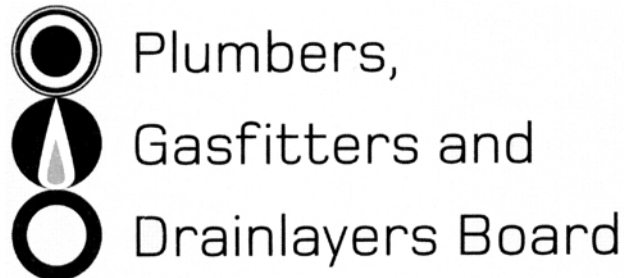


Affix label with Candidate Code  
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Number if known

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No. 9196



## REGISTRATION EXAMINATION, JUNE 2019

# 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 18-21 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**

Candidates that sat this examination in June 2019 were provided with the following documents:

- AS/NZS 5601 Part 1: General Installations
- AS/NZS 5601 Part 2: LP Gas installations in caravans and boats for non-propulsive purposes

## 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) A caravan is designed to house three occupants.

The appliances installed in the caravan are a cooker with a gas consumption of 25,000 BTU, and a heater with a gas consumption of 17,000 BTU.

- (i) Calculate the minimum free area of the permanent ventilation required.

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(4 marks)

- (ii) The ventilation opening calculated above is to be 200 mm wide.

Calculate the height of the opening.

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(1 mark)

- (b) According to AS/NZS 5601 Part 2, a 90 litre gas refrigerator installed in a caravan has ventilation requirements that are specific to refrigerators.

- (i) Give TWO conditions regarding the ventilation that must be met.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (ii) Give the minimum free area of the ventilation required for this situation.

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(1 mark)

**Total 8 marks**

**QUESTION 2**

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

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

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

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

(2 marks)

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

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

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

(2 marks)

(iii) State what would be classed as general gasfitting.

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

(1 mark)

**QUESTION 2 (cont'd)**

(b) After an addition to an existing gas installation has been completed, a COC (Certificate of Compliance) is required to be generated by a suitably qualified person.

(i) State the minimum qualification required to be able to complete a COC.

---

(1 mark)

(ii) List SIX items of information that a COC must state.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

6 \_\_\_\_\_

(6 marks)

(iii) Other than creating a COC, list TWO further documents or forms that must be completed after the work has been finished.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

**Total 14 marks**

### QUESTION 3

A gas burner has been operated on full and measured 12.45 m<sup>3</sup>/h of natural gas being consumed.

The installation operating pressure is 9 kPa.

(a) Calculate the corrected volume of gas consumed in MJ/h.

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(4 marks)

(b) The burner is 80% efficient.

Calculate the output of the burner in MJ/h.

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(1 mark)

(c) Calculate how much oxygen will be consumed by the burner every hour.

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(2 marks)

**Total 7 marks**

#### QUESTION 4

- (a) Complete the table below by indicating which of the situations listed require notification of Particular Hazardous Work and which do not.

Description of work	Particular Hazardous Work Y/N
A trench which is 2 metres deep and 1.5 metres wide at the top	
Working in a confined space	
Working on a scaffold where the handrail is 5 metres high	
Working on a residential property which is known to contain asbestos containing materials	
Work in which a person wears a face mask with filter canisters	
Working in an area where the temperature exceeds 45°C	

(6 marks)

- (b) Give THREE characteristics of a work site that determine that the site will be considered to be a confined space.

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

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

3 \_\_\_\_\_  
\_\_\_\_\_

(3 mark)

**Total 9 marks**



**QUESTION 5**

- (a) The diagram below shows a schematic of existing gas copper pipework (NZS 3501) in a building.

