No. 9196

**Plumbers,
Gasfitters and
Drainlayers Board**

REGISTRATION EXAMINATION, NOVEMBER 2022
CERTIFYING GASFITTER

QUESTION AND ANSWER BOOKLET

Time allowed THREE hours

INSTRUCTIONS

Please check that the booking reference number on your booking confirmation slip is the same as the number on the label at the top of this page. **Do Not** remove the exam booking confirmation slip from your exam paper.

Do not start writing until you are told to do so by the Supervisor.

Total marks for this examination: 100.

This exam booklet consists of 2 sections

Section A – Questions 1 to 11

Section B – Questions 1 to 10

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 26-28 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.

Do not use red pen for drawings or writing in your paper.

Check that this booklet has all of 30 pages in the correct order.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

USEFUL FORMULAE

Circumference of circle = 2 × π × R   or   Circumference of circle = π × D

Area of circle = π × R² or Area of circle = 0.7854 × D²

Volume of cylinder = π × R² × H   or   Volume of cylinder = 0.7854 × D² × H

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

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

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

SECTION A

QUESTION 1

(a) A new appliance is to be added to an existing installation in a building.

The installation has an operating pressure of 3.75 kPa.

State the names of the pressure tests to be performed and the testing pressures required throughout the course of the installation.
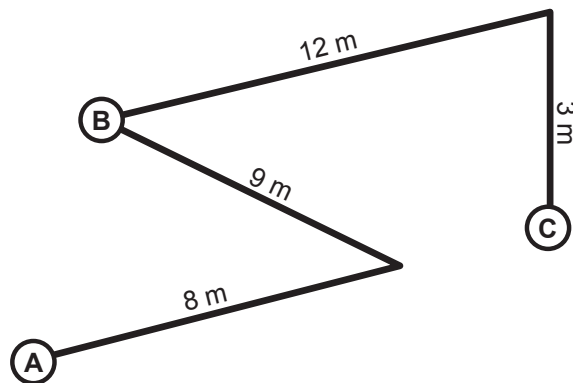
_____

_____

_____

_____

(8 marks)

(b) The diagram below shows the pipework from an existing installation in a buiding. The installation is to be pressure tested before work begins.

Section A – B is 32 mm copper NZS 3501
Section B – C is 20 mm copper NZS 3501

Calculate the maximum pressure drop permitted during the pressure test.

_____

_____

_____

_____

(4 marks)

Total 12 marks

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QUESTION 2

(a)   Give THREE reasons why an installation would be deemed to be unsafe according to the Gas (Safety and Measurement) Regulations 2010.

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   _____

(1 mark)

(c)   State what information must be given to both of the parties in (a).

_____

_____

_____

_____

(2 marks)

Total 6 marks

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QUESTION 3

A gas burner has been operated on full and measured 12.25 m³/h of natural gas being consumed. The installation operating pressure is 10 kPa.

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

_____

_____

_____

_____

(4 marks) ☐

(b)   The burner is 82% efficient. Give the output of the burner in MJ/h.

_____

(1 mark) ☐

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

_____

_____

(2 marks) ☐

(d)   An LPG appliance has an efficiency of 90%.

The test dial on the gas meter connected to this appliance completes 1 revolution in 1 minute 15 seconds.

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

The heating value (HV) of LPG is 95 MJ/m³.

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

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

_____

_____

_____

_____

(4 marks) ☐

Total 11 marks ☐

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QUESTION 4

(a) Give the TWO purposes 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 ☐

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QUESTION 5

(a)   The ventilation for a plant room containing gas appliances is being designed.

State THREE factors that must be considered in determining the location of the ventilation grilles.

1   _____

2   _____

3   _____

(3 marks) [   ]

(b)   A gas boiler has been installed in a plant room. The gas boiler has an energy input of 650 kW.

