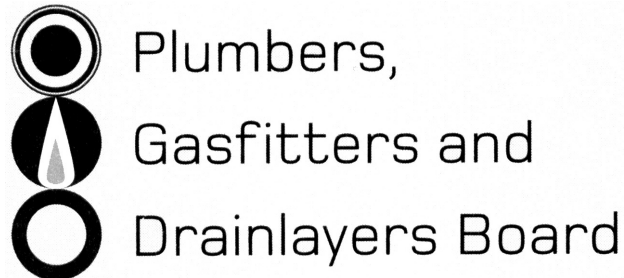


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Number if known

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No. 9196



## REGISTRATION EXAMINATION, JUNE 2020

# 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 20-21 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, 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 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**

## USEFUL FORMULAE

Circumference of circle =  $2 \times \pi \times R$  or Circumference of circle =  $\pi \times D$

Area of circle =  $\pi \times R^2$  or Area of circle =  $0.7854 \times D^2$

Volume of cylinder =  $\pi \times R^2 \times H$  or Volume of cylinder =  $0.7854 \times D^2 \times H$

Heating time (seconds) =  $\frac{\text{mass of water (kg)} \times 4.2 \times \text{temp diff (}^\circ\text{C)} \times 100}{\text{heat energy input per hour (kJ)} \times \text{efficiency (\%)}}$

Correction factor =  $\frac{\text{atmospheric pressure} + \text{supply pressure}}{\text{atmospheric pressure}}$

Gas rate (m<sup>3</sup>/h) =  $\frac{\text{volume (m}^3\text{)} \times 3600}{\text{time (seconds)}}$

## SECTION A

### QUESTION 1

- (a) Give THREE reasons why an appliance would require combustion air to be ducted from outside.

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 probable situations which would allow this fault to occur.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

**Total 6 marks**

**QUESTION 2**

- (a) AS/NZS 5601 Part 2 gives the purpose of ventilation of compartments in which gas appliances are installed.

Give TWO conditions the ventilation is designed to prevent.

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

(1 mark)

- (b) Two 6 kW gas cookers are to be installed in a boat that is designed for the occupancy of five people.

Using AS/NZS 5601 Part 2, calculate the minimum free area of the ventilation openings required for the area.

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

(4 marks)

- (c) According to AS/NZS 5601 Part 2, high and low level ventilation is required in compartments of a boat in which gas appliances are installed.

Give TWO systems/devices that may be used to assist the ventilation of the compartments.

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

(1 mark)

**Total 6 marks**

**QUESTION 3**

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

State SIX factors to be taken into account when calculating the size of the flue.

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

(3 marks)

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

State FOUR ways in which condensation in the flue can be minimised.

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

(2 marks)

**Total 5 marks**

#### QUESTION 4

The Gas (Safety and Measurement) Regulations define the three categories of gasfitting work: low-risk, high-risk and general risk.

(a) (i) Give TWO examples of gasfitting that would be classed as low-risk.

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

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

(2 marks)

(ii) Give TWO examples of gasfitting that would be classed as high-risk.

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

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

(2 marks)

(iii) State what is classed as general-risk.

\_\_\_\_\_

(1 mark)

#### QUESTION 4 (cont'd)

- (b) The situations given in the table below relate to installations supplied by single 9 kg LPG cylinders.

Choose the correct risk category for each situation.

Situation	Risk Category
Adding a gas hob to an existing installation in a house.	
Installing a gas hob in a caravan with sleeping quarters.	
Installing a gas hob in a new house.	
Replacing a gas hob in a house with another one of the same model.	

(4 marks)

**Total 9 marks**

**QUESTION 5**

(a) Give THREE reasons why an installation would be deemed to be unsafe according to the Gas (Safety and Measurement) Regulations.

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

(3 marks)

(b) Name the TWO parties that must be advised when a gasfitter finds an installation that presents immediate danger.

