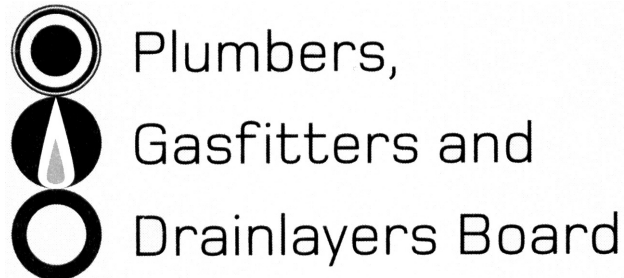


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

.....

No. 9196



REGISTRATION EXAMINATION, NOVEMBER 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

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 (m³/h) = $\frac{\text{volume (m}^3\text{)} \times 3600}{\text{time (seconds)}}$

SECTION A

QUESTION 1

Give the full name of each document relating to gasfitting listed below, and state when each is to be issued.

(a) CoC

Name: _____

When issued: _____

(2 marks)

(b) GSC

Name: _____

When issued: _____

(2 marks)

(c) CoV

Name: _____

When issued: _____

(2 marks)

Total 6 marks

QUESTION 2

(a) A natural gas appliance has an efficiency of 85%.

The test dial on the gas meter connected to this appliance completes 1 revolution in 1 minute 25 seconds.

The test dial on the meter is marked 0.05 m³ per revolution.

The heating value (HV) of natural gas is 42 MJ/m³.

Calculate, in kW, the energy output for the appliance.

Formula:

$$\text{Gas rate in MJ/hr} = \frac{\text{m}^3 \times \text{HV} \times 3600}{\text{time taken in seconds}}$$

(5 marks)

(b) A natural gas appliance has an energy input of 120,000 BTU.

The heating value of natural gas is 42 MJ/m³.

Calculate, in m³/h, the gas rate for the appliance.

(3 marks)

QUESTION 2 (cont'd)

(c) The operating pressure in the installation in (b) is 7 kPa.

Calculate the corrected volume of gas that is flowing through this meter per hour at this pressure.

(3 marks)

Total 11 marks

QUESTION 3

(a) A gas-fired storage water heater is not in operation.

Give THREE indicators that the flue has a blockage.

- 1 _____
- 2 _____
- 3 _____

(3 mark)

(b) Give TWO indications that the flue in (a) is blocked while the appliance is in operation.

- 1 _____
- 2 _____

(2 marks)

(c) 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 7 marks

QUESTION 4

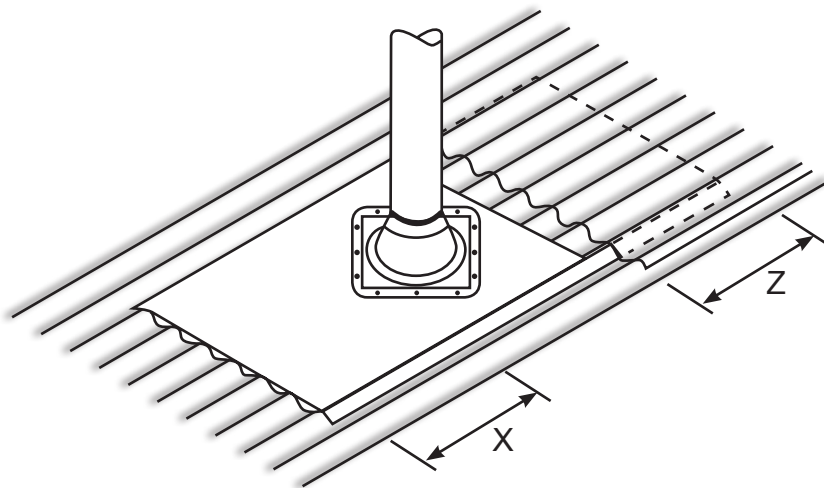
(a) Explain when a soaker flashing is required on a flue penetration of a corrugated iron roof.

(1 mark)

(b) Describe the situation when additional timber support is required under a soaker flashing.

(1 mark)

(c) The diagram below shows a 150 mm flue penetrating a corrugated iron roof having a pitch of 20°.



(i) Give the minimum measurement of X where the maximum wind speed expected for the location is 35 metres per second.

(3 marks)

(ii) Give the minimum allowable measurement of Z where the soaker flashing is to terminate under the cover sheet.

