to be held in reserve for this installation.

(1 mark)

Total 5 marks

QUESTION 7

(a) An LPG appliance has an energy input of 3 kW.

Calculate the gas rate in m^3/h for the appliance, given that the heating value of LPG is 90 MJ/m^3.

(3 marks)

(b) A correction factor must be applied to the answer to (a) due to the operating pressure in the installation being 7 kPa.

Calculate the corrected volume of gas.

Formula:

$$\text{Correction factor} = \frac{(A + O)}{A}$$

where
A = atmospheric pressure
O = operating pressure

(3 marks)

(c) A room measures 6 m by 4.5 m and has a stud height of 2.7 m.

Calculate the maximum total gas consumption of thermostatically controlled unflued space heaters for the room according to AS/NZS5601 Part 1. Give your answer in kW.

(4 marks)

QUESTION 7 (cont'd)

(d) Give THREE ways that a volume of pipework larger than 30 litres may impact on the purging and testing procedures for an installation.

1 _____

2 _____

3 _____

(3 marks)

Total 13 marks

QUESTION 8

(a) The best position for a thermostat controlling a gas-fired ducted central heating furnace is to be selected.

(i) Give THREE recommended locations.

1 _____

2 _____

3 _____

(ii) Give THREE locations which should be avoided.

1 _____

2 _____

3 _____

(3 marks) ☐

(b) A gas-fired ducted central heating furnace has developed a fault. The customer is complaining of headaches and a strange smell when the furnace is operating.

(i) Give the most likely explanation for the fault.

_____

(1 mark) ☐

(ii) Give TWO causes of the fault.

1 _____

2 _____

(2 marks) ☐

QUESTION 8 (cont'd)

(c) A gas-fired ducted central heating furnace starts up and supplies warm air, and then suddenly blasts cold air for five minutes. The circulation fan then stops and the furnace starts up again, repeating the process. This is known as cycling.

(i) State why the cycling is occurring.

_____

(1 mark) ☐

(ii) Give THREE reasons for this condition to occur.

1 _____

2 _____

3 _____

(3 marks) ☐

Total 10 marks ☐

QUESTION 9

(a) State TWO actions a gasfitter is required to take if he or she finds an unsafe gas appliance that presents a danger to life or property.

1 _____

2 _____

(2 marks)

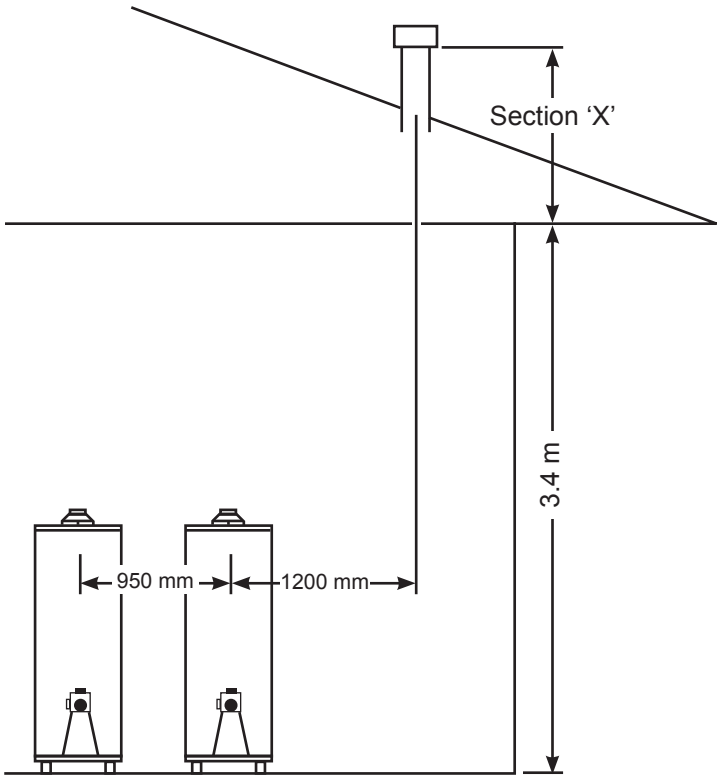
(b) Two 64 MJ/h water heaters require a combined flue to be designed with a manifold at the base as shown in AS/NZS 5601 Part 1 Figure H4.

The water heaters are both 1.6 m high with 100 mm diameter flue spigots.

On the starter drawing below, draw the flue between the appliances and the roof termination.

On the drawing show
- the minimum length of section X
- the minimum sizes of each section of the flue
- the minimum rise of the lateral flue connector.

Plan not to scale



(7 marks)

Total 9 marks

QUESTION 10

(a) The New Zealand Building Code requires that buildings shall be constructed to maintain structural stability during a fire.

