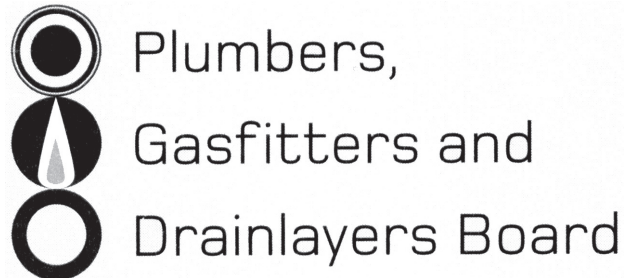


Affix label with Candidate Code  
Number here.  
If no label, enter candidate  
Number if known

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No. 9196



## REGISTRATION EXAMINATION, JUNE 2017

# 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 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, 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 2017 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 =  $0.7854 \times D^2 \times H$

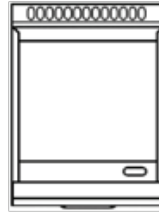
Heating time =  $\frac{\text{mass of water (kg)} \times 4.2 \times \text{temp diff (}^\circ\text{C)} \times 100}{\text{heat energy input per hour in kJ} \times \text{efficiency (\%)}}$

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

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

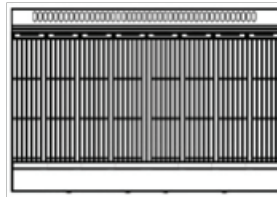
## APPLIANCE INFORMATION SHEET

<b>Bench Griddle</b>	Natural Gas
Bench top	BG453N
Gas Consumption	60 MJ/h
Gas Inlet Pipe Size	15 mm
Operating Pressure	1.2 kPa



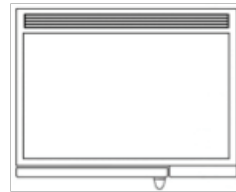
Bench Griddle

<b>Chargrill</b>	Natural Gas
Bench top	CH98765N
Gas Consumption	128 MJ/h
Gas Inlet Pipe Size	20 mm
Operating Pressure	1.5 kPa



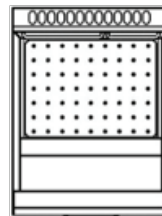
Chargrill

<b>Combi-Steamer</b>	Natural Gas
Free Standing	CSL55543N
Gas Consumption	96 MJ/h
Gas Inlet Pipe Size	15 mm
Operating Pressure	1.5 kPa



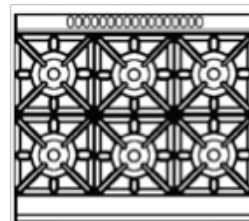
Combi-Steamer

<b>Deep Fryer</b>	Natural Gas
Free Standing	DFA33453N
Gas Consumption	150 MJ/h
Gas Inlet Pipe Size	20 mm
Operating Pressure	2.0 kPa



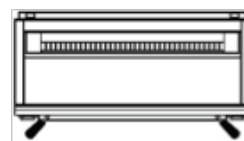
Deep Fryer

<b>Oven</b>	Natural Gas
Free Standing	BG453N
Gas Consumption	196 MJ/h
Gas Inlet Pipe Size	20 mm
Operating Pressure	1.0 kPa



Oven

<b>Salamander</b>	Natural Gas
Bench top	DFRE345N
Gas Consumption	31.5 MJ/h
Gas Inlet Pipe Size	15 mm
Operating Pressure	2.2 kPa



Salamander

# SECTION A

## QUESTION 1

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

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 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 6 marks**

## QUESTION 2

- (a) Give THREE safety aspects that should be checked before using a cherry picker to access a high point on the exterior of a building.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3 marks)

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

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

**Total 5 marks**

### QUESTION 3

The kitchen plan view on the opposite page shows the position of the appliances located on both sides of a wall.

The copper manifold is specified as NZS 3501.

The gas manifold pressure is to be supplied at 10% above the highest operating pressure required by the appliances.

Freestanding appliances only will require flexible hoses.