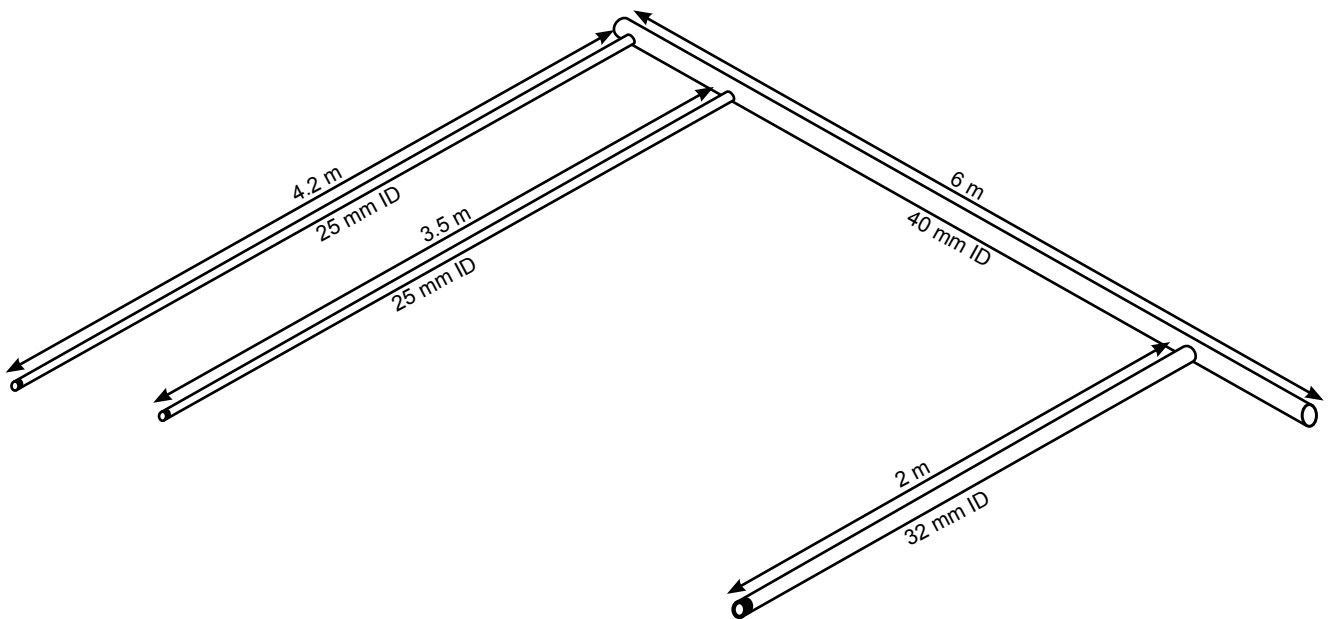
Find, in litres, the approximate volume of the pipework.

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(4 marks)

- (b) State the maximum acceptable pressure drop permitted according to AS/NZS 5601 Part 1, when a leakage test of the installation in (a) is being undertaken.

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(1 mark)

**Total 5 marks**

**QUESTION 6**

(a) List THREE approved Codes of Practice relevant to gasfitting.

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

(3 marks)

(b) Give the purpose of Approved Codes of Practice.

\_\_\_\_\_

(1 mark)

(c) Explain why following the recommendations of Approved Codes of Practice is beneficial if an incident were to occur.

\_\_\_\_\_

\_\_\_\_\_

(1 mark)

**Total 5 marks**

## QUESTION 7

A 'notifiable incident' is an unplanned or uncontrolled incident in the workplace that seriously exposes, endangers or threatens the health and safety of workers or others to a serious risk.

(a) Give FOUR examples of occurrences that would be classed as notifiable incidents.

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

(4 marks)

(b) Give TWO actions that must be taken immediately after a notifiable incident has occurred.

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

(2 marks)

(c) A notifiable incident is classed as a 'notifiable event'.

Give TWO other occurrences that are classed as notifiable events.

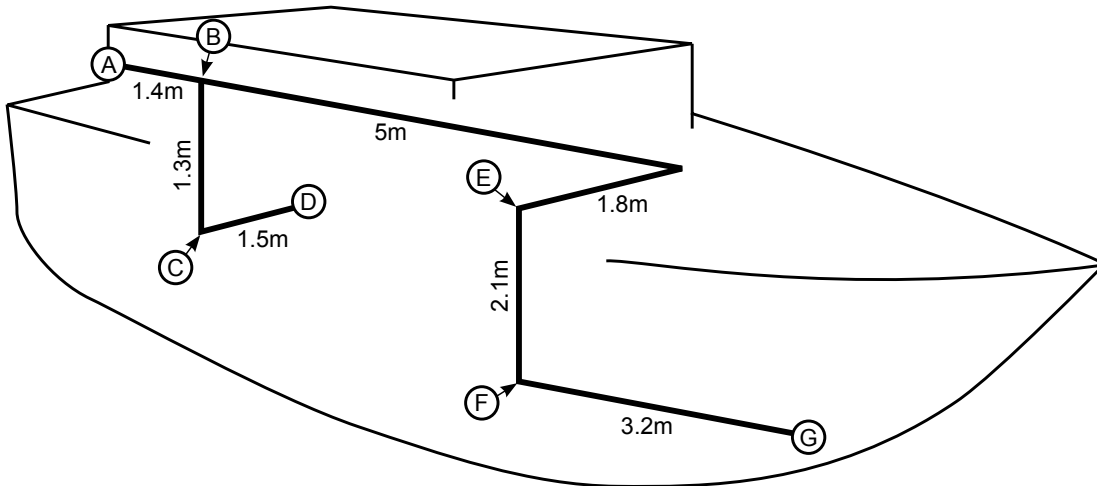
- 1 \_\_\_\_\_
- 2 \_\_\_\_\_

(2 marks)

**Total 8 marks**

**QUESTION 8**

- (a) The diagram below shows an outline of a boat and a schematic of rigid pipework to be installed in the boat.
- Support is to be provided 150 mm from each end of the pipe.
  - Three supports are to be included for each tee, each located 150 mm from the tee.
  - Two supports are to be included for each bend, each located 150 mm from the bend.