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

(2 marks)

(c) Give TWO items of information that must be given to both of the parties in (b).

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

(2 marks)

**Total 7 marks**



**QUESTION 6**

- (a) A restaurant in an area having a cold climate is supplied with LPG from four 45 kg cylinders. When the cylinders are exchanged, it is found that the cylinders contain significant quantities of unused gas despite the indicator on the changeover regulator showing low gas pressure.

Explain what prevents the use of this gas.

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(2 marks)

- (b) Give TWO ways in which the problem in (a) can be rectified.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (c) Several factors affect the vaporisation rate of LPG in a container.

Give TWO of these.

1 \_\_\_\_\_

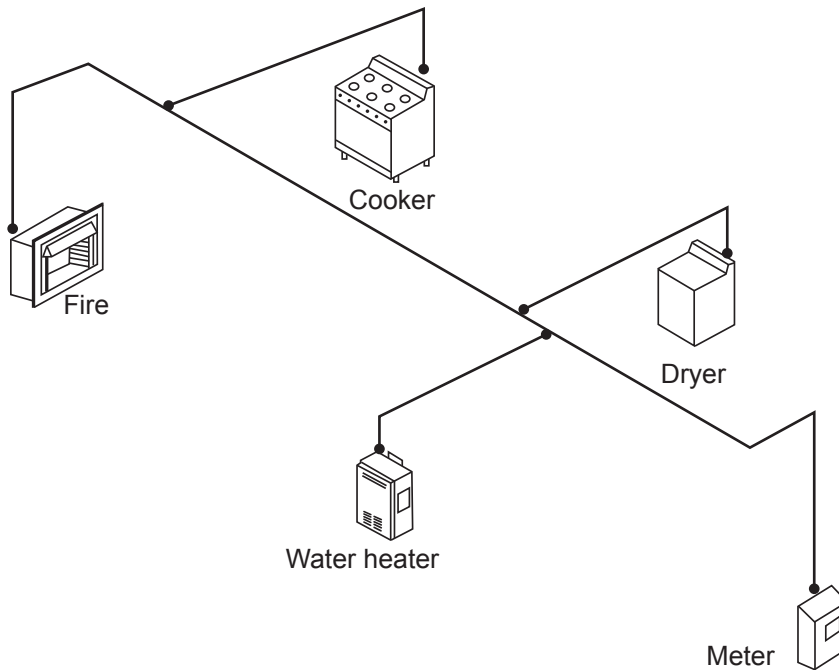
2 \_\_\_\_\_

(2 marks)

**Total 6 marks**

## QUESTION 7

The diagram below shows the layout of the gas installation in a detached dwelling. The pipe material is multi-layered pipe. The pipework between the meter and the fire is 12.3 m long.



(a) On the diagram, show the locations where reversion fittings are required.

(2 marks)

(b) State the purpose of the reversion fittings.

(1 mark)

(c) Give TWO acceptable reversion fittings that are suitable for the installation.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

(d) Give the TWO special requirements that must be met with regard to identification of the proprietary piping in the installation.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

