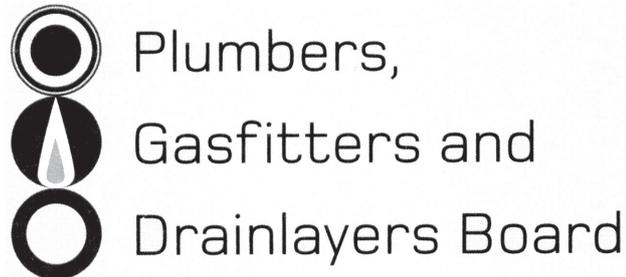


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9193



REGISTRATION EXAMINATION, JUNE 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 16–17 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 17 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 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 = $\frac{\text{mass of water (kg)} \times 4.2 \times \text{temp diff (}^\circ\text{C)} \times 100}{\text{heat energy input per hour in kJ} \times \text{efficiency (\%)}}$

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

- (a) Complete the table below by giving the name and chemical symbol for THREE chemical elements used in combustion in relation to a gas burner.

Chemical element	Chemical symbol

(3 marks)

- (b) Complete the table below by giving the name and chemical symbol for THREE products of incomplete combustion in relation to a gas burner.

Name of product	Chemical symbol

(3 marks)

Total 6 marks

QUESTION 2

Answer the following questions in relation to AS/NZS 5601 Part 2.

(a) Give TWO requirements that must be met regarding the air supply for gas appliances.

1 _____

2 _____

(2 marks)

(b) Give THREE design features required for an LPG cylinder compartment on a boat.

1 _____

2 _____

3 _____

(3 marks)

(c) List THREE materials acceptable for use in piping systems for caravans.

1 _____

2 _____

3 _____

(3 marks)

(d) State FOUR requirements that must be met for a manual gas isolation valve installed on a boat.

1 _____

2 _____

3 _____

4 _____

(2 marks)

Total 10 marks

QUESTION 3

- (a) An appliance has been run on high and the meter shows that the appliance has consumed 0.13 m³ of natural gas in five minutes.

Calculate how many MJ the appliance will consume in an hour.

(2 marks)

- (b) Calculate how much air is required for combustion when the appliance in (a) is run on high for five hours.

(2 marks)

- (c) An LPG appliance has an energy input of 150 000 BTU.

Calculate in m³/hr the gas rate for the appliance.

(2 marks)

- (d) A room measures 6.000 m by 4.500 m and has a stud height of 2.700 m.

The room requires 0.4 MJ/m³ to adequately heat it.

Calculate the output of a space heater needed to adequately heat the room.

(2 marks)

Total 8 marks

QUESTION 4

- (a) Give the required position for the high level ventilation opening for a cupboard containing a gas-fired storage water heater.

(1 mark)

- (b) Give the required position for the low level ventilation opening for a cupboard containing a gas-fired storage water heater.

(1 mark)

- (c) Give THREE reasons for fitting a down draught diverter to a gas appliance flue.

1

2

3

(3 marks)

Total 5 marks

QUESTION 5

All gas appliances that are intended for installation in New Zealand must meet certain requirements.

Compliance information is available so that gasfitters can ensure the appliances they are installing meet these requirements.

- (a) Name the government agency responsible for managing the database that contains this information.

(1 mark)

- (b) State where the compliance declarations for appliances can be found.

(1 mark)

- (c) Name the symbol shown below and state where it is found on a gas installation.



(2 marks)

Total 4 marks

QUESTION 6

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

The installation has an operating pressure of 2.5 kPa.

State the types of gas tightness tests and give the testing pressure required for each to be performed throughout the course of the installation.

The completed installation is to comply with AS/NZS 5601 Part 1.

(8 marks)

(b) A new installation is to have an operating pressure of 5.0 kPa.

State the minimum pressure to which the new pipework for the installation must be tested.

(1 mark)

(c) The operating pressure for an existing gas installation is to be increased from 2.5 kPa to 7 kPa.

List the required checks or tests that should be carried out during the process of changing the pressure.

(3 marks)

QUESTION 6 (cont'd)

- (d) AS/NZS 5601 Part 1 states that when performing a gas tightness test on an existing installation an acceptable pressure drop is permitted.

State the maximum acceptable pressure drop permitted for an existing installation with a volume of 19 litres.

(1 mark)