Complete the following table to show the number of supports required for the pipework. The supports are to be installed to comply with the minimum requirements of AS/NZS 5601 Part 2.

Pipe Section	Number of clips
A - B	
B - C	
C - D	
B - E	
E - F	
F - G	

(6 marks)

- (b) Give TWO restrictions regarding pipe support selection according to AS/NZS 5601 Part 2.

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

(2 marks)

**Total 8 marks**

## QUESTION 9

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

Installation Details are as follows:

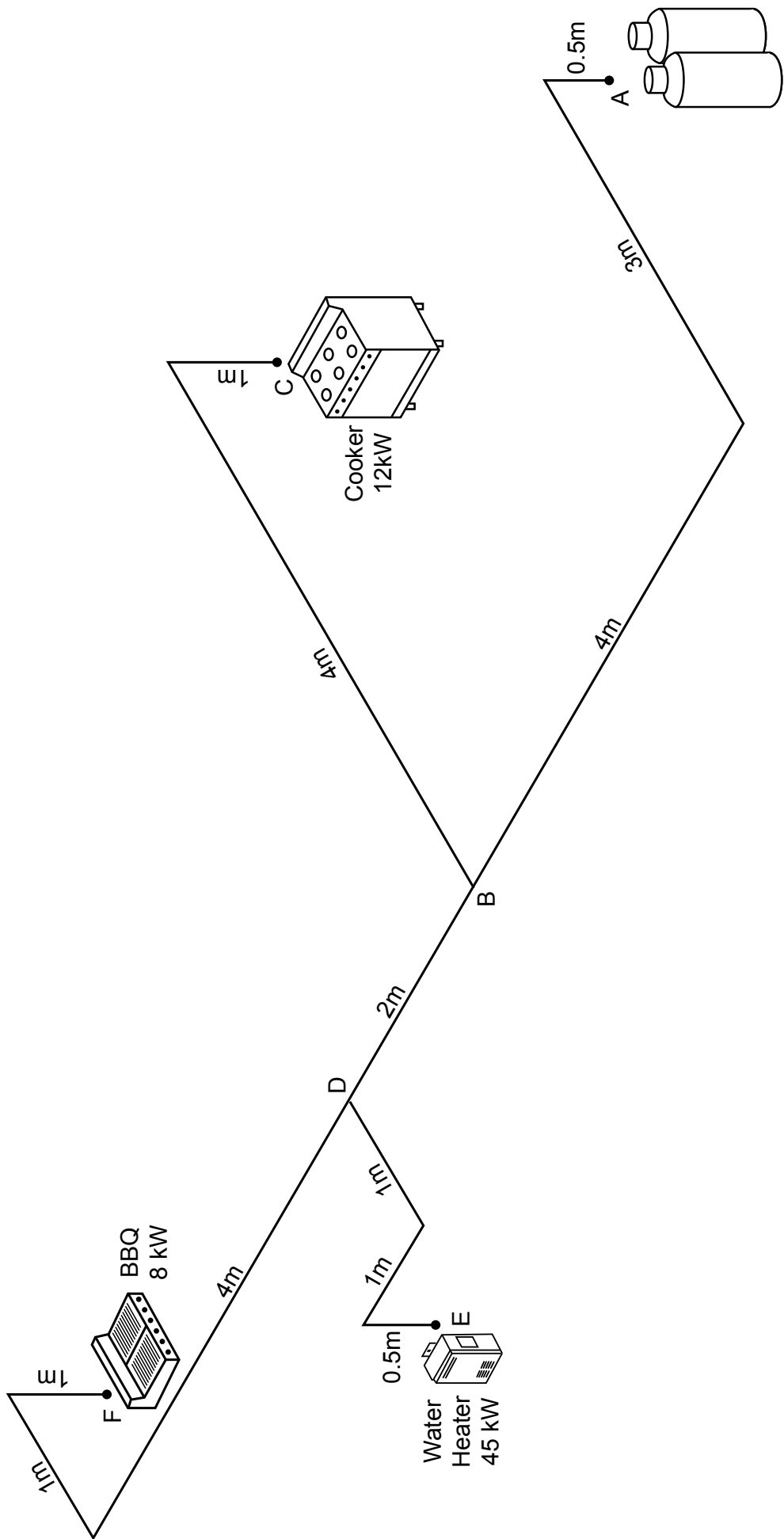
- LPG
- Copper pipe (NZS 3501)
- The installation supply pressure is 2.75 kPa.

