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, JUNE 2016

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 2016 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 = $0.7854 \times D^2 \times H$

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

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

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

SECTION A

QUESTION 1

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

1 _____

2 _____

3 _____

4 _____

(4 marks)

(b) A fault has developed on a gas-fired, electronic continuous-flow water heater. When the water tap is turned on, the appliance starts and the gas ignites, but the appliance shuts down after a few seconds. An error code is displayed which indicates failed ignition.

Give FOUR reasons for this fault to occur.

1 _____

2 _____

3 _____

4 _____

(4 marks)

(c) 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)

Total 12 marks

QUESTION 2

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

Installation Details are as follows:

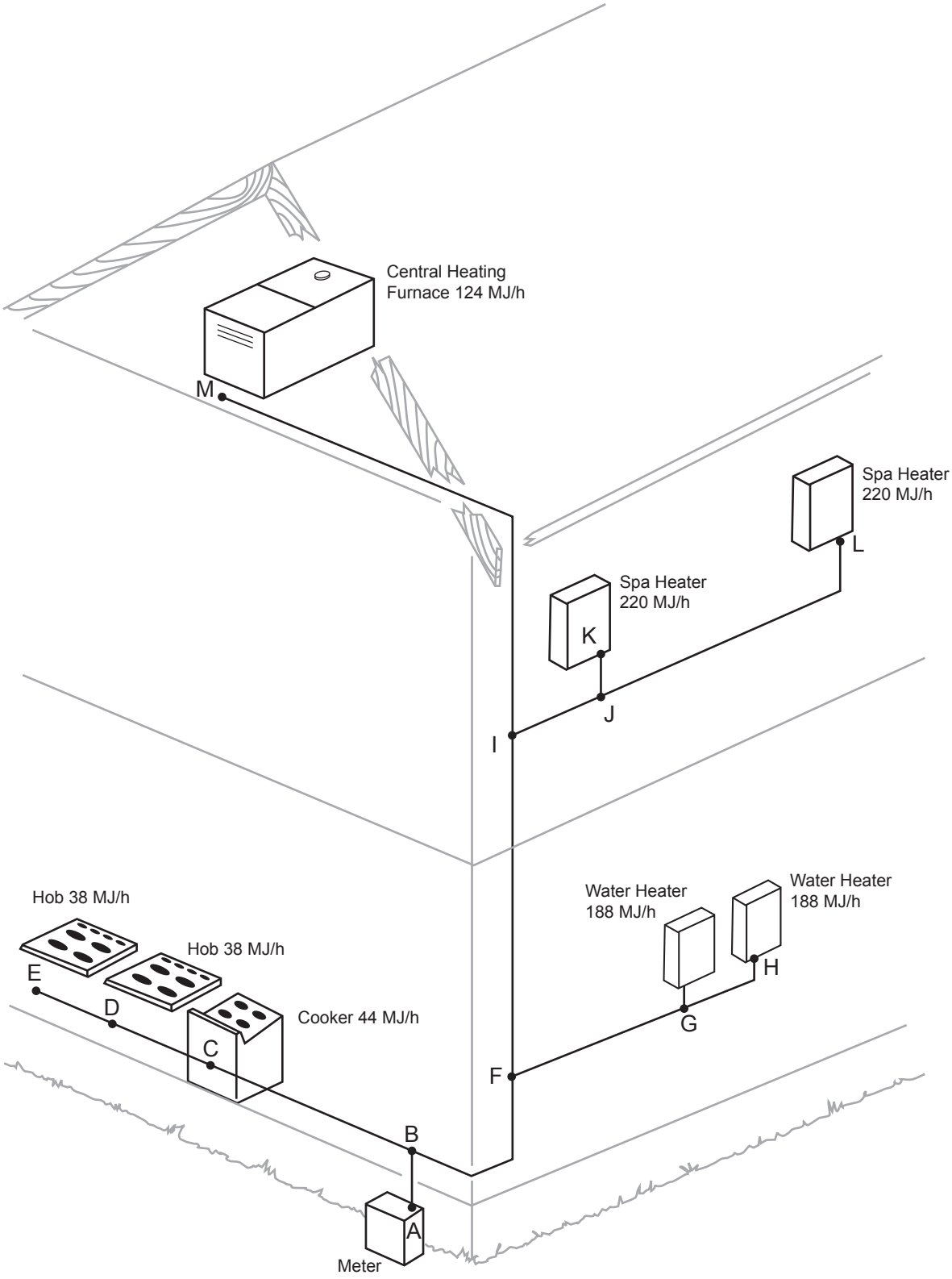
- Natural gas
- Copper pipe (NZS 3501)
- The installation supply pressure is 2.75 kPa.