Total 13 marks

QUESTION 7

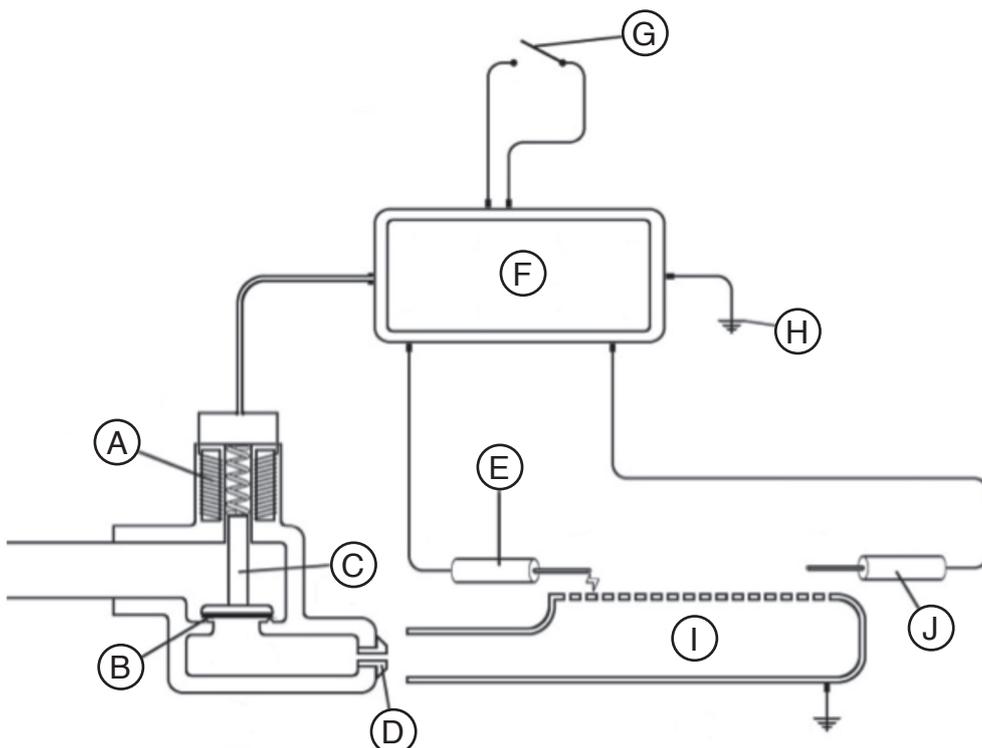
The diagrams in parts (a), (b) and (c) below and on the opposite page show flame failure systems.

In each part

- (i) name the system shown in the diagram
- (ii) complete the table by matching each letter with the number for the correct description from the table below.

1.	Solenoid coil	14.	Millivolt electromagnet
2.	Iron plunger disc	15.	Combustion air intake
3.	Valve spring	16.	Solenoid valve seat
4.	Control board	17.	Gas control tap
5.	On/Off switch	18.	Earth connection
6.	Burner	19.	Weep tube
7.	Mercury valve seat	20.	Fulcrum
8.	Pilot burner	21.	Hot thermocouple junction
9.	Iron plunger	22.	Injector
10.	Bellows	23.	Capillary
11.	Phial/probe	24.	Gas inlet
12.	Ignition electrode	25.	Cold thermocouple junction
13.	Flame sensing probe	26.	Push button

(a) (i) Name: _____

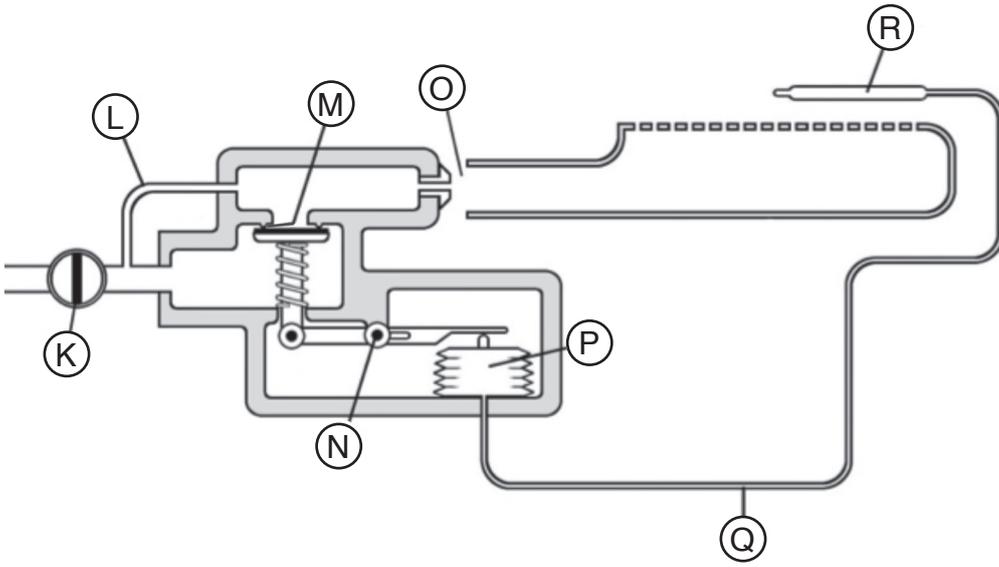


(ii)

Letter	Number
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	

QUESTION 7 (cont'd)