Give THREE reasons why the stability of the building must be maintained during a fire.

1 _____

2 _____

3 _____

(3 marks)

(b) In addition to being used as a lining, plasterboard internal wall linings can have other purposes or features that they perform within a building structure.

(i) Give FOUR of these additional features or purposes.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(ii) Give TWO ways in which these specialised linings can be identified.

1 _____

2 _____

(2 marks)

Total 7 marks

QUESTION 11

(a) List THREE different types of equipment designed to protect people working at heights.

1 _____

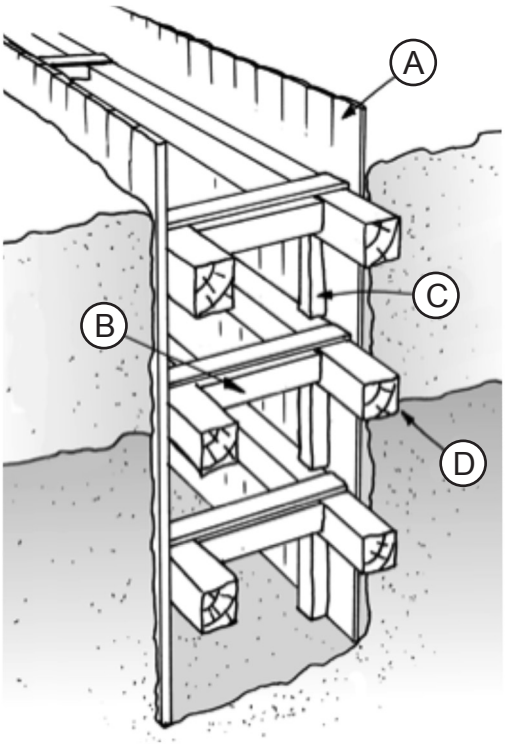
2 _____

3 _____

(3 marks)

(b) Complete the table to match the letter to the correct name for each of the shoring component indicated in the drawing below.

Component Name	Letter
Walings	
Sheeting	
Props	
Struts	



(2 marks)

(c) List THREE construction-related approved Codes of Practice.

1 _____

2 _____

3 _____

(3 marks)

Total 8 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 in this section of the examination no marks will be awarded for that question.

1. What term is used for a hazard that has the potential to cause serious harm?

   A Significant hazard.

   B Potential hazard.

   C Serious hazard.

   D Class 1 hazard.

   E High hazard.

   ☐

2. According to AS/NZS 5601 Part 1, what is the maximum permissable diameter or depth of a hole drilled in the face of a 75 mm wooden stud?

   A 19 mm.

   B 22 mm.

   C 25 mm.

   D 32 mm.

   E 40 mm.

   ☐

3. Which term best describes an inert gas?

   A Non-flammable.

   B Non-reactive.

   C Non-toxic.

   D Non-potable.

   E Non-aggressive.

   ☐

4. At what height does work become notifiable to the Department of Labour?

A 2 metres.

B 3 metres.

C 5 metres.

D 7 metres.

E 10 metres.

☐

5. According to the Health and Safety in Employment Act, in what situation does an employer NOT need to provide an employee with personal protective clothing?

A When the employee provides their own and it is of acceptable standard.

B When the employee prefers not to use personal protective clothing.

C When any accident that may occur will not result in serious harm.

D When the workplace hazards have been minimised.

E When the company safety policy states that personal protective clothing must not be worn while in public view.

☐

6. Why is it a good idea to follow the methods outlined in Codes of Practice?

A As evidence of good practice in a court.

B Codes of Practice are mandatory.

C There is no better method of completing the task.

D There is no other method of completing the task.

E If a code of practice is not followed the Health and Safety in Employment Act will be breached.

☐

7. For how long must a trainee who holds a limited certificate work in the presence of a certifying gasfitter?

A 1 month.

B 2 months.

C 6 months.

D 12 months.

E 24 months.

☐

8. Which of the following is the party to whom a hazard notice is issued?

A Health and safety representative.

B Health and safety inspector.

C Property owner.

D Employee.

E Employer.

9. If a health and safety representative believes that there is a hazard in the place of work and has brought the hazard to his employer's attention but the employer has refused to address the hazard, what should be the next action taken?

A Issue a complaint notice.

B Issue a prohibition notice.

C Issue an improvement notice.

D Issue a hazard notice.

E Issue an infringement notice.

10. According to AS/NZS5601 Part 1, a permanent notice displaying the regulator outlet pressure must be in a prominent position near a natural gas consumer piping regulator where the regulator outlet pressure is greater than which of the following?

A 1.5 kPa.

B 3.5 kPa.

C 5.0 kPa.

D 7.0 kPa.

E 10 kPa.

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		