

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 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 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 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

QUESTION 1

- (a) Give FOUR advantages of installing a gas-fired continuous flow water heater compared with a gas-fired storage water heater.

1 _____

2 _____

3 _____

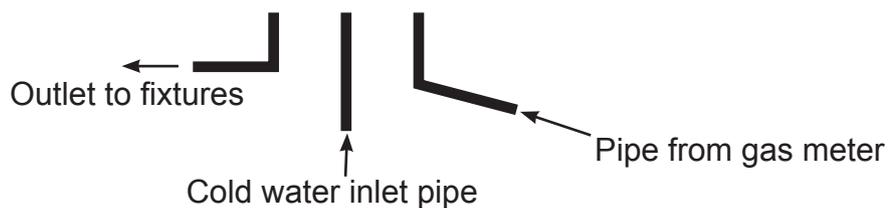
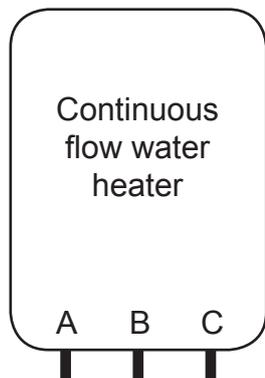
4 _____

(4 marks)

- (b) The schematic drawing below shows part of a gas-fired continuous flow water heater installation.

Complete the drawing to show the components that must be installed to connect the appliance to the pipework. Label the components.

A = Hot water outlet
B = Cold water inlet
C = Gas inlet



(4 marks)

Total 8 marks

QUESTION 2

(a) A gas consumer reports a smell of gas in his/her home.

The house has an existing natural gas installation.

(i) Describe the process to prove that there is a leak in the installation.

(4 marks)

(ii) Describe the process that should be followed to locate where the leak is occurring.

(2 marks)

QUESTION 2 (cont'd)

(b) Give FOUR effects carbon monoxide poisoning may have on a person.

1 _____

2 _____

3 _____

4 _____

(4 marks)

Total 10 marks

QUESTION 3

(a) An LPG bulk storage tank supplies vapour to a large commercial installation.

Give the TWO advantages of installing a vapouriser on the outlet of the tank.

1 _____

2 _____

(2 marks)

(b) State the main purpose of a gas appliance regulator.

(1 mark)

(c) State the purpose of the fins that are fitted on the tubes of a gas fired boiler.

(1 mark)

(d) State the temperature and pressure that relate to the term “standard conditions” for gases.

Temperature: _____

Pressure: _____

(2 marks)

Total 6 marks

QUESTION 4

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

1 _____

2 _____

3 _____

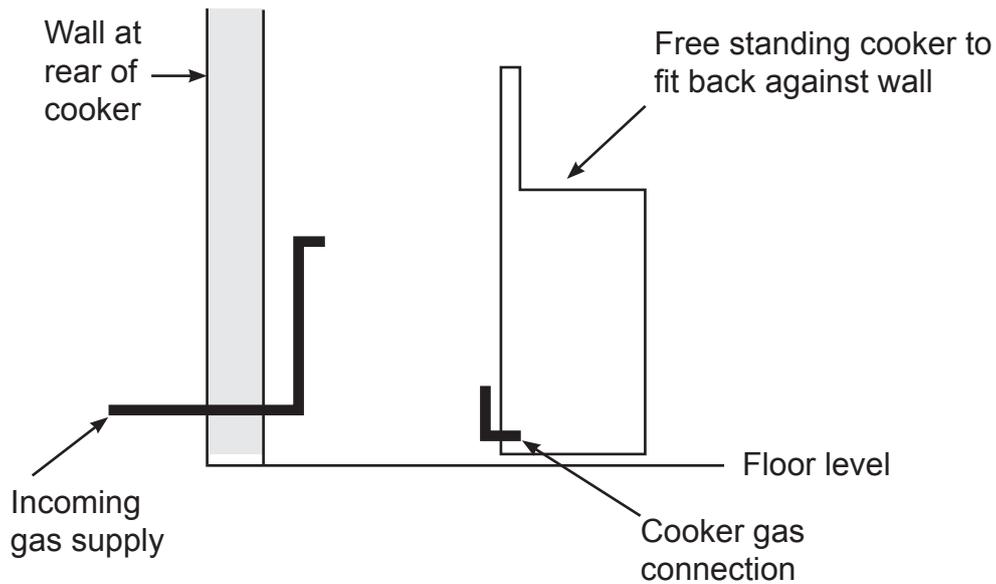
4 _____

(2 marks)

(b) A free standing gas cooker is to be installed.