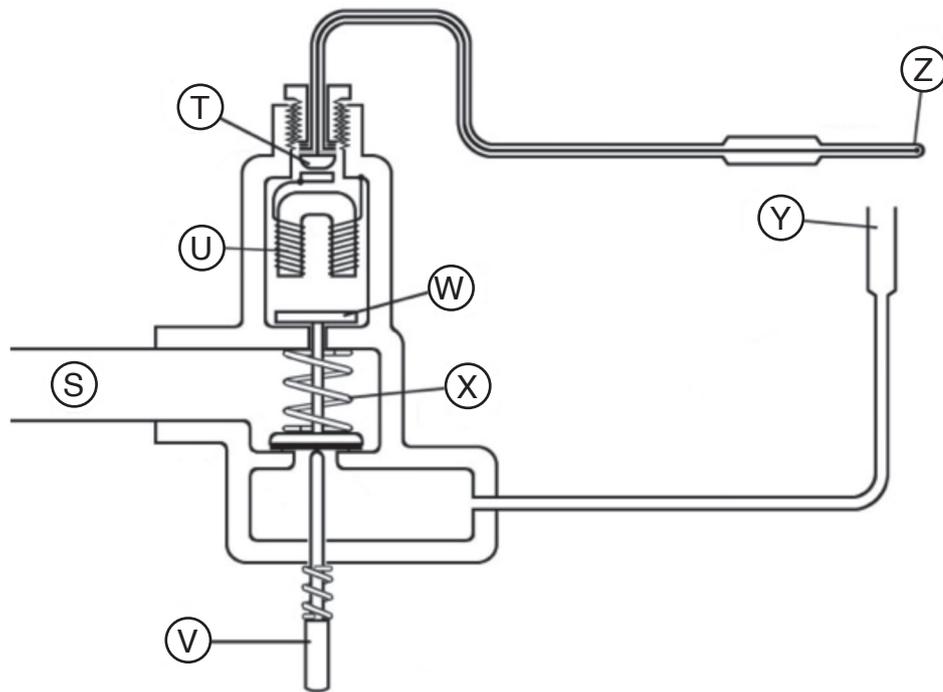
(b) (i) Name: _____



(ii)

Letter	Number
K	
L	
M	
N	
O	
P	
Q	
R	

(c) (i) Name: _____



(ii)

Letter	Number
S	
T	
U	
V	
W	
X	
Y	
Z	

Total 16 marks

QUESTION 8

(a) Name FOUR thermostat types and state in what appliance type each one is commonly incorporated.

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

(8 marks)

(b) List THREE safety devices you would expect to find in a portable gas space heater.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(c) Give THREE reasons test points are installed in a domestic gas installation.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 14 marks

QUESTION 9

(a) Name FOUR situations where asbestos could be found in relation to gasfitting.

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

(4 marks)

(b) Explain how exposure to asbestos may cause harm to people.

- _____
- _____

(2 marks)

(c) Construction related work with asbestos is classed as particular hazardous (notifiable) work.

List FOUR types of particular hazardous work other than working with asbestos.

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

(4 marks)

(d) Give TWO devices that reduce the risk of electrocution when using a power tool.

- 1 _____
- 2 _____

(2 marks)

Total 12 marks

QUESTION 10

Give FOUR reasons why the gas pressure in an LPG installation may be insufficient at times of high demand.

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

Total 4 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 device found in LPG pigtails and regulators limits the amount of gas flow to prevent a large accumulation of gas in the event of a leakage?

- A Back-check module.
- B Overpressure relief.
- C Excess flow device.
- D Over pressure shut off.
- E Pressure limiting valve.

2. Which of the following best describes the term vitiation?

- A The flame of a burner lighting back to the injector.
- B The fluctuation of gas supply due to a highly sensitive regulator spring.
- C The process of combustion products corroding a flue.
- D Irregular flame due to decreasing gas supply.
- E The contamination of air supply to a burner by the products of combustion.

3. Which of the following is equivalent to 8 kW?

- A 28.8 MJ.
- B 32.2 MJ.
- C 68.4 MJ.
- D 72.0 MJ.
- E 80.0 MJ.

4. According to AS/NZS 5601 Part 1, what is the maximum flue gas temperature at which PVC-U (polyvinyl chloride) pipe may be used as flue?

A 45°C

B 50°C

C 55°C

D 60°C

E 65°C

5. When not specified in the appliance manufacturer's instructions, what is the minimum height a natural draught flue can have?

A 0.6 m.

B 0.9 m.

C 1.0 m.

D 1.2 m.

E 1.6 m.

6. According to AS/NZS 5601 Part 1, an exhaust duct is required to be fitted to a gas laundry dryer if the gas consumption exceeds which of the following?

A 10 MJ/h.

B 18 MJ/h.

C 20 MJ/h.

D 24 MJ/h.

E 40 MJ/h.

7. Which of the following would cause gas to escape from the breather hole on an appliance regulator?

- A The regulator adjustment screw cap has been left off.
- B The seat of the regulator valve has jammed closed.
- C The regulator breather hole has been enlarged.
- D The regulator is relieving excess pressure.
- E The regulator diaphragm has ruptured.

8. Which of the following appliance types is most susceptible to adverse effects of air movement caused by the operation of mechanical ventilation systems?

- A Balanced flued appliances.
- B Natural draught appliances.
- C Fan forced appliances.
- D Power flued appliances.
- E Room sealed appliances.

Total 8 marks

For Examiner's use only

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