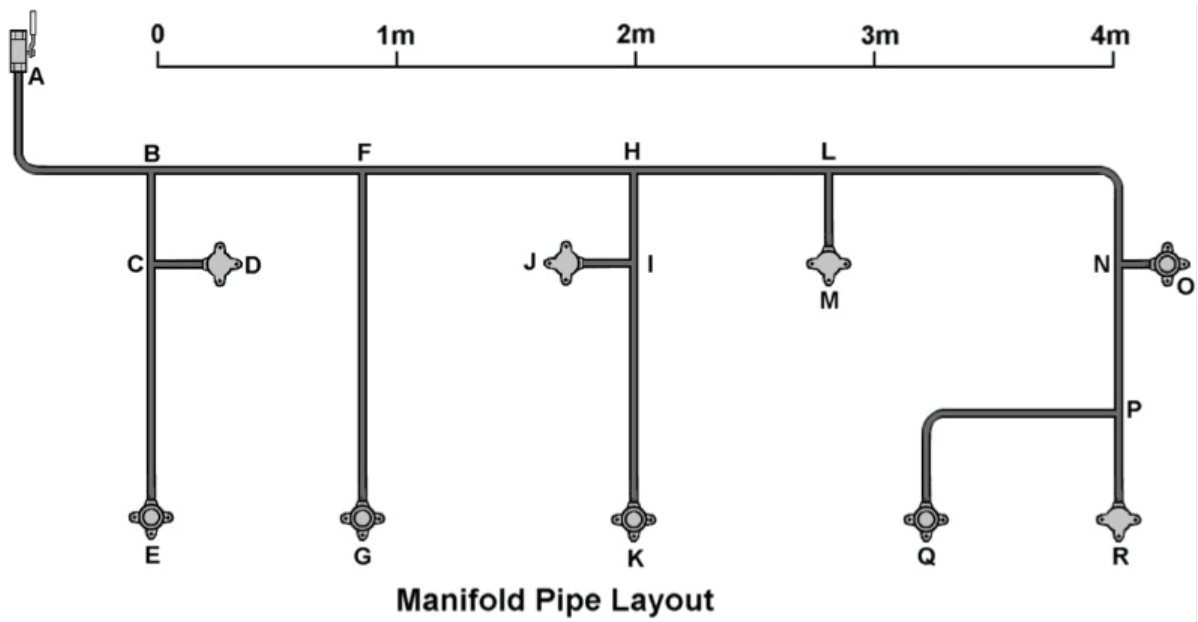
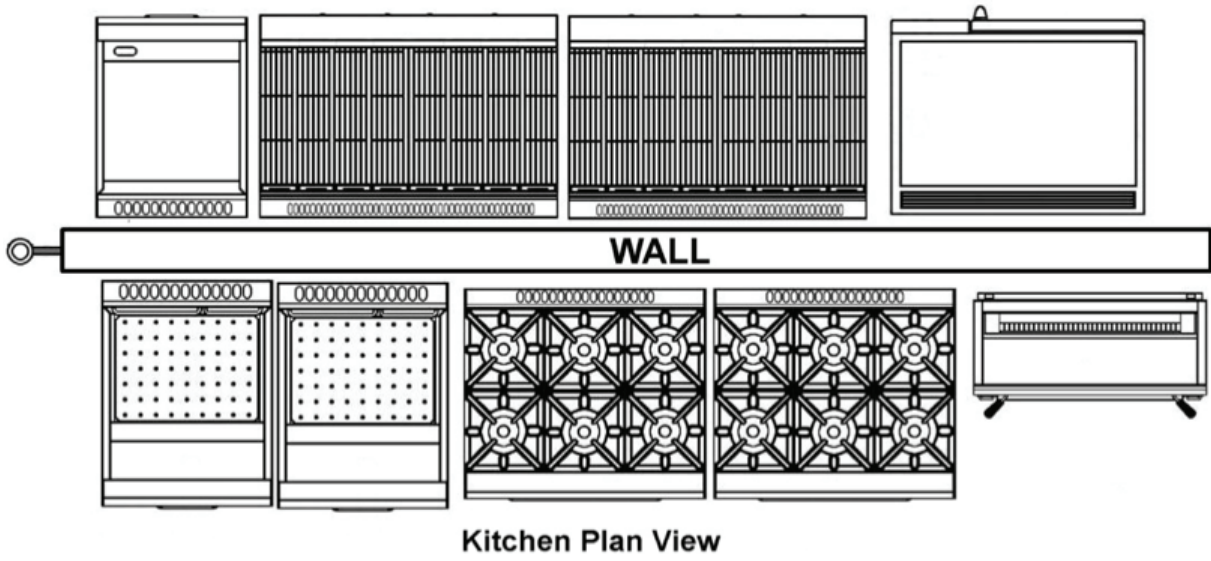
Using the Appliance Information Sheet on page 1 and the plan view and manifold pipe layout shown on the opposite page, complete the tables below. Use the tables and not the graphs in AS/NZS 5601 Part 1 for the pipe sizing.