It is to be connected to the gas supply using a flexible hose and bayonet fitting.

On the sketch below, show the completed installation to ensure that it complies with NZS 5261. Label the gas piping and all associated equipment behind the cooker.



(5 marks)

Total 7 marks

QUESTION 5

(a) A water manometer is often used when measuring the working pressure of an installation.

An LPG installation has a working pressure of 2.75 kPa.

State the equivalent water column height on the manometer.

(1 mark)

(b) Explain fully the meaning of the term lower explosive limit of a gas.

(2 marks)

(c) Explain why is it difficult to get butane to vaporise in cold weather.

(1 mark)

(d) Give the air flow feature of each of the following forms of ventilation.

Adventitious ventilation: _____

Forced ventilation: _____

(2 marks)

Total 6 marks

QUESTION 6

A new gas appliance has just been installed.

(a) (i) Explain why the appliance must be commissioned before it is used.

(2 marks)

(ii) The burner pressure of the appliance has been set correctly.

Describe how the aeration of the appliance burner should then be set.

(2 marks)

(b) The heat exchanger of a gas-fired warm air central heating furnace has developed a hole.

Give TWO consequences of this.

1

2

(2 marks)

Total 6 marks

QUESTION 7

The types of materials commonly used for gas pipework are listed below.

NZS 5261 places restrictions on the locations in which these materials can be used.

For each type of material, give the restriction on location.

Black steel / iron: _____

Copper: _____

Galvanised steel/iron: _____

Macro-composite (PE/Al): _____

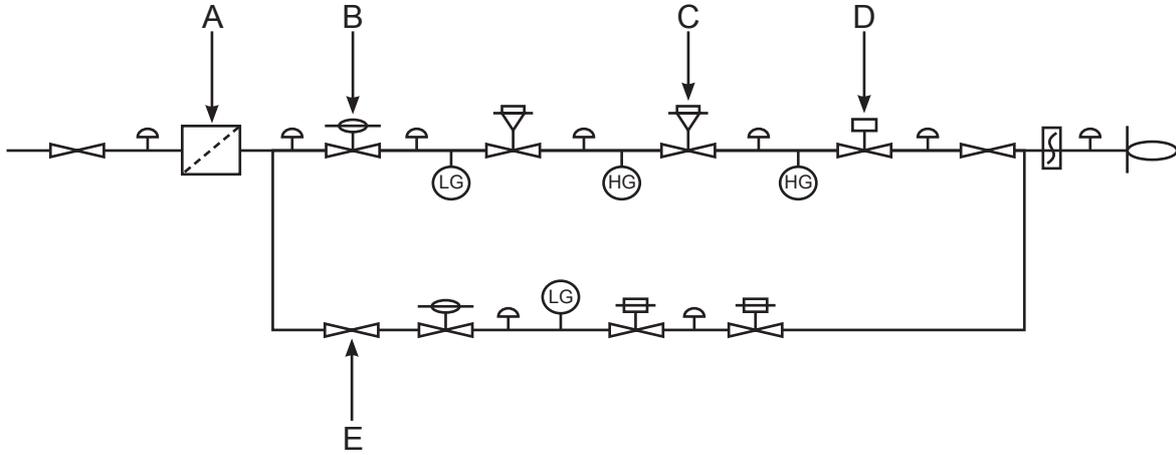
Polyethylene: _____

Total 5 marks

QUESTION 8

(a) The diagram below shows the valve train for an industrial gas burner.

Identify each of the items labelled A – E.



- A: _____
- B: _____
- C: _____
- D: _____
- E: _____

(5 marks)

(b) A domestic space heater ignites explosively.

Give THREE likely causes of this.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 8 marks

QUESTION 9

An LPG gas-fired storage water heater is installed in a cupboard.

The heater has a gas input rating of 35MJ/h.

- (a) Calculate the heat output in kW if the appliance has an efficiency of 75%. (1kWh = 3.6MJ)

(2 marks)

- (b) The heating value for LPG is 90MJ/m³.