Calculate the natural free ventilation area required if the ventilation air must pass through an adjacent storeroom before ventilating to outside.
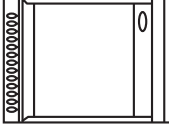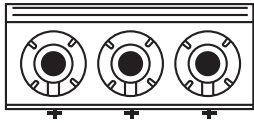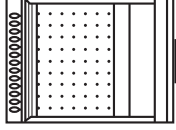
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(3 marks) [   ]
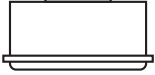
Total 6 marks [   ]

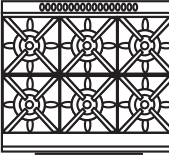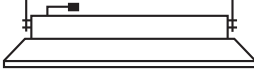## QUESTION 6

(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 and not the sizing graphs from AS/NZS 5601 to complete the tables below to pipe size the installation.

Pipe Section	Length (m)	Main run (m)	Gas flow (MJ/h)	Nominal size (mm)
A - B	10			
B - C	1.5			
B - D	3.2			
D - E	3.5			
E - F	1.5			
F - G	0.6			
D - H	7.0			
H - I	3.2			
H - J	9.2			

Total 14 marks

Gas
Meter

Restaurant

Bench

Kitchen

A
(Gas meter)

B

C

D

E

F

G

H

I

J
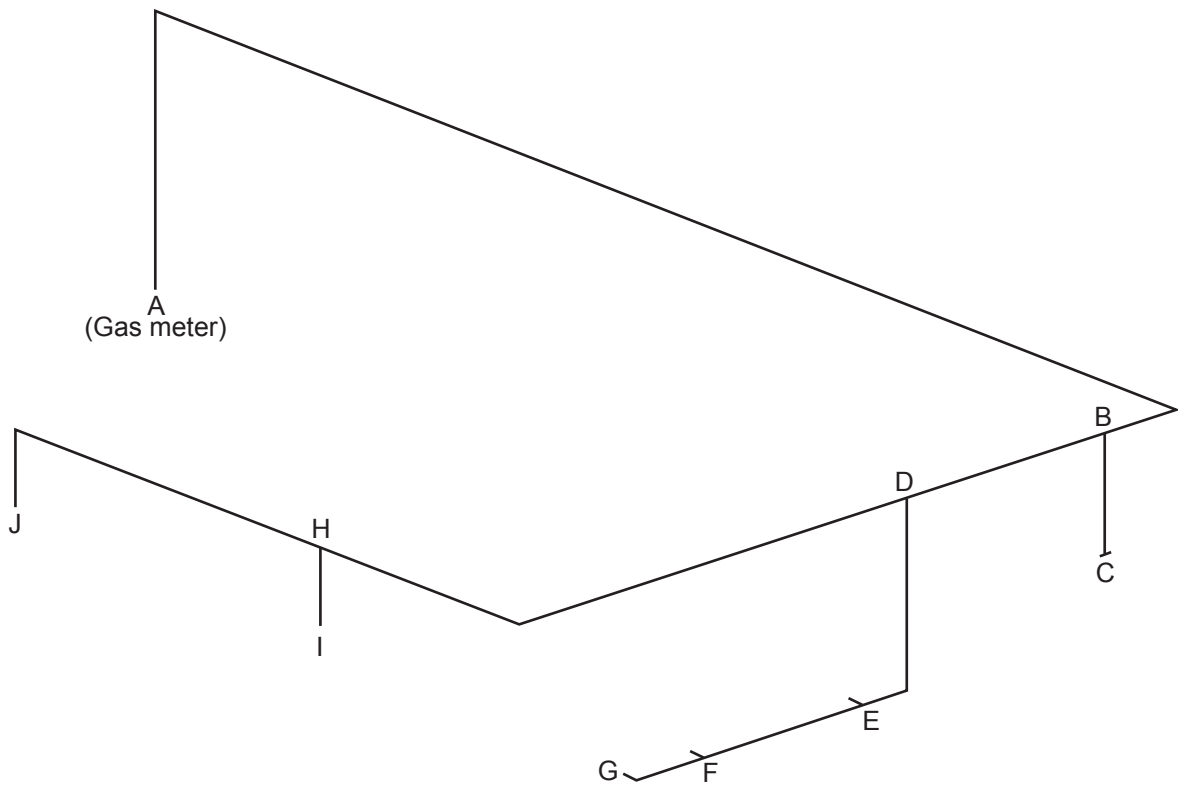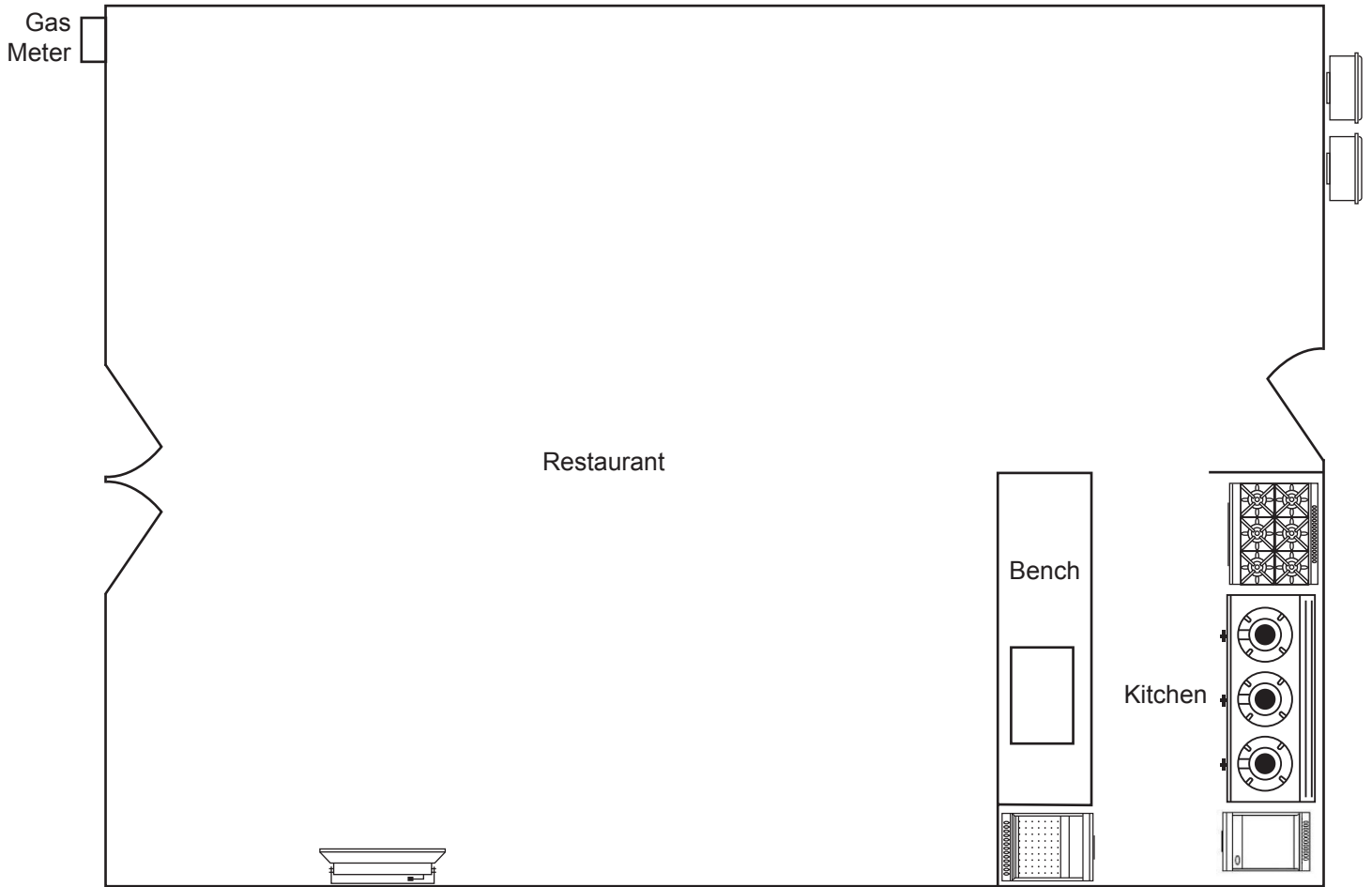
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QUESTION 7

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 ☐

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QUESTION 8

(a) A gas hob is being installed into 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) Give THREE methods of protecting the wall if the clearance is 100 mm.