**Total 7 marks**

### QUESTION 8

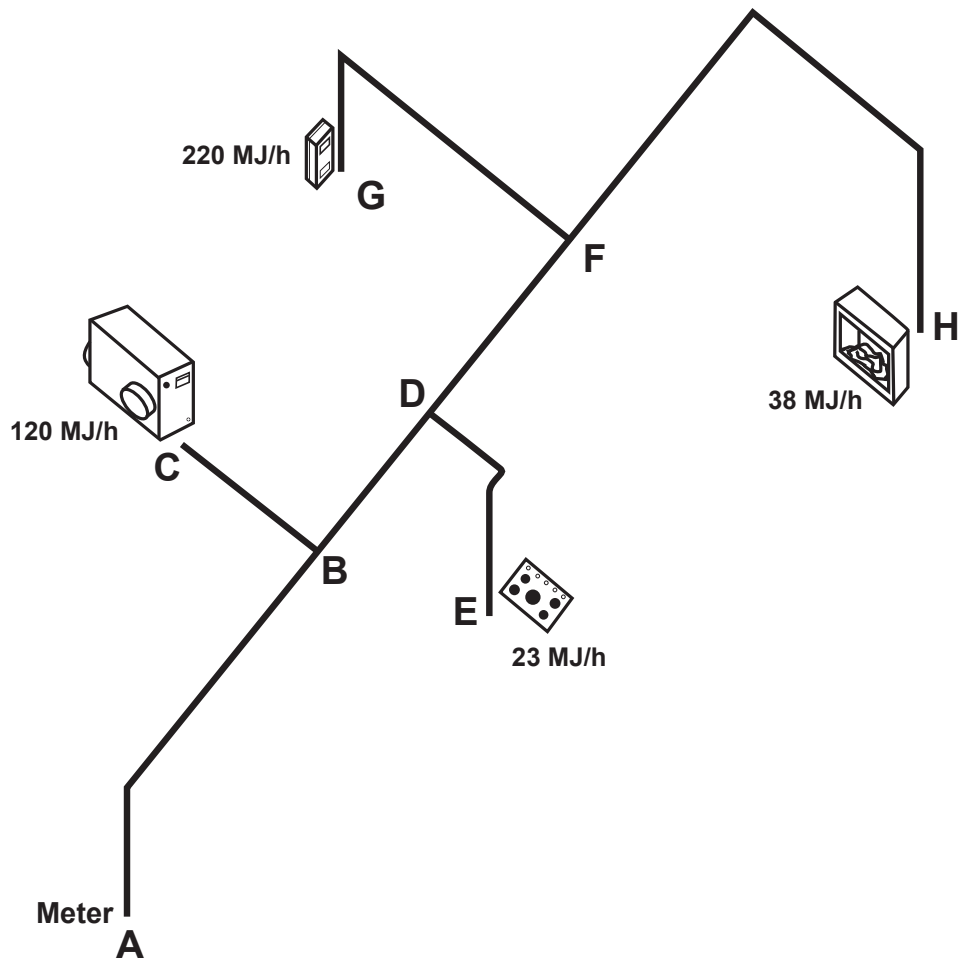
The diagram below shows the pipework and appliances for a gas installation in a house.

Installation details are as follows:

- Natural gas
- Copper pipe (NZS 3501)
- The installation supply pressure is 2.75 kPa.

Using the Pipe Sizing Tables (not the graphs) from AS/NZS 5601 Part 1, complete the tables below.

Pipe Section	Length (m)	Main run (m)	Gas flow (MJ/h)	Nominal size (mm)
A – B	4.5			
B – C	2.3			
B – D	3.7			
D – E	4.4			
D – F	2.2			
F – G	4.5			
F – H	5.6			



Total 11 marks

### QUESTION 9

Name FOUR licensing categories for which workers must be supervised and have their work verified by a certifying gasfitter.

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

Total 4 marks

**QUESTION 10**

A gas burner has been operated on full, and the gas meter indicates that 5.2 m<sup>3</sup>/h of LPG is being consumed.

The installation supply pressure is 15 kPa.

Calculate the corrected gas consumption in MJ/h.

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**Total 4 marks**

**QUESTION 11**

(a) A gasfitter has injured himself at work.

Give EIGHT items of information that should be included on the accident record.

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

(4 marks)

(b) Name the organisation to which a Particular Hazardous Work Notification form needs to be submitted.

\_\_\_\_\_

(1 mark)

(c) State how long before work commences that a Particular Hazardous Work Notification form should be submitted.

\_\_\_\_\_

(1 mark)

**QUESTION 11 (cont'd)**

(d) Give FIVE items of information that are to be provided on a Particular Hazardous Work Notification form.