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

Pipe Section	Length (m)	Main Run (m)	Gas Flow (MJ/h)	Nominal Size
A – B	1.5			
B – C	5			
C – D	1.5			
D – E	1			
B – F	4.2			
F – G	4.5			
G – H	0.5			
F – I	4.4			
I – J	2.6			
J – K	1.2			
J – L	5.3			
I – M	8.7			

Total 19 marks

QUESTION 2 (cont'd)



QUESTION 3

(a) Two 45 kg exchange cylinders are to be installed on the outside wall of a house. The customer has requested the cylinders be located below an openable window.

Referring to AS/NZS 5601 Part 1, state the minimum clearance below the window required for the cylinder valves.

_____

(1 mark)

(b) AS/NZS 5601 Part 1, lists clearances required from LPG cylinders to openings, drains and doorways.

Name another hazard that LPG cylinders must have clearances from.

_____

(1 mark)

(c) A changeover regulator which has a 20 mm vent terminal is to be installed on the wall between the two cylinders.

(i) Referring to AS/NZS 5601 Part 1, state the minimum clearance below the window required for the vent terminal.

_____

(1 mark)

(ii) If the clearance in (c) (i) cannot be achieved, give a solution that does not include changing the regulator or altering the window.

_____

(1 mark)

QUESTION 3 (cont'd)

(d) (i) Explain why an auto-changeover regulator may switch to the reserve cylinder, while the primary cylinder is still half full.

_____

(ii) Give TWO options that can reduce the chance of the situation in (d)(i) happening.

1 _____

2 _____

(3 marks)

(e) State the conditions under which a site Location Certificate is required for LPG.

_____

(2 marks)

Total 9 marks

QUESTION 4

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

1 _____

2 _____

3 _____

(3 marks)

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

_____

(1 mark)

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

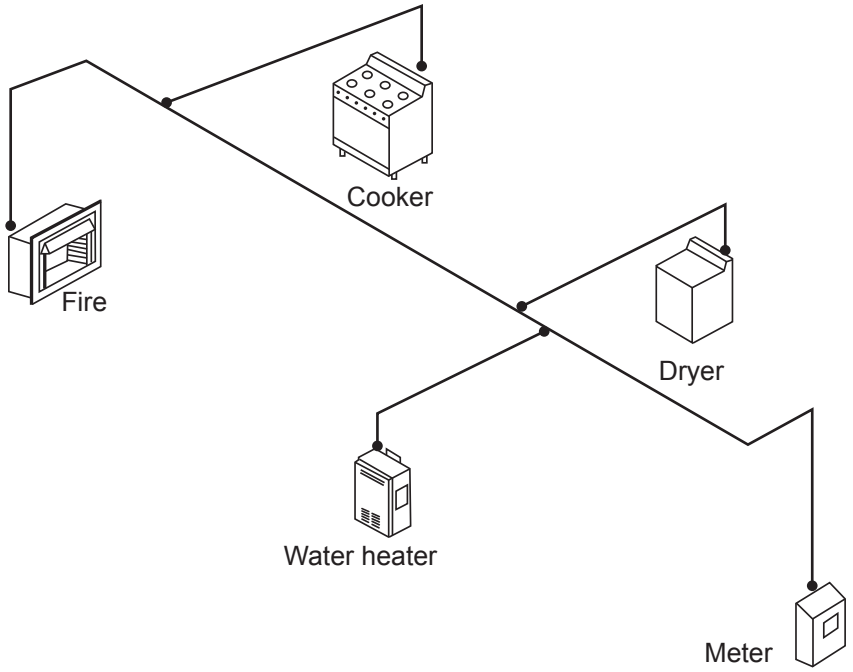
_____

(1 mark)

Total 5 marks

QUESTION 5

The diagram below shows the layout of the gas installation in a multi-unit dwelling. The pipe material is cross-linked polyethylene. The distance between the meter and the fire is 12.3 m.