Supply Pressure	
Length of Longest Run	
Quantity of 15mm Appliance Regulators	
Quantity of 20mm Appliance Regulators	
Quantity of 15mm Flexible Hoses	
Quantity of 20mm Flexible Hoses	

Pipe section	MJ	Diameter (mm)	Pipe section	MJ	Diameter (mm)
A - B			I - K		
B - C			H - L		
C - D			L - M		
C - E			L - N		
B - F			N - O		
F - G			N - P		
F - H			P - R		
H - I			P - Q		
I - J					

Total 21 marks

QUESTION 3 (cont'd)

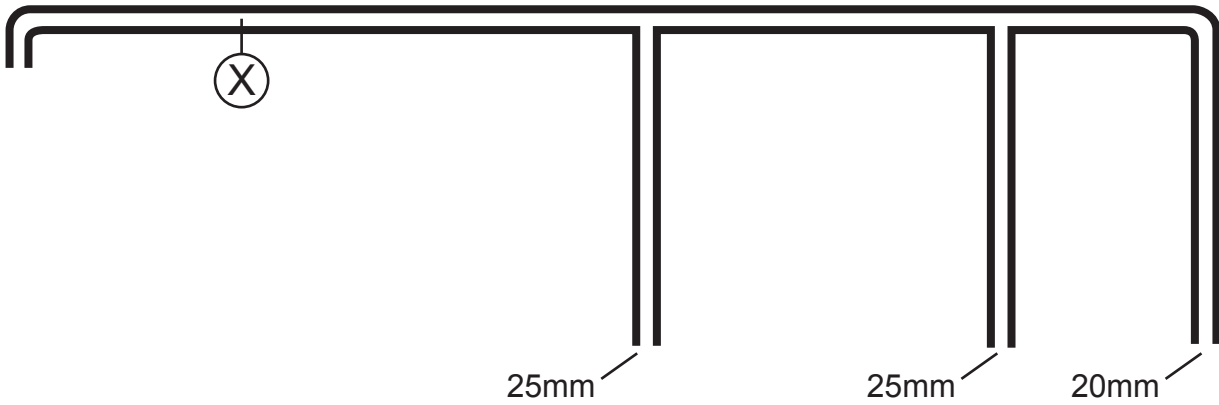




**QUESTION 4**

The diagram below shows a common vent line X that serves an appliance. The appliance has three vents with diameters 25 mm, 25 mm and 20 mm.

Using AS/NZS 5601 Part 1, determine the minimum diameter of the common vent line X.



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**Total 5 marks**

## QUESTION 5

Complete the table below by calculating in m<sup>3</sup> the daily consumption of gas required to supply the energy requirement of each listed appliance.

- Heating value of natural gas = 40 MJ/m<sup>3</sup>.
- Heating value of LPG = 90 MJ/m<sup>3</sup>.

Appliance	Daily operating time	Consumption (m <sup>3</sup> /day)
Natural gas, package burner 95 kW	8 hours	
LPG, cooker 140 MJ/h	3 hours	
Natural gas, furnace 113 750 BTU	5 hours	
Natural gas, space heater 35 MJ/h	4 hours	