(1 mark)

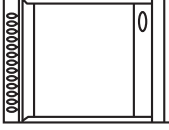
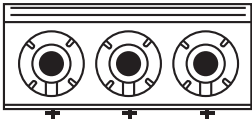
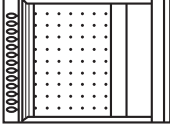
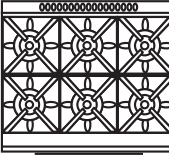
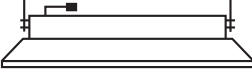
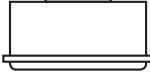
Total 6 marks

QUESTION 5

(a) The diagram on the opposite page shows the pipework and appliances for a gas installation.

Installation details are as follows:

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

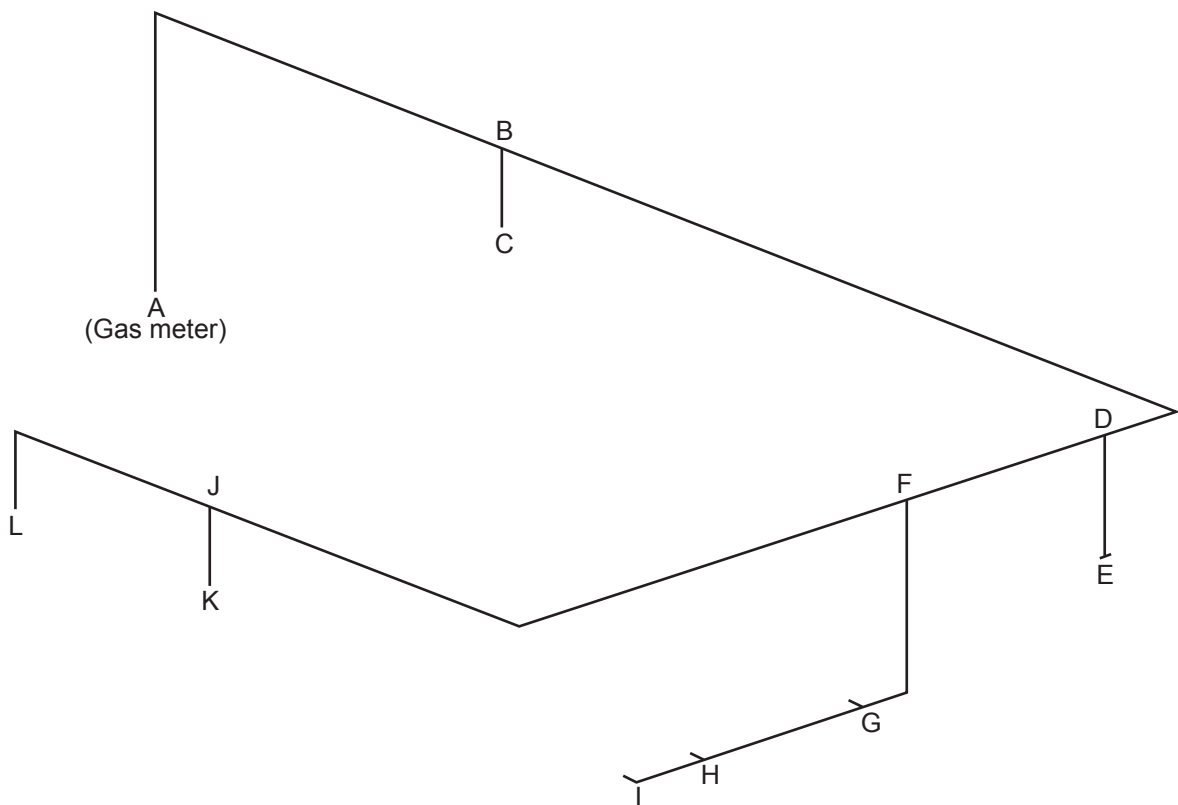
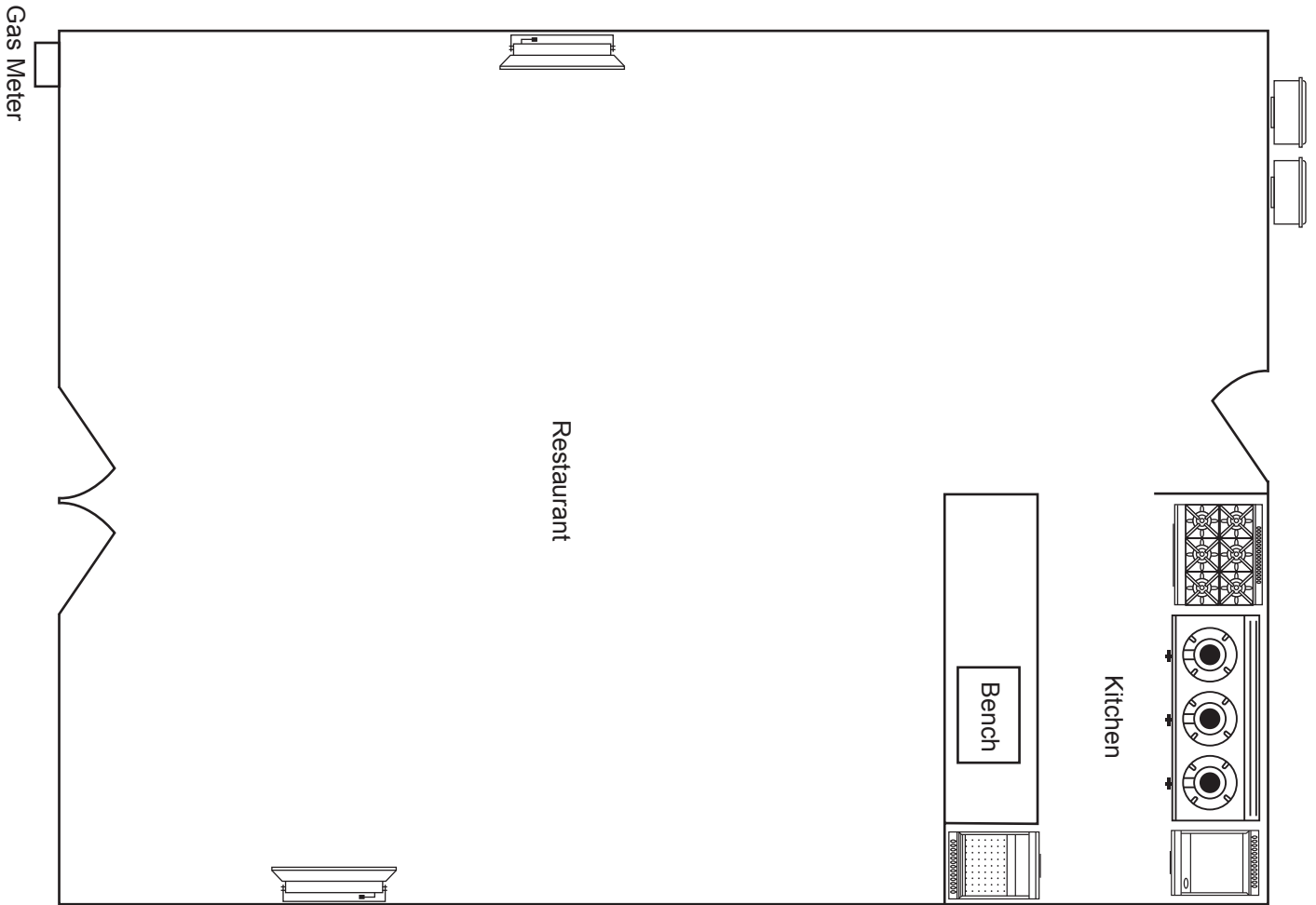
		