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

(5 marks)

**Total 11 marks**

## QUESTION 12

A trench is to be excavated on private property between two buildings.

List SIX factors about the site that need to be considered before excavation commences.

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

Total 6 marks



**QUESTION 13**

(a) Give TWO functions of a wall cavity between a building frame and the external wall cladding.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

(b) 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 \_\_\_\_\_

(2 marks)

**Total 4 marks**

**QUESTION 14**

- (a) A room measures 5.000 m × 3.200 m and has a ceiling height of 2.700 m. The heat input per cubic metre of room volume is to be 0.36 MJ/h.

Calculate the heat input required for the room in kW.

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(3 marks)

- (b) A 12 MJ flueless space heater is to be installed in a hallway having a ceiling height of 2.400 m.

Calculate in square metres the minimum floor area the hallway can have.

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(2 marks)

**Total 5 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.

Should your choice of answer be unclear no mark will be awarded.

1. An appliance is to be installed in a covered outdoor area that has only one open side. The appliance has a fan assisted flue.

What is the maximum distance the flue is permitted to be from the opening?

- A. 100 mm.
- B. 250 mm.
- C. 500 mm.
- D. 600 mm.
- E. 1200 mm.

2. When consumer gas pipework is to be embedded in a concrete wall, what operating pressure must not be exceeded?

- A. 3 kPa.
- B. 7 kPa.
- C. 10 kPa.
- D. 14 kPa.
- E. 30 kPa.

3. Which of the following is the definition of an alternative solution in relation to the New Zealand Building Code?

- A. A custom designed method that differs from an Acceptable Solution or Verification Method but that will fulfil the requirements of the Building Code.
- B. A performance based standard that states how completed work and its parts must perform.
- C. A pre-approved method of compliance that is included in a Building Code Acceptable Solution or Verification Method.
- D. A design solution, calculation or test procedure that has been approved and, if used, will guarantee an installation will comply with the Building Code.
- E. A statement supplied by or on behalf of any applicant for a building consent.

4. Which of the following is the maximum length of a gas appliance restraint on a freestanding appliance according to AS/NZS 5601 Part 1?
- A. 75% of the length of the flexible hose.
  - B. 80% of the length of the flexible hose.
  - C. 85% of the length of the flexible hose.
  - D. 95% of the length of the flexible hose.
  - E. 100% of the length of the flexible hose.

5. What is the minimum spacing of supporting devices for a 25 mm diameter copper gas pipe which is installed vertically in a building according to AS/NZS 5601 Part 1?
- A. 1.0 m.
  - B. 1.5 m.
  - C. 2.0 m.
  - D. 2.5 m.
  - E. 3.0 m.

6. Where a roof is accessible by the public, the termination of a flue must be what minimum distance above the roof level?
- A. 0.6 m.
  - B. 1.2 m.
  - C. 1.5 m.
  - D. 1.8 m.
  - E. 2.0 m.

7. What is the maximum number of gas appliances permitted to be connected together to form a combination cooking range?
- A. 2
  - B. 3
  - C. 4
  - D. 5
  - E. 6
- 

8. A gas appliance is installed under a floor and is located over 2 m from an access opening. What is the minimum allowable clearance between the lowest part of the floor structure and the ground from the access opening to the appliance?
- A. 600 mm.
  - B. 800 mm.
  - C. 1000 mm.
  - D. 1200 mm.
  - E. 1500 mm.
- 

9. Why are heat exchangers used in high efficiency gas appliances often constructed from stainless steel?
- A. Because of the corrosive nature of condensate.
  - B. Stainless steel is less likely to fracture from expansion due to temperature fluctuations.
  - C. The appliance can produce higher temperatures without damaging the heat exchanger.
  - D. The heat exchanger can be thin, making the appliance lighter.
  - E. Stainless steel is a good heat conductor.
- 

**Total 9 marks**





For Examiner's use only

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