(a) On the diagram, show the locations where reversion fittings are required. (2 marks)

(b) State the purpose of the reversion fittings.

_____

(1 mark)

(c) Describe TWO acceptable reversion fittings suitable for the installation in (a).

1 _____

2 _____

(2 marks)

(d) State the special requirement that must be met with regard to identification of the pipe in the installation.

_____

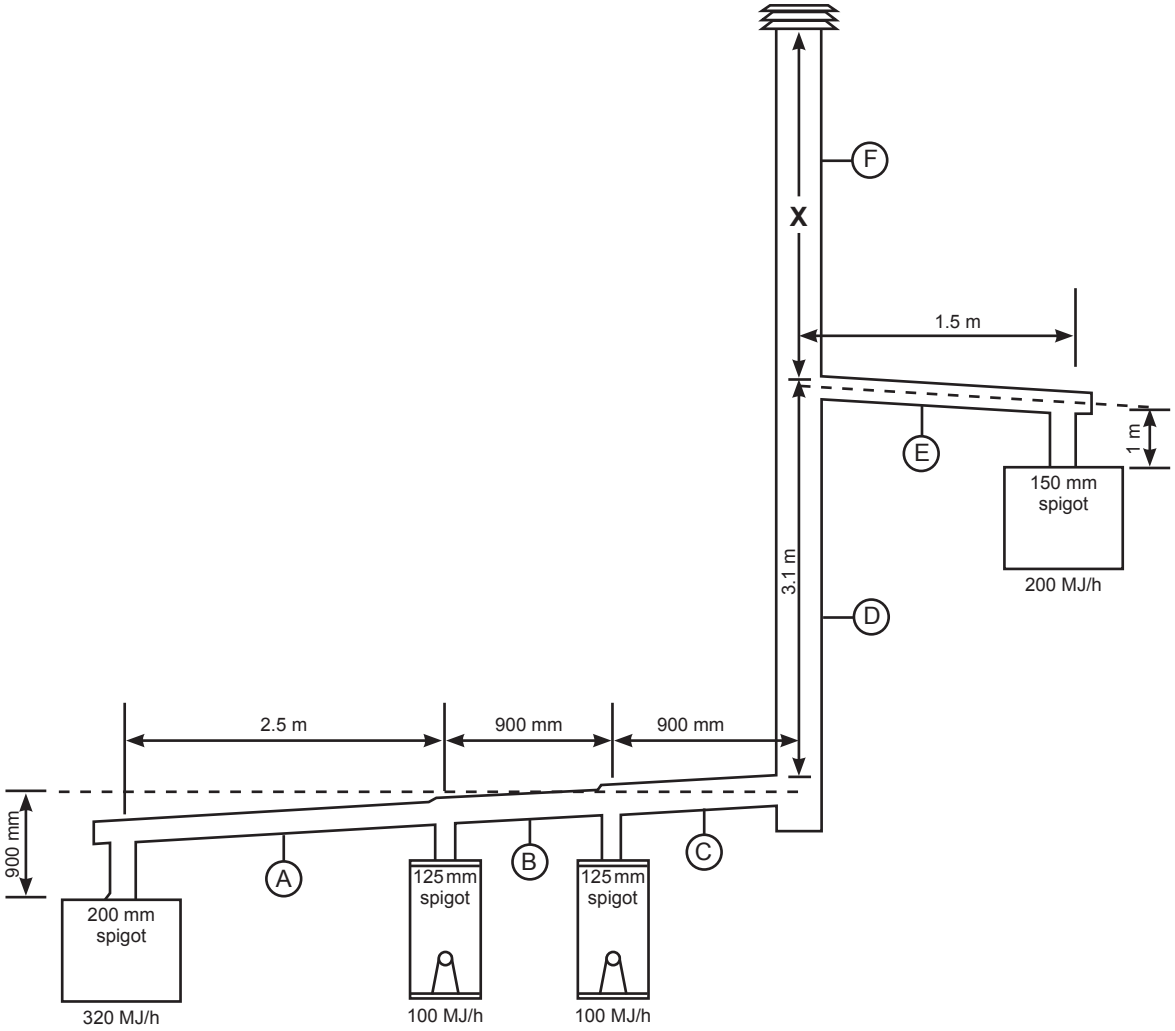
_____

(2 marks)

Total 7 marks

QUESTION 6

The diagram below shows a combined natural draught flue in a low heat loss situation in a two storied building.



Complete the table below according to AS/NZS 5601 Part 1.

Minimum length X			
Minimum Diameter of A		Minimum Diameter of D	
Minimum Diameter of B		Minimum Diameter of E	
Minimum Diameter of C		Minimum Diameter of F	

Total 9 marks

QUESTION 7

(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)

Total 5 marks

QUESTION 8

Notifiable work is to be carried out.

(a) Name the organisation that must be notified of this.

_____

(1 mark)

(b) State how long before work commences a notification form must be received by the organisation in (a).

_____

(1 mark)

(c) Give a situation where notifiable work may be performed prior to sending the notification form.

_____

(1 mark)

(d) List FIVE types of construction work that are defined as notifiable work.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks)

Total 8 marks

QUESTION 9

(a) A natural gas appliance has an energy input of 78,000 BTU.

Calculate the gas rate in m^3/h for the appliance.

The heating value of natural gas is 42 MJ/m^3.

(3 marks)

(b) The operating pressure in the installation in (a) is 10 kPa.

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

(3 marks)

Total 6 marks

QUESTION 10

5 m of 150 mm ID consumer gas piping is to be isolated for hot work to be carried out.

State what is recommended good practice for completing the hot work once the section has been fully isolated from the existing gas supply.

Total 2 marks

QUESTION 11

The Gas (Safety and Measurement) Regulations define three categories of gasfitting work.

(a) Name the THREE categories.

1 _____

2 _____