Griddle	Wok bench	Deep fryer
62 MJ/h	360 MJ/h	160 MJ/h
		
Oven	Space heater	Water heater
204 MJ/h	24 MJ/h	220 MJ/h

Use the Pipe Sizing Tables from AS/NZS 5601 Part 1 to complete the tables below to pipe size the installation. DO NOT use the sizing graphs to answer this question.

Pipe Section	Length (m)	Main run (m)	Gas flow (MJ/h)	Nominal size (mm)
A - B	8.5			
B - C	1.5			
B - D	9.0			
D - E	1.5			
D - F	3.2			
F - G	3.5			
G - H	1.5			
H - I	0.6			
F - J	7			
J - K	3.2			
J - L	9.2			

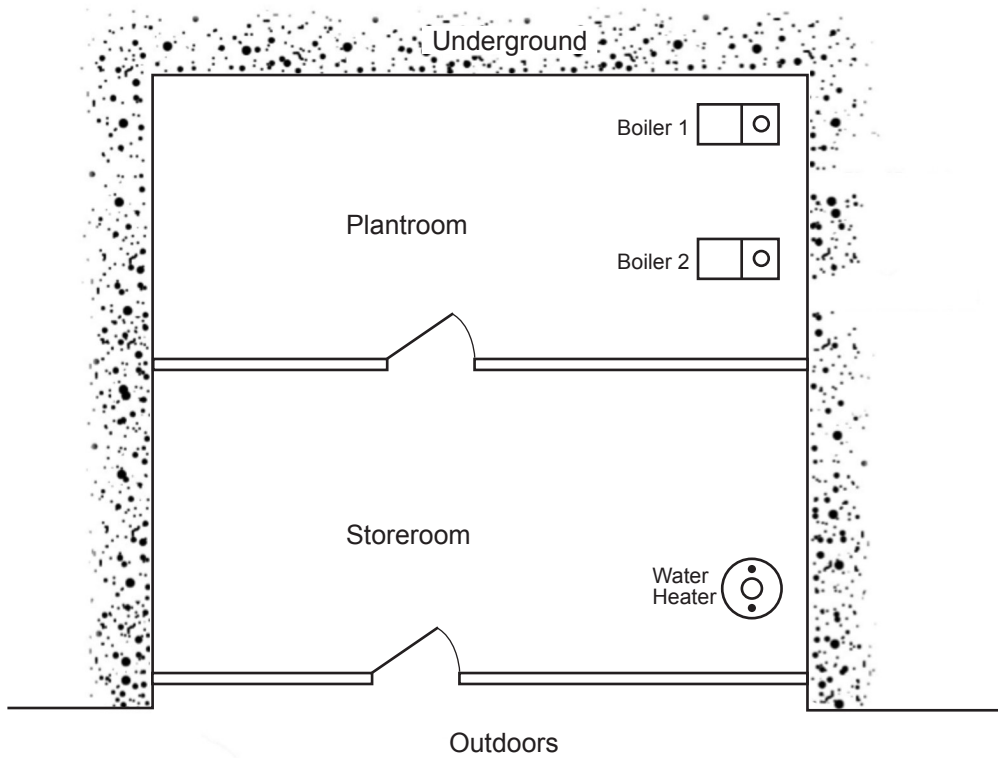
Total 17 marks

QUESTION 5 (cont'd)



QUESTION 6

The diagram below shows two open-flued boilers in a plantroom, and an open-flued water heater in a storeroom.



The following gas appliances are to be installed as shown on the diagram.

- Boiler 1 180 MJ/h
- Boiler 2 180 MJ/h
- Water heater 60 MJ/h

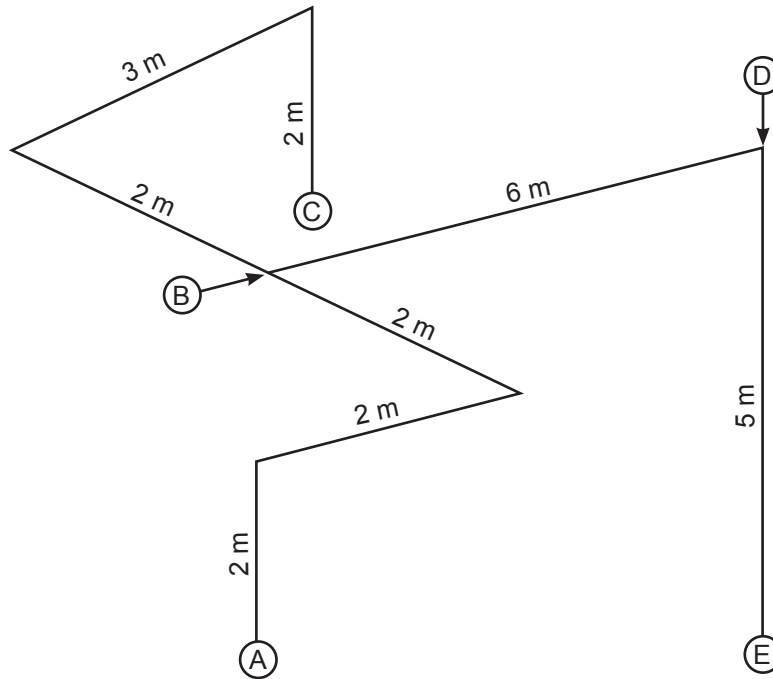
The ventilation is to be natural ventilation in accordance with the minimum requirements of AS/NZS 5601 Part 1.

Specify the number, size (including the units) and location of each vent required.

Total 6 marks

QUESTION 7

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



Complete the following table to find the volume of each given section of pipework.