Calculate the input gas flow rate.

(1 mark)

- (c) Calculate the total area of the ventilation openings.

Formula:

$$A = F \times T$$

where

A = minimum free ventilation area (mm²)

F = 600

T = total gas consumption (MJ/h)

(2 marks)

QUESTION 9 (cont'd)

(d) The ventilation openings are square.

Find their dimensions.

(1 mark)

Total 6 marks

QUESTION 10

(a) A small area at one end of a warehouse requires heating for staff working for short periods at a workbench.

(i) Name the type of gas-fired heater which would be the most suitable for this application and give the reason for using this type.

Name: _____

Reason: _____

(2 marks)

(ii) State where this heater should be located.

(1 mark)

(b) Give the THREE factors that determine how much gas will pass through a burner injector in a gas appliance.

1 _____

2 _____

3 _____

(3 marks)

Total 6 marks

QUESTION 11

Three terms used in relation to gas pressure in an installation are given below.

Give the meaning of each term and state where in the gas installation this pressure should be measured.

(a) Static or lock-up pressure

Meaning: _____

Place where measured: _____

(2 marks)

(b) Working pressure

Meaning: _____

Place where measured: _____

(2 marks)

(c) Appliance pressure

Meaning: _____

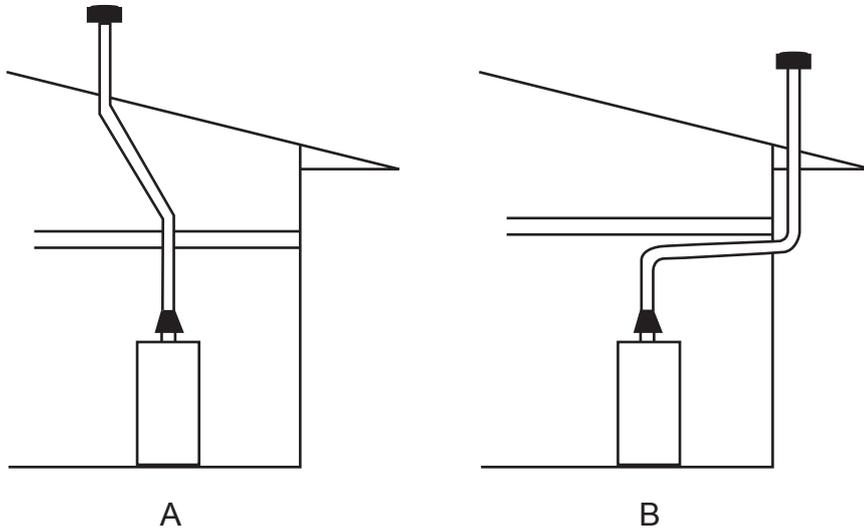
Place where measured: _____

(2 marks)

Total 6 marks

QUESTION 13

The diagram below shows two alternative methods of installing the flue for a storage water heater.



Give THREE advantages of method A compared with method B.

- 1 _____
- 2 _____
- 3 _____

Total 3 marks

QUESTION 14

(a) Explain why it is necessary to add odorant to natural gas.

(1 mark)

(b) Explain why the odorant in (a) must have an unpleasant smell.

(1 mark)

(c) An elderly consumer has lost her sense of smell and cannot detect gas.

(i) State an alternative means of detection that is available.

(ii) State who is required to hold information about alternative means of detection.

(2 marks)

Total 4 marks

QUESTION 15

(a) A registered gasfitter is to install a gas-fired storage water heater.

Give THREE requirements that the registered gasfitter must meet under the Plumbers, Gasfitters, and Drainlayers Act to allow him to carry out this installation.

1 _____

2 _____

3 _____

(3 marks)

(b) To comply with NZS 5261, before work commences on a gas installation, the gas type and pressure must be verified.

Give TWO reasons for this.

1 _____

2 _____

(2 marks)

(c) To comply with NZS 5261, a gas appliance must be located so that specific requirements are met.

State FOUR of these.

1 _____

2 _____

3 _____

4 _____

(4 marks)

Total 9 marks

QUESTION 16

Draw a diagram to show the SIX main components of a pre-aerated gas burner suitable for use in a gas cooker. Label all components.

Total 5 marks

For Examiner's use only

| Question number | Marks | Marks |
|-----------------|-------|-------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| Total | | |