   1 _____

   2 _____

   3 _____

   (3 marks) ☐

(c) State the minimum height the wall protection must have if the clearance is 100 mm.

   _____

   (1 mark) ☐

   Total 6 marks ☐

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QUESTION 9

(a) A 12 MJ flueless space heater is to be installed in a hallway having a ceiling height of 3.1 m.

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

_____

_____

(3 marks)

(b) A room measures 7.5 m × 3.6 m, and has a ceiling height of 2.4 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.

_____

_____

_____

(3 marks)

(c) An open flued space heater is to be installed in a living area.

The living area has a volume of 10 m^3.

Give the maximum gas consumption of the space heater where only adventitious ventilation is to be used.

_____

_____

(1 mark)

Total 7 marks

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QUESTION 10

The table below lists some gas appliances with the energy consumption requirement of each.

- Heating value of natural gas = 40 MJ/m^3
- Heating value of LPG = 90 MJ/m^3

Appliance	Daily Operating Time	m^3 per week consumption
Natural gas, package burner 80 kW	10 hours	
Natural gas, furnace 220,500 BTU	6 hours	
LPG, cooker 50 MJ/h	6 hours	
Natural gas, space heater 62 MJ/h	3 hours	

Calculate the weekly m^3 per week consumption energy requirement for each appliance, assuming all appliances are operated every day of the week.

Total 8 marks

QUESTION 11

(a) Who is permitted to supply an endorsement for an imported gas appliance?

(1 mark)

(b) Describe where the main run of the gas pipework should be located on a caravan.

(2 marks)

(c) Give TWO important design requirements regarding pipe joints other than jointing method and pipe material, to consider when installing gas pipework in a boat.

1

2

(2 marks)

(d) Give TWO situations where commissioning a gas installation is required to be carried out.

1

2

(2 marks)

QUESTION 11 (cont'd)

(e)   Give an example where gasfitting work in a caravan would not be classed as high risk.

_____

(1 mark) ☐

(f)   State what is required where pipework passes through a void that is adjacent to the living space of a motor home, according to AS/NZS 5601 Part 2.

_____

_____

(2 marks) ☐

Total 10 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 2, what is the minimum possible permitted free area of the total permanent ventilation for any space in a caravan that contains a gas appliance?

    A   1000 mm^2.

    B   2000 mm^2.

    C   3000 mm^2.

    D   4000 mm^2.

    E   5000 mm^2.

2. The alarm and solenoid used on a gas detection system installed in a boat must activate when the concentration of LPG in air exceeds what percentage of the lower explosive limit?

    A   2%.

    B   5%.

    C   11%.

    D   15%.

    E   25%.

3. According to AS/NZS 5601 Part 2, what is the maximum capacity of gas an LPG locker with internal access on a boat is permitted to contain?

    A   One 9 kg cylinder.

    B   Two 9 kg cylinders.

    C   One 15 kg cylinder.

    D   Two 15 kg cylinders.

    E   One 18 kg cylinder.

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. An appliance with a fan-assisted flue that is designed for outdoor installation is to be installed in a covered area with only one side open.

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.

6. AS/NZS 5601 Part 1 specifies the total input rating that must not be exceeded when a flueless space heater is to be installed in a habitable space.

Which of the following is the maximum total input for a flueless space heater that is installed in a dining room and not thermostatically controlled?

A   0.02 MJ/h/m^3.

B   0.2 MJ/h/m^3.

C   0.4 MJ/h/m^3.

D   2.0 MJ/h/m^3.

E   4.0 MJ/h/m^3.

7. According to AS/NZS 5601 Part 2, what is the minimum spacing of supporting devices for a horizontal section of rigid gas pipe which is installed in a motorhome?

A   300 mm.

B   600 mm.

C   750 mm.

D   1000 mm.

E   1250 mm.

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. 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.

10. 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   NZS 4219.

C   AS/NZS 3500.

D   NZS 3501.

E   BS 3799.

Total 10 marks

This page is available for additional working or answers

Question number _____

This page is available for additional working or answers

Question number _____

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Question number _____

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Question number	Marks	Marks
1		
2		
3		
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11		
Section B		
Total		