Section	Diameter (mm)	Volume
A - B	50	
B - C	40	
B - D	32	
D - E	25	

(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.

(1 mark)

Total 5 marks

QUESTION 8

(a) A gas hob is being installed in a new kitchen. The wall behind the hob is timber-framed, and is lined with 10 mm thick plasterboard.

(i) State the minimum allowable distance between the hob and the unprotected plasterboard.

(1 mark)

(ii) Specify where on the gas hob the distance is measured from.

(1 mark)

(b) (i) The clearance in (a) is 100 mm.

Give THREE ways of protecting the wall.

1 _____

2 _____

3 _____

(3 marks)

(ii) State the minimum height the wall protection must have.

(1 mark)

Total 6 marks

QUESTION 9

(a) Give a situation that would make working in a confined space particular hazardous work.

(1 mark)

(b) Give FOUR items, in addition to standard personal protection equipment, that should be supplied to the person monitoring people working within a confined space.

1 _____

2 _____

3 _____

4 _____

(4 marks)

Total 5 marks

QUESTION 10

- (a) Describe what is meant by the term nominated person in relation to supervision of gasfitting work.

(2 marks)

- (b) State the minimum length of time that a trainee gasfitter must work under direct supervision of his or her supervisor.

(1 mark)

- (c) State the minimum length of time that a gasfitter working with an exemption under supervision must work under the direct supervision of his or her supervisor.

(1 mark)

- (d) Name TWO licensing categories, other than trainees and exemption holders, for which workers must be supervised and have their work verified by a certifying gasfitter.

1

2

(2 marks)

Total 6 marks

QUESTION 11

(a) Fall arrest harnesses need to be treated carefully to ensure that they last.

Give FOUR factors that can shorten the life of fall arrest harnesses.

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

(2 marks)

(b) List THREE types of equipment, other than fall arrest harnesses, that are designed to protect people working at heights.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(c) List FIVE types of construction work that are defined as particular hazardous work.

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

(5 marks)

Total 10 marks

QUESTION 12

(a) Two 45 kg LPG cylinders are to be housed in a recessed sheet metal enclosure.

Openings for ventilation are required in the enclosure door, which is 0.90 m wide.

Using AS/NZS 5601 Part 1, calculate in mm the minimum height for the ventilation openings required, and state where they are to be located in the door.

(4 marks)

(b) When a domestic LPG cylinder is filled with liquid LPG, it is permitted to be filled to 85% only.

Give TWO reasons for this.

1 _____

2 _____

(2 marks)

Total 6 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. According to AS/NZS 5601 Part 1, what is the maximum sized hole permitted to be drilled through a 200 mm deep timber joist?

- A. 19 mm.
- B. 25 mm.
- C. 30 mm.
- D. 32 mm.
- E. 40 mm.

2. When taking a flue gas analysis reading from a natural gas burner, what percentage of carbon dioxide is closest to complete combustion?

- A. 8%
- B. 12%
- C. 16%
- D. 20%
- E. 24%

3. 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. Appliances with atmospheric burners joined to the same flue as appliances with forced draught burners.
- B. Appliance that run at different burner operating pressures.
- C. Appliances for use with propane gas.
- D. Appliances with an hourly consumption in excess of 90 MJ.
- E. Appliances for use in school or early childcare facilities.

4. According to AS/NZS 5601 Part 2, what pressure should installation pipework in a caravan be pressurised to when performing a pipework test?
- A. 2.0 kPa.
 - B. 2.75 kPa.
 - C. 5.0 kPa.
 - D. 7.0 kPa.
 - E. 14.0 kPa.

5. 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.

6. According to AS/NZS 5601, when using uPVC for a flue, what is the maximum allowable temperature for the flue gases?
- A. 60°C.
 - B. 65°C.
 - C. 75°C.
 - D. 90°C.
 - E. 100°C.

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

8. What performance standard should be referred to with regard to seismic considerations when gas pipe support systems are being designed?
- A. AS/NZS 1477.
 - B. AS/NZS 3500.
 - C. NZS 3501.
 - D. NZS 4219.
 - E. BS 3799.

9. According to AS/NZS 5601 Part 1, what is the maximum spacing of supporting devices for a 25 mm diameter multi-layer gas pipe that is installed vertically in a building?
- A. 1 m.
 - B. 1.5 m.
 - C. 2 m.
 - D. 2.5 m.
 - E. 3 m.

Total 9 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		