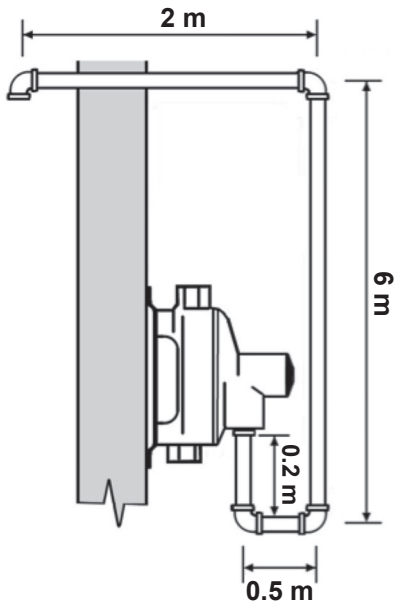
Total 4 marks

**QUESTION 6**

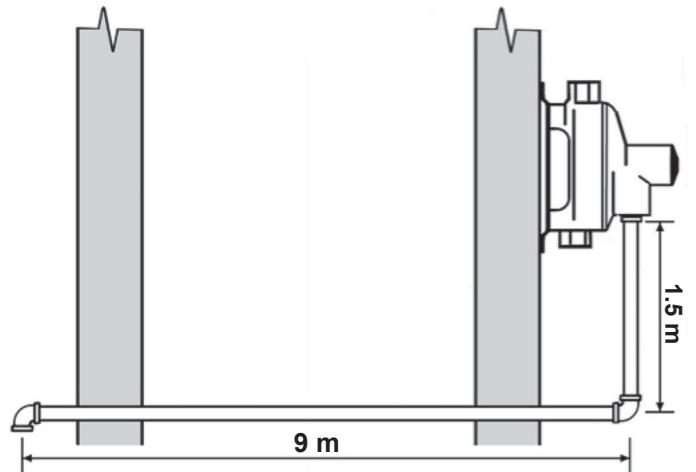
Figure 1 and Figure 2 below show gas pressure regulators with internal relief.

Vent lines for the relief of the gas pressure regulators are to be installed.

State the minimum vent line size requirements that must be met in each case.



**Figure 1**



**Figure 2**

Figure 1

Figure 2

(2 marks)

**QUESTION 6 (cont'd)**

- (b) An existing regulator controlling the gas supply to a burner train is required to supply a greater volume of gas and deliver a higher pressure.

Identify the TWO components of the regulator that may need to be changed and give a reason for each. Assume all other equipment is suitable for the increased throughput.

1 Component to be changed

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Reason

---

2 Component to be changed

---

Reason

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(4 marks)

**Total 6 marks**

**QUESTION 7**

(a) A caravan is designed to house four occupants.

The appliances installed in the caravan are a cooker with a gas consumption of 26 000 BTU, and a heater with a gas consumption of 12 000 BTU.

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

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(4 marks)

(ii) The ventilation opening in (i) is to be 300 mm wide.

Calculate the height of the opening.

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(1 mark)

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

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

1 

---

2 

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(2 marks)

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

---

(1 mark)

**Total 8 marks**

**QUESTION 8**

A gas-fired storage water heater of 180 litres capacity has a gas burner rated at 45 MJ/h.

The thermal efficiency of the appliance is 78%.

Calculate in minutes how long it will take to heat the water from 18°C to 70°C.

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**Total 6 marks**

**QUESTION 9**

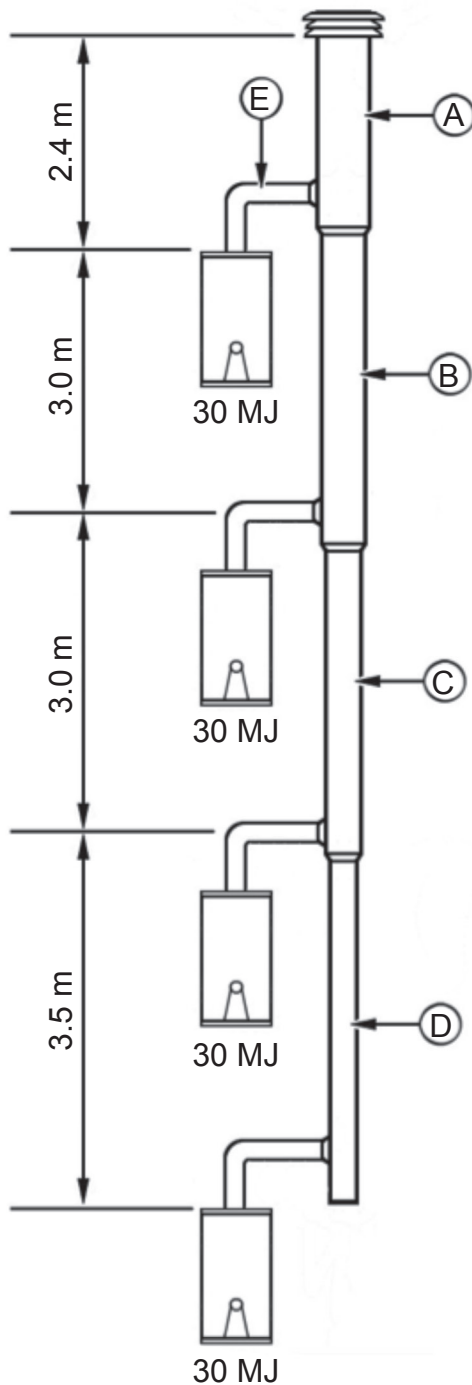
(a) A common flue is to be installed within a four-storey apartment building.