Using AS/NZS 5601 Part 2, complete the tables below pipe sizing the plan on the page opposite. Use the sizing tables or the sizing graphs to answer this question.

Main/longest run	
------------------	--

Pipe section	Length (metres)	Gas flow (MJ/h)	Nominal size (mm)
A - B			
B - C			
B - D			
D - E			
D - F			

Total 11 marks



**QUESTION 10**

(a) Give FOUR reasons why spillage from a gas appliance may occur.

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

(4 marks)

(b) A line of soot has appeared on the front of a radiant/convector gas heater installed in an existing fire place.

Give FOUR likely reasons this may have occurred.

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

(4 marks)

(c) Give TWO effects excessive heat loss can have on the operation of a natural draught flue.

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

(2 marks)

**Total 10 marks**

## QUESTION 11

A fire collar is to be fitted to a uPVC flue that passes through the concrete wall of a plant room.

(a) Explain the purpose of the fire collar.

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(2 marks)

(b) Explain how the fire collar achieves its intended purpose.

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(2 marks)

**Total 4 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. A 30 MJ internal gas storage water heater is to be installed in a room using only adventitious ventilation.

According to AS/NZS 5601 Part 1, what is the minimum volume the room can have?

- A 10 m<sup>3</sup>.
- B 12 m<sup>3</sup>.
- C 18 m<sup>3</sup>.
- D 24 m<sup>3</sup>.
- E 30 m<sup>3</sup>.

2. When must a soaker flashing be installed?

- A When the size of the roof penetration is greater than 85 mm diameter.
- B When the roof is in a high wind zone.
- C When the roof is constructed from tiles (concrete or slate).
- D When the average rainfall intensity for the area exceeds 42 mm/hr.
- E When rainwater from the roof is going to be used as a potable water supply.

3. A gas installation has been disconnected from the gas supply.

After what period of time is a certificate of verification required for reconnection?

- A 3 months.
- B 6 months.
- C 12 months.
- D 24 months.
- E 36 months.

4. A 9 kg LPG cylinder is permitted to be used indoors with which type of connection?

A Companion/camping.

B POL.

C CGA555.

D QCC.

E Primus.

5. Flues can sometimes be joined together, for example to have fewer penetrations through the roof of the building.

Under what circumstances is this NOT permitted?

A On appliances that run at different burner operating pressures.

B On appliances that use propane gas.

C On appliances with an hourly consumption in excess of 90 MJ.

D On appliances for use in school or early childcare facilities.

E On appliances with atmospheric burners joined to the same flue as appliances with forced draught burners.

6. The maximum over-pressure is not indicated on an individual component used in a gas installation and the rated working pressure is known to be 2 kPa.

According to AS/NZS 5601 Part 1, which of the following would be used as the maximum over-pressure for the installation?

A 2 kPa.

B 2.5 kPa.

C 3 kPa.

D 7 kPa.

E 14 kPa.

7. According to AS/NZS 5601 Part 1, above what incoming operating pressure is over-pressure protection required on a natural gas installation?
- A 7 kPa.
  - B 10 kPa.
  - C 14 kPa.
  - D 15 kPa.
  - E 30 kPa.
- 

8. According to AS/NZS 5601 Part 1, what is the maximum size notch or hole permitted where a notch or hole is cut into a 75 mm wide timber stud?
- A 19 mm.
  - B 25 mm.
  - C 30 mm.
  - D 32 mm.
  - E 40 mm.
- 

9. What is the minimum allowable diameter of a drain fitted in the base of an LPG cylinder compartment on a boat?
- A 10 mm.
  - B 15 mm.
  - C 19 mm.
  - D 20 mm.
  - E 25 mm.
-

10. A 40 MJ storage water heater with a natural draught flue is to be installed in a cupboard. The cupboard will be ventilated using mechanical means.

According to AS/NZS 5601 Part 1, what is the minimum rate at which the fan will need to supply air at low level?

- A 20 litres/second.
- B 40 litres/second.
- C 50 litres/second.
- D 100 litres/second.
- E 150 litres/second.

11. Which agency administers the gas installation high-risk database?

- A Gas Association of New Zealand.
- B The Institute of Gas Engineers.
- C The Plumbers, Gasfitters and Drainlayers Board.
- D The local regional authority.
- E Energy Safety.

**Total 11 marks**

For Examiner's use only

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