3 _____

(3 marks)

(b) Name the category of gasfitting work that requires details of the installation to be entered into an on-line data base.

_____

(1 mark)

(c) Name the government agency that manages the on-line data base in (b).

_____

(1 mark)

Total 5 marks

QUESTION 12

A 100 mm galvanised gas dryer vent is being installed, and is to penetrate the external wall of a wooden framed house with brick cladding.

List the steps required to ensure that the penetration is weather tight.

Total 3 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. 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%

   ☐

2. AS/NZS 5601 Part 2 is used to determine the sizing of gas pipe to be used in a boat.

   What fitting allowance has been included in the design of the graphs and tables to allow for diameter, pressure drop and roughness of the pipe and fittings?

   A 10%

   B 20%

   C 25%

   D 50%

   E 60%

   ☐

3. According to AS/NZS 5601 Part 2, a flue constructed of stainless steel 300 and 430 Series Grade can convey combustion products up to what maximum temperature?

   A 200°C.

   B 300°C.

   C 430°C.

   D 450°C.

   E 500°C.

   ☐

4. 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.

☐

5. 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.

☐

6. According to AS/NZS 5601 Part 1, if 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, 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, 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.

☐

8. A gas appliance is installed under a floor and is located over 2 m from the access opening.

What is the minimum allowable clearance between the lowest part of the floor structure and the ground from the access opening to the appliance?

A 600 mm.

B 800 mm.

C 1000 mm.

D 1200 mm.

E 1500 mm.

☐

9. 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.

☐

10. 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.

☐

Total 10 marks ☐

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Question number _____

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Question number	Marks	Marks
1		
2		
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Section B		
Total		