No. 9193

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2017
TRADESMAN 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 November 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 (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 = $\dfrac{\text{atmospheric pressure} + \text{supply pressure}}{\text{atmospheric pressure}}$

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

SECTION A

QUESTION 1

(a) A customer is complaining about the flames on a gas cooker being too small.

The gas is supplied via two 45 kg LPG cylinders on an auto change over system.

List SIX likely faults that should be checked for.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(6 marks)

(b) A continuous flow gas fired water heater stops supplying hot water every time any cold water tap in the home is turned on.

Describe the fault most likely causing this to occur.

_____

(1 marks)

(c) A customer is complaining that a gas heater is no longer blowing as much warm air around the room as it used to.

Describe why this is likely to be occurring.

_____

(1 marks)

Total 8 marks

QUESTION 2

(a)   Components of a constant pressure regulator are listed below.

Describe the function and operation of each component.

(i)   Diaphragm.

_____

_____

_____

(2 marks)

(ii)   Adjustment screw.

_____

_____

_____

(2 marks)

(iii)   Spring.

_____

_____

_____

(2 marks)

(iv)   Breather hole.

_____

_____

_____

(2 marks)

QUESTION 2 (cont'd)

(b) (i) State the main purpose of gas regulators.

_____

_____

(1 mark)

(ii) State the purpose of the first stage regulator on a two stage regulator for an LPG installation.

_____

_____

(1 mark)

(iii) State the purpose of the second stage regulator on a two stage regulator for an LPG installation.

_____

_____

(1 mark)

(iv) State the purpose of a single stage regulator for an LPG installation.

_____

_____

(1 mark)

(v) State the purpose of an appliance regulator.

_____

_____

(1 mark)

Total 13 marks

QUESTION 3

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

(a) State the minimum gas pressure required at the inlet of a natural gas appliance.

_____

(1 mark)

(b) State the minimum gas pressure required at the inlet of a LPG appliance.

_____

(1 mark)

(c) State a situation where joints are not permitted when installing multilayer consumer piping.

_____

(1 mark)

(d) List the THREE acceptable substances permitted for pressure testing natural gas installations.

1 _____

2 _____

3 _____

(3 marks)

(e) Describe what the term DN means in relation to gas fittings.

_____

(1 mark)

Total 7 marks

QUESTION 4

Answer the following according to AS/NZS 5601 Part 2.

(a)   Give the THREE requirements that must be met so that a flueless continuous flow water heater can be installed inside a boat.

1   _____

2   _____

3   _____

(3 marks)

(b)   State the difference between accessible and readily-accessible in relation to gasfitting.

_____

_____

(1 mark)

(c)   State the maximum pressure that an appliance is permitted to operate at when installed in a caravan.

_____

(1 mark)

(d)   Give the maximum permitted spacing of pipe supports used on a straight length of flexible pipework running vertically in a boat.

_____

(1 mark)

Total 6 marks

QUESTION 5

(a) Particular Hazardous Work (Notifiable Work) is work that must be reported at least 24 hours before it is to begin.

    (i) Name the agency that should be contacted with regard to Particular Hazardous Work.

        _____

        (1 mark)

    (ii) Give a work situation that could be deemed to be Particular Hazardous Work.

        _____

        (1 mark)

(b) Give THREE examples of biohazards that are commonly found on worksites.

    1   _____

    2   _____

    3   _____

        (3 marks)

(c) Pipework is to be run across the ceiling in a large warehouse.

Give FOUR methods for minimising the risk of working at height in this situation.

    1   _____

    2   _____

    3   _____

    4   _____

        (4 marks)

        Total 9 marks

QUESTION 6

(a) Draw a sketch of a flanged joint for use in a gas installation.

Label all main parts of the jointing system, and indicate the point of seal.

(3 marks)

(b) Name THREE types of compression joint, other than a flanged joint, that are commonly found in gas installations.

1 _____

2 _____

3 _____

(3 marks)

Total 6 marks

QUESTION 7

Describe the purpose of each of the following steps in the lighting sequence of a forced draught burner.

