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

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No. 9196

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2021

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.

This exam booklet consists of 2 sections

Section A – Questions 1 to 12

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 28-31 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 32 pages in the correct order.

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

USEFUL FORMULAE

Circumference of circle = $2 \times \pi \times R$ 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 = $0.7854 \times D^2 \times H$

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

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

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

SECTION A

QUESTION 1

(a) Define the term direct presence supervision as it relates to supervision of a gasfitter under the Plumbers, Gasfitters and Drainlayers Board supervision policy.

_____

(2 marks)

(b) Complete the following table by naming two authorisation types that have a mandatory direct presence period, and give the minimum length of time after obtaining the authorisation that each supervisee must be directly supervised.

Authorisation type	Minimum length of time of direct supervision

(4 marks)

(c) Name the TWO categories of license holders who are permitted to carry out direct presence of the supervisees with the authorisation types in (b).

1 _____

2 _____

(2 marks)

Total 8 marks

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QUESTION 2

(a) Two 6 kW gas cookers are to be installed in a boat which is designed for the occupancy of eight people.

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

(4 marks)

(b) Give FOUR requirements according to AS/NZS 5601 Part 2 that must be met where LPG cylinders are located within an external combined storage compartment/locker.

1

2

3

4

(4 marks)

Total 8 marks

QUESTION 3

(a) List SIX items of information that a GSC (Gas Safety Certificate) must contain.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(6 marks)

(b) A gas space heater has been permanently removed from a house, and the gasfitting work has been completed.

Other than completing a GSC, list TWO actions that must be completed after the work has been finished.

1 _____

2 _____

(2 marks)

(c) Give the full name of a CoV relating to gasfitting, and state when it is to be issued.

Name:

_____

When issued:

_____

(2 marks)

QUESTION 3 (cont'd)

(d) The following situations relate to installations supplied by single 9 kg LPG cylinders. Give the risk category for each situation.

Situation	Risk category
Servicing a gas fridge in a motorhome	
Relocating the ventilation openings in a caravan	
Replacing a gas hob with another one of the same model in a caravan	
Adding a gas hob to an existing installation in a house	
Replacing a gas valve on a gas hob in a house	
Installing a gas hob in a new motorhome	

(3 marks)

Total 13 marks

QUESTION 4

(a) Give the meaning of the following in relation to the New Zealand Building Code, and give an example of each.

(i) Acceptable solution

Meaning: _____

_____

Example: _____

(2 marks)

(ii) Alternative solution

Meaning: _____

_____

Example: _____

(2 marks)

(iii) Verification method

Meaning: _____

_____

Example: _____

(2 marks)

QUESTION 4 (cont'd)

(b) (i) Give the meaning of the term Codes of Practice.

_____

_____

(1 mark)

(ii) List TWO gasfitting related Codes of Practice.