A water heater is to be installed on each floor in the building.

Each flue connector has a rise of 400 mm and a lateral run section of 600 mm.

Each water heater has a 75 mm down draught diverter.

Using the information on the diagram below and AS/NZS 5601 Part 1 Appendix H, complete the table to give the minimum diameter of each flue section.



Flue section	Minimum diameter
A	
B	
C	
D	
E	

(5 marks)

**QUESTION 9 (cont'd)**

(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 7 marks**



## QUESTION 10

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

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3 marks)

- (b) Complete the table below by stating if each situation listed is classified as particularly hazardous or not.

Description of work	Notifiable work Y/N
Working in an area where the temperature exceeds 45°C	
Working in a confined space	
Working on a scaffold which is over 5 metres high	
A trench which is 2 metres deep and 4 metres wide at the top	
Work on the roof of a 2 storey residential building which is 6 metres high.	
Work in which a person wears a face mask with filter canisters	
Using a 3.5 meter high mobile scaffold on a commercial site	
Working on a residential property which is known to contain asbestos containing materials	

(4 marks)

**Total 7 marks**

**QUESTION 11**

(a) List SIX items of information that a gas COC (Certificate of Compliance) must contain.

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

(6 marks)

(b) Other than creating a gas COC, list TWO processes that must be completed after the work has been finished.

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

(2 marks)

**Total 8 marks**

## QUESTION 12

Answer the following in accordance with AS/NZS 5601 Part 1.

- (a) Give TWO situations in which identification markings are required on above-ground copper consumer piping that is installed in a multi-occupancy residential premises.

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

(2 marks)

- (b) State the maximum allowable spacing between the identification markings in a straight section of pipework for a multiple-occupancy residential premises.

\_\_\_\_\_

(1 mark)

- (c) Give the situation in which the operating pressure must be shown on consumer pipework.

\_\_\_\_\_

(1 mark)

- (d) Give THREE requirements that must be met with regard to the isolation of each occupancy where consumer piping is installed in a multi-occupancy residential premises.

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

(3 marks)

**Total 7 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. 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.

2. A consumer piping gas regulator used on a LPG installation will require the outlet pressure setting to be displayed on the regulator where the outlet operating pressure setting exceeds what pressure?

A 3.0 kPa.

B 3.5 kPa.

C 3.75 kPa.

D 7.0 kPa.

E 10.0 kPa.

3. Which of the following specifies the minimum permitted gradient on a lateral run of flue?

A 10 mm per m.

B 15 mm per m.

C 20 mm per m.

D 25 mm per m.

E 30 mm per m.

4. When a gas appliance is to be installed in a garage, what is the minimum height above the ground that the burners and combustion air intake should be situated?
- A 100 mm.
  - B 250 mm.
  - C 300 mm.
  - D 450 mm.
  - E 600 mm.
- 

5. What is the minimum vertical dimension of a free ventilation opening used for air supply to a gas appliance?
- A 4 mm.
  - B 6 mm.
  - C 10 mm.
  - D 15 mm.
  - E 20 mm.
- 

6. What temperature must combustion products from a natural gas appliance that is connected to a common flue not exceed?
- A 260°C.
  - B 380°C.
  - C 440°C.
  - D 510°C.
  - E 650°C.
- 

7. A twin wall flue is to be installed inside a wall of a house.  
What is the maximum input that an appliance connected to the flue can have?
- A 34 MJ/h.
  - B 40 MJ/h.
  - C 45 MJ/h.
  - D 50 MJ/h.
  - E 60 MJ/h.
-

8. 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 volume of air the fan will need to supply at low level?

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

9. What is the maximum number of gas appliance permitted to be connected together to form a combination cooking range?

- A 2
- B 3
- C 4
- D 5
- E 6

10. What is the minimum clearance to a combustible surface from the rear of a gas-fired commercial cooking appliance with a splashback?

- A 20 mm.
- B 50 mm.
- C 75 mm.
- D 100 mm.
- E 125 mm.

**Total 10 marks**

For Examiner's use only

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