(a) Post-purge.

_____

_____

(1 mark)

(b) Pre-purge.

_____

_____

(1 mark)

(c) Lock out.

_____

_____

(1 mark)

(d) Fan proving.

_____

_____

(1 mark)

Total 4 marks

QUESTION 8

(a) State the minimum period of time a gasfitting trainee holding a limited certificate is required to work in the presence of his/her supervisor.

_____

(1 mark) ☐

(b) State the minimum period of time a person working under an exemption to perform gasfitting is required to work in the presence of his/her supervisor.

_____

(1 mark) ☐

(c) Describe what is meant by the term direct supervision.

_____

(1 mark) ☐

(d) Give the date each year by which a tradesman gasfitter must ensure his or her licence is renewed to be able to continue doing gasfitting work.

_____

(1 mark) ☐

(e) Give THREE requirements a tradesman gasfitter must meet to relicense each licence period.
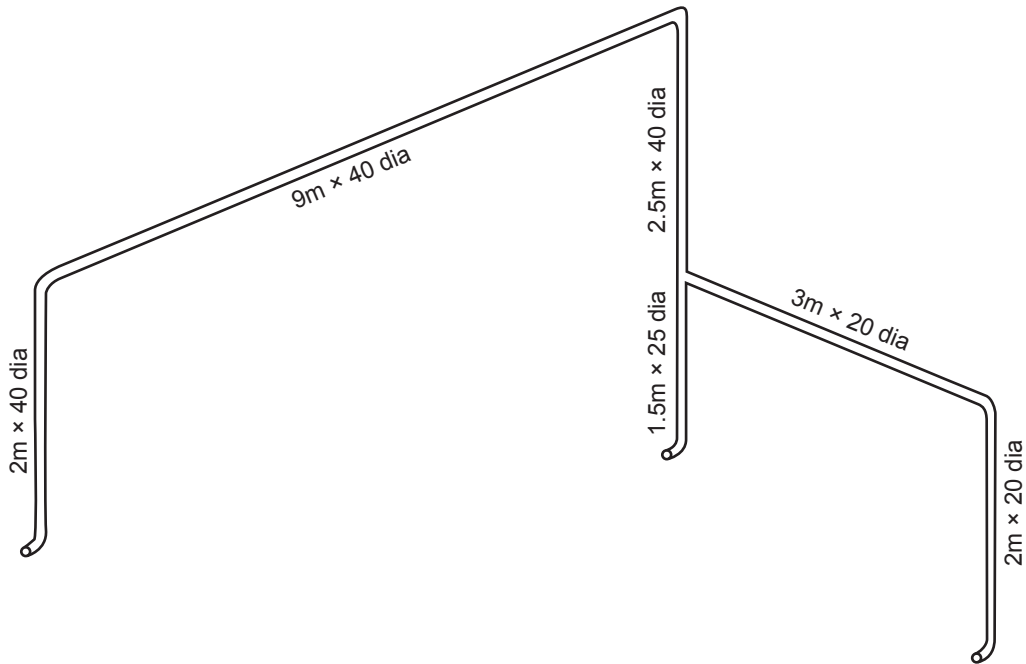
1 _____

2 _____

3 _____

(3 marks) ☐

Total 7 marks ☐

QUESTION 9

(a) (i) Calculate the volume of the copper pipework within the LPG installation shown below.

(4 marks)

(ii) Convert your answer in (a) (i) to litres.

(1 mark)

(b) The existing installation shown in (a) has an operating pressure of 10 kPa.

Complete the table below with regard to a gas tightness test of the installation.

Name of test			
Pressure of test			
Stabilisation time		Test time	
Permitted pressure loss			

(4 marks)

Total 9 marks

QUESTION 10

(a)   Give the TWO points from which the total flue height is measured on a natural draught flue.

1   _____

2   _____

(2 marks) [   ]

(b)   State the maximum permitted horizontal run of a flue which has a total flue height of 7 m.