_____

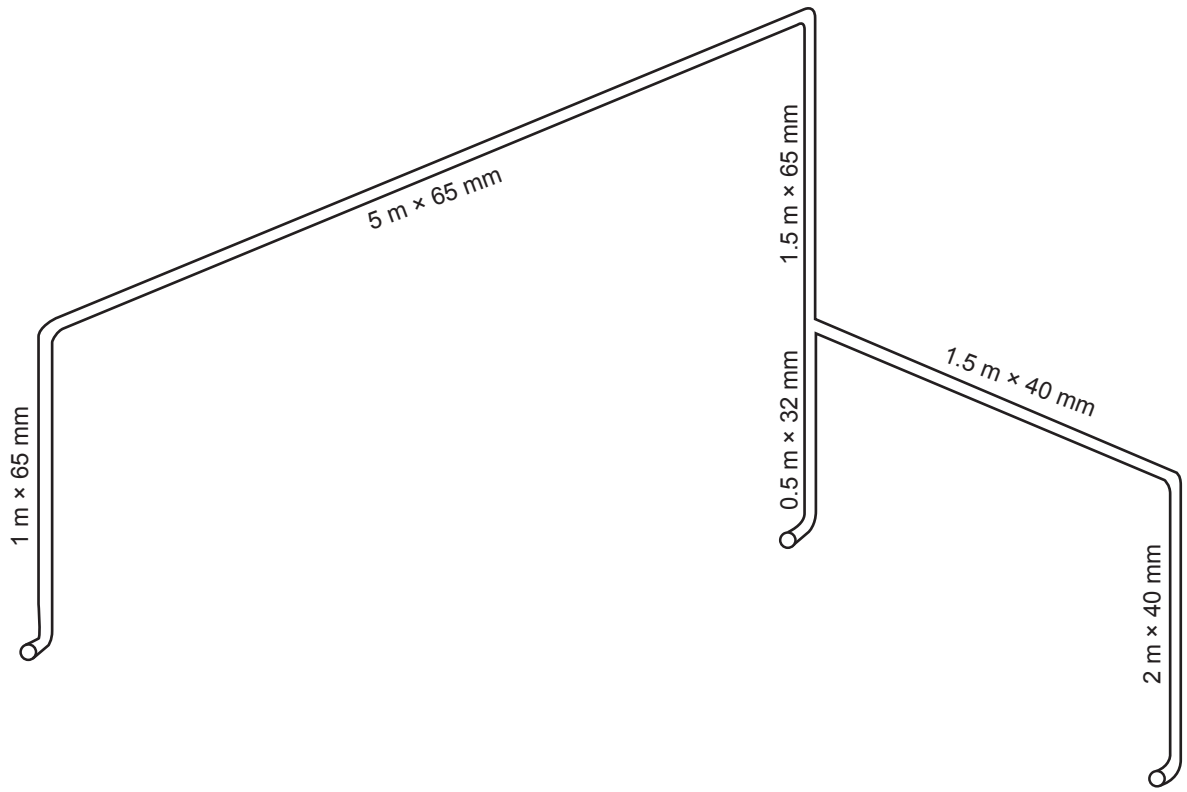
_____

(2 marks)

Total 9 marks

QUESTION 5

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



(i) Find, in litres, the total volume of the pipework.

(4 marks)

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

(1 mark)

QUESTION 5 (cont'd)

(b) A gas installation has a pipework volume of 90 litres.

State the minimum test time required for a leakage test using a digital manometer for this installation in accordance with AS/NZS 5601 Part 1.

(2 marks)

(c) Additional measures are required when purging a large volume installation.

Describe these measures, and state why they are required.

(3 marks)

Total 10 marks

QUESTION 6

The diagram on the page opposite shows the pipework and appliances for a gas installation in a dwelling.

Installation details are as follows:

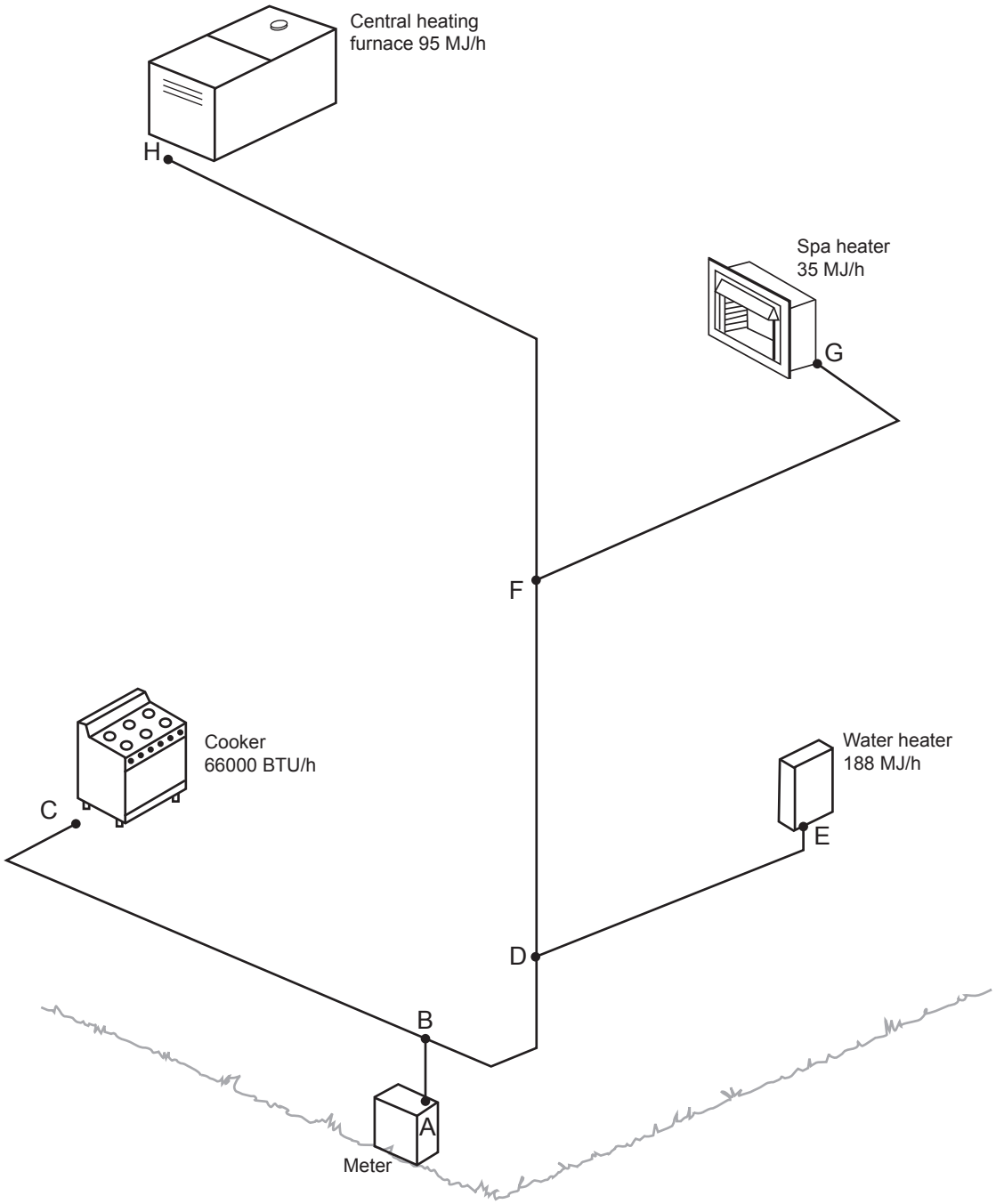
- Natural gas
- Copper pipe (NZS 3501)
- The installation supply pressure is 3 kPa.

