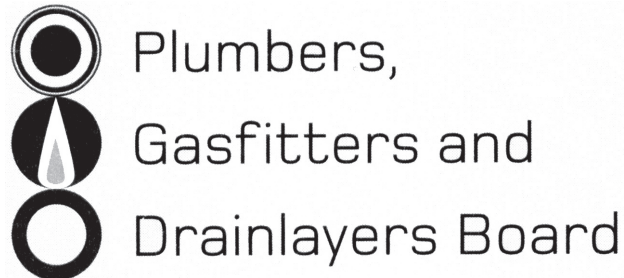


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9193



REGISTRATION EXAMINATION, JUNE 2010

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.

Write your answers and draw your sketches in this booklet. If you need more paper, use pages 19–21 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

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) (i) Two types of pressure test must be carried out prior to commissioning a new gas installation.

Name each type of test and state what is being tested in each test.

1 _____

2 _____

(4 marks)

- (ii) A new space heater is being installed and connected into an existing gas line.

Name the pressure test required prior to commencing work and state its purpose.

(2 marks)

- (iii) State TWO sources for information about the working pressure of a gas appliance that must be supplied with the appliance.

1 _____
2 _____

(2 marks)

- (b) A gas leak has occurred in a confined space.

The space must be ventilated.

Explain what the ventilation achieves.

(2 marks)

QUESTION 1 (cont'd)

- (c) Describe the operation of a PIEZO spark ignition system that is suitable for a domestic gas appliance.

(5 marks)

Total 15 marks

QUESTION 2

- (a) Give TWO essential features of supports for gas pipework running overhead through a building.

1 _____

2 _____

(2 marks)

- (b) Give TWO reasons why polyethylene pipes should not be used above ground.

1 _____

2 _____

(2 marks)

Total 4 marks

QUESTION 3

- (a) (i) A bare steel gas pipe is to be buried below ground and protected against corrosion with a tape wrapping system.

State what materials should be used, the purpose of the materials, and a suitable process of wrapping.

(5 marks)

- (ii) State FOUR requirements that must be met when a gas supply pipe is installed through a foundation wall of a building. Give the purpose of each requirement.

1

2

3

4

(4 marks)

- (iii) Give TWO reasons for installing an insulating joint in a gas pipe at the point where the pipe comes out of the ground.

1

2

(2 marks)

QUESTION 3 (cont'd)

- (b) Give FOUR characteristics of a pre-aerated natural gas flame operating under good combustion conditions on a gas hob.

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

(2 marks)

- (c) In addition to a filter, name TWO types of device that can be fitted adjacent to the gas meter or gas cylinder to protect against the supply regulator failing to control the incoming gas pressure to a safe level.

- 1 _____
- 2 _____

(2 marks)

Total 15 marks

QUESTION 4

- (a) An LPG appliance has an energy input of 5 kW.

Calculate the gas rate in m³/hr for the appliance given that the heating value of LPG is 90 MJ/m³. Show your working.

1 kW = 3.6 MJ.

(2 marks)

- (b) A room measures 6.000 m by 4.500 m and has a stud height of 2.700 m.

The room requires a heat input of 0.4 MJ/m³ of room volume.

Calculate the output of a space heater required for the room. Show your working.

(2 marks)

- (c) A commercial gas installation consists of 15.000 m of 50 mm diameter pipe, 30.000 m of 25 mm pipe, and 10.000 m of 15 mm pipe.

Calculate the total volume of the pipework for purging and testing purposes. Give your answer in litres.

(3 marks)

- (d) Calculate the total weight of a 120 litre gas water storage heater when full of water if the water heater weighs 50 kg when empty.

(1 mark)

QUESTION 4 (cont'd)

- (e) Calculate the corrected meter volume from the following information. Show all working.

Meter gauge pressure = 20 kPa

Atmospheric pressure = 101.3 kPa

Measured volume shown on meter = 3000 m³

Formula:

$$P_1 \times V_1 = P_2 \times V_2$$

(4 marks)

- (f) Draw a diagram to show all the requirements, including depths, for a polyethylene gas pipe operating at 100 kPa laid under a lawn within a private property.

(3 marks)

Total 15 marks

QUESTION 5

(a) There are different types of domestic hot water systems.

State the distinguishing characteristics of the following types.

(i) Storage

(2 marks)

☐

(ii) Continuous flow

(2 marks)

☐

(iii) Indirect

(2 marks)

☐

(b) Give TWO advantages of using a gas-fired radiant panel heater in a warehouse.

1

2

(2 marks)

☐

QUESTION 5 (cont'd)

- (c) (i) State the position for the high level ventilation opening for a cupboard containing a gas-fired storage water heater.

(1 mark)

- (ii) State the position for the low level ventilation opening for a cupboard containing a gas-fired storage water heater.

(1 mark)

Total 10 marks

QUESTION 6

(a) Give THREE reasons for fitting a down draught diverter to a gas appliance flue.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) List SIX materials that are acceptable for manufacturing flue pipes for gas appliances.

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

(3 marks)

(c) Give TWO reasons for carrying out flue gas analysis on an industrial gas-fired boiler.

- 1 _____
- 2 _____

(2 marks)

QUESTION 6 (cont'd)

- (d) List SIX individual components that are incorporated in a multi-function gas control valve fitted to a gas-fired storage water heater.

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

(6 marks)

- (e) Name TWO types of positive displacement gas meters.

- 1 _____
- 2 _____

(2 marks)

- (f) State FOUR items of information that must be provided on the data plate of a domestic gas-fired water heater.

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

(2 marks)

QUESTION 6 (cont'd)

- (g) (i) A commercial kitchen contains several gas-fired cookers and ovens.

State how the products of combustion are collected and disposed of.

(2 marks)

- (ii) 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)

Total 22 marks

QUESTION 7

- (a) State a condition under which a registered gasfitter is permitted to test gas installation work.

(1 mark)

- (b) NZS 5261 gives requirements that must be met for ventilation when gas appliances are installed.

Give TWO of these requirements.

1

2

(2 marks)

- (c) State the parties who, in addition to the gas supplier, must have copies of a Gas Certification Certificate.

(1 mark)

- (d) Name FOUR Acts of Parliament under which gasfitters operate, and name the organisation that administers each.

1

2

3

4

(4 marks)

Total 8 marks

QUESTION 8

- (a) (i) Briefly describe the process by which biogas is produced.

(2 marks)

☐

- (ii) State the TWO principal constituents of biogas.

1

2

(2 marks)

☐

- (b) Explain what an inert gas is, and name one inert gas.

(2 marks)

☐

- (c) Give a reason for odourising natural gas.

(1 mark)

☐

- (d) When natural gas and LPG disperse from a gas leak, they behave differently.

State the behaviour of each gas when a leak occurs and give the reason for that behaviour.

Natural gas:

LPG:

(2 marks)

☐

QUESTION 8 (cont'd)

(e) Gases have different properties and behave in different ways.

From the list provided, complete the following table for the two gases shown.

List

2.4% to 9.5%

0.65

25 to 1 approximately

40 MJ/m³

10 to 1 approximately

102 MJ/m³

5% to 14%

1.55

	LPG	Natural gas
Main constituent gases	Propane / Butane	Methane
Air / gas mixture ratio		
Heat (calorific) value		
Flammability range		
Relative density		

(2 marks)

Total 11 marks

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Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
Total		