_____

(1 mark) [   ]

(c)   Give THREE requirements that must be met by appliances connected to a common flue.

1   _____

2   _____

3   _____

(3 marks) [   ]

Total 6 marks [   ]

QUESTION 11

(a) Name THREE types of gas cylinder connection.

1 _____

2 _____

3 _____

(3 marks) ☐

(b) Give TWO reasons why LPG cylinders are only filled to about 80% of the total capacity.

1 _____

2 _____

(2 marks) ☐

(c) Describe why ice can form on dry LPG cylinders even during warm weather.

_____

_____

(2 marks) ☐

(d) Give the name for each symbol shown below.

(i) _____

(ii) _____

(iii) _____

(iv) _____

(2 marks) ☐

Total 9 marks ☐

QUESTION 12

Match each New Zealand Building code clause name in the table below with the correct clause number from the following list.

- B2
- E1
- E2
- G4
- G11
- H1

Clause Name	Clause number
External moisture	
Durability	
Gas as an energy source	
Ventilation	

Total 4 marks

QUESTION 13

Give FOUR different ignition systems used on gas appliances.

1 _____

2 _____

3 _____

4 _____

Total 2 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. Which of the following is the correct name for AS/NZS 3604:2011?

    A   Gas appliance safety.

    B   Storage and handling of LP Gas.

    C   Gas verification.

    D   Pipe materials.

    E   Timber framed buildings.

2. What is the main constituent of natural gas?

    A   Methane.

    B   Propane.

    C   Butane.

    D   Hexane.

    E   Pentane.

3. Butane is part of which family of gases?

    A   1st family.

    B   2nd family.

    C   3rd family.

    D   4th family.

    E   5th family.

4. What TWO main elements occur in both natural gas and LPG?

A   Hydrogen and nitrogen.

B   Carbon and hydrogen.

C   Propane and butane.

D   Nitrogen and oxygen.

E   Hydrogen and oxygen.

☐

5. Gases are classified in families.

What does it mean if two gases are in the same family?

A   The gases require similar pressures to change state from gas into liquid.

B   The vaporisation points of the gases are within 25°C of each other ensuring even dilution of molecules once in a gas state.

C   The gases were separated after being extracted from the same well source.

D   There is the possibility to interchange between the gases without the need to change the injector size.

E   There is not more than 1 kg/m³ difference in density between the gases.

☐

6. A thermocouple produces an electrical current.

Which reading would you expect to read on a multi-meter when testing a working thermocouple?

A   Between 20 and 35 Watts.

B   Between 20 and 35 Amps.

C   Between 20 and 35 Volts.

D   Between 20 and 35 mA.

E   Between 20 and 35 mV.

☐

7. What can occur within an appliance that has an efficiency exceeding 85%?

A   Flame cooling.

B   Vitiation due to low flue temperatures.

C   Condensation.

D   Excessive carbon dioxide creation.

E   Excessive flame noise and lift.

☐

8.   Which statement best describes a thermistor?

    A   A vapour or liquid filled sensing vial.

    B   A bimetallic temperature operated switch.

    C   An electronically controlled capacitor.

    D   A temperature dependant resistor.

    E   A mercury temperature sensing bulb.

9.   Why are heating outlets from ducted warm air furnaces permitted to be installed in small bedrooms and bathrooms?

    A   The ducting can be altered to restrict flow.

    B   Convection heating cannot distribute carbon dioxide.

    C   The combustion portion of the heater is room sealed.

    D   Adequate ventilation is provided by the return air grille.

    E   The air entering the room is filtered.

10.   What is the maximum permissible length of a restraint chain on an appliance that is designed to be slid out for servicing?

    A   75% of the length of the hose assembly.

    B   80% of the length of the hose assembly.

    C   85% of the length of the hose assembly.

    D   90% of the length of the hose assembly.

    E   95% of the length of the hose assembly.

Total 10 marks

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
Section B		
Total		