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

Pipe Section	Length (m)	Main run (m)	Gas flow (MJ/h)	Nominal size (mm)
A - B	1.5			
B – C	6			
B – D	2.5			
D – E	3			
D – F	2.4			
F – G	3.5			
F – H	3.2			

Total 11 marks

QUESTION 6 (cont'd)



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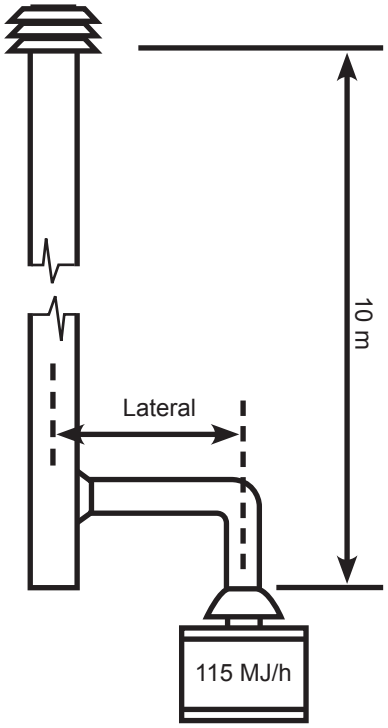
QUESTION 7

A flue for a gas fired space heater with a 100 mm draught diverter is to be installed as shown in the following diagram.



Using the information from the diagram, complete the following tables by giving the minimum size of the flue for each lateral length according to AS/NZS 5601 Part 1.

(a) Flue located in a high heat loss environment.

	Lateral length 0.6 m	Lateral length 1.5 m
Minimum flue diameter		

(b) Flue located in a low heat loss environment.

	Lateral length 1.5 m	Lateral length 0.6 m
Minimum flue diameter		

Total 4 marks

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QUESTION 8

A gas burner consumes 17.25 m^3/h of natural gas.

The installation operating pressure is 15 kPa.

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

(4 marks)

(b) The burner is 85% 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)

Total 7 marks

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QUESTION 9

(a) Give TWO permitted options for substituting components on a proprietary gas pipework system.

1 _____

2 _____

(2 marks)

(b) When a proprietary gas pipework system is being installed, state how the product used is to be made identifiable for future alterations/additions.

_____

(2 marks)

Total 4 marks

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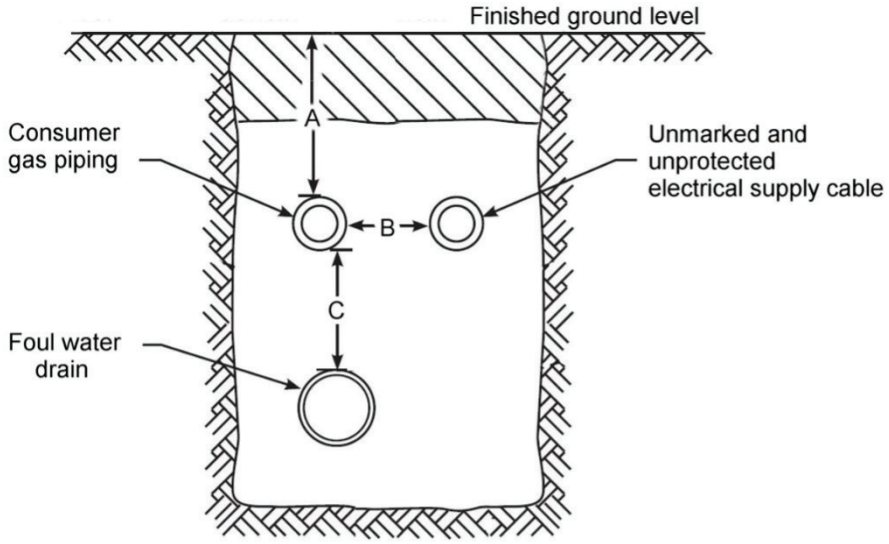
QUESTION 10

The diagram below shows a 25 mm diameter consumer gas pipe laid in a trench under a driveway on private property. The trench also contains an unmarked and unprotected electrical supply cable and a foul water drain.

(a) Give the minimum measurement required for each of the distances marked A, B, and C.



A _____

B _____

C _____

(3 marks) ☐

(b) (i) Before entering a building, the gas pipe crosses over a telecommunications cable.

Give TWO requirements in addition to the minimum allowable separation distance that must be met in relation to the crossover.

1 _____

2 _____

(2 marks) ☐

(ii) The gas pipe will exit the ground near the electrical earthing electrode for the building. The electricity supply is less than 1000 V.

State the minimum allowable distance between the pipe and the electrode.

_____

(1 marks) ☐

Total 6 marks ☐

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QUESTION 11

(a) Give SIX construction related products that could contain asbestos.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(3 marks)

(b) Excluding asbestos, name TWO other work-related hazards common to gasfitting that can slowly damage a gasfitters health.

1 _____

2 _____

(2 marks)

Total 5 marks

INTENTIONALLY BLANK

QUESTION 12

The operation of a range-hood is causing products of combustion to spill from an open-flued gas appliance.

Describe how a spillage test should be conducted and how the size of the required ventilation would be determined.

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. According to AS/NZS 5601 Part 1, what is the minimum spacing of supporting devices for a 25 mm diameter copper gas pipe which is installed vertically in a building?

   A 1 m.

   B 1.5 m.

   C 2 m.

   D 2.5 m.

   E 3 m.

   ☐

2. What is the maximum amount of non-friable asbestos permitted to be removed before a licence is required?

   A 1 m^2.

   B 5 m^2.

   C 10 m^2.

   D 15 m^2.

   E 20 m^2.

   ☐

3. A 30 MJ storage water heater with a natural draught flue is to be installed in a cupboard.

   The cupboard will be mechanically ventilated using.

   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 5 litres/second.

   B 15 litres/second.

   C 30 litres/second.

   D 60 litres/second.

   E 100 litres/second.

   ☐

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

   A 3 kPa.

   B 7 kPa.

   C 10 kPa.

   D 14 kPa.

   E 30 kPa.

   ☐

5. According to AS/NZS 5601 Part 1, what is the largest volume of gas pipework a manometer (water gauge) can be used to test?

   A 0.3 m^3.

   B 0.6 m^3.

   C 3.0 m^3.

   D 10 m^3.

   E 30 m^3.

   ☐

6. 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.

   ☐

7. According to New Zealand Building Code acceptable solution E2/AS1 External Moisture, when must a soaker flashing be installed?

   A When the rainwater is going to be used as a potable water supply.

   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 the size of a profiled metal roof penetration is greater than 85 mm diameter.

   ☐

8. Which of the following is the maximum total input for a flueless space heater installed in a lobby but which is 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.

☐

9. 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^3.

B 12 m^3.

C 18 m^3.

D 24 m^3.

E 30 m^3.

☐

10. Which of the following pressures is equivalent to six inches water gauge?

A 0.6 kPa.

B 1.0 kPa.

C 1.5 kPa.

D 2.0 kPa.

E 2.4 kPa.

☐

Total 10 marks ☐

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Question number _____

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Question number	Marks	Marks
1		
2		
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12		
Section B		
Total		