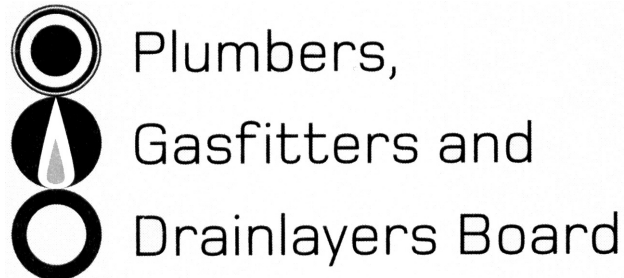


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9193



REGISTRATION EXAMINATION, JUNE 2012

LICENSED 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 19–21 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 2012 were provided with the following documents:

- NZS 5261 Gas installation

SECTION A

QUESTION 1

(a) Give the meaning of the following in relation to New Zealand Standard 5261 Gas Installation.

(i) Normative

(ii) Informative

(2 marks)

(b) Give FOUR different situations where a soundness test must be performed on a gas installation.

1

2

3

4

(2 marks)

(c) A 'let by' test is performed to ensure that a service isolating valve shuts off the gas supply fully.

(i) State when this test would be performed.

(1 mark)

(ii) Describe how this test would be performed.

(2 marks)

Total 7 marks

QUESTION 2

(a) Complete the table below by giving a description of each term with regard to gas regulators.

Term	Description
Lock up Pressure	
Chatter	
Token relief	
Full relief	
Over pressure shut off	
Under pressure shut off	

(6 marks)

(b) The gas pressure for an existing installation is to be increased from 1.8 kPa to 3.5 kPa.

Complete the following table by listing the checks required when changing the pressure, and stating whether each check is carried out before or after the pressure increase.

Check	Before or after?

(3 marks)

Total 9 marks

QUESTION 3

(a) Sketch and label a self-igniting burner which uses a flame rectification system.

(5 marks)

(b) Describe the operation of a flame rectification system for a natural draught burner.

(4 marks)

QUESTION 3 (cont'd)

(c) List FOUR different ignition systems used on gas appliances.

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

(2 marks)

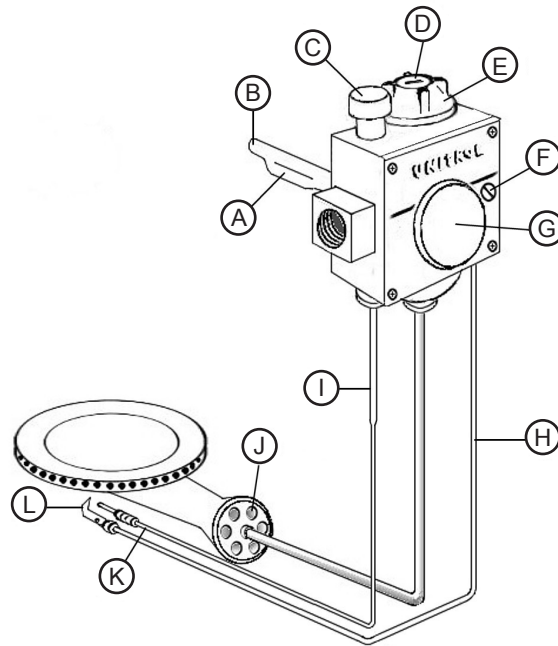
(d) Describe the operation of a thermistor.

(2 marks)

Total 13 marks

QUESTION 4

(a) The diagram below shows a valve and burner assembly for a storage water heater.



Complete the table below writing the letter for each component.

Description	No.	Description	No.
Aeration adjustment		Pilot adjustment	
Thermocouple		Burner regulator adjustment	
Pilot head		Thermostat control	
Pilot Tube		Energy cut out	
Thermal fuse		Thermostat probe	
TEFFD button		Gas valve	

(6 marks)

QUESTION 4 (cont'd)

- (b) A consumer reports that an existing gas-fired storage water heater has become inefficient (and expensive to operate).

List SEVEN likely causes for this.

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____

(7 marks)

- (c) Describe fully the operation of an energy cut-out (ECO) a gas-fired storage water heater.

(2 marks)

- (d) State the function and purpose of a baffle on a gas-fired, storage water heater.

(2 marks)

Total 17 marks

QUESTION 5

Three natural gas kilns are installed in a building.

The kilns are programmed to work at full consumption and run for exactly six hours per day.

The meter reading at the start of the day is 7683.573 m³.

The meter reading at day end is 7725.621 m³.

The heating value of natural gas is 40 MJ/m³.

The hourly gas consumption of each kiln is indicated on its data plate is 85 MJ.

(a) Calculate the average MJ consumed per hour by each appliance.

(4 marks)

(b) Give TWO possible reasons why the average MJ consumed per hour by each appliance is not the same as the 85 MJ/h listed on the appliance data plate.

1

2

(2 marks)

Total 6 marks

QUESTION 6

(a) Sketch a natural draught flue showing the main components.

(4 marks)

(b) State TWO functions of a natural draught flue system.

1 _____

2 _____

(1 mark)

Total 5 marks

QUESTION 7

(a) Name THREE different LPG cylinder connection types.

1 _____

2 _____

3 _____

(3 marks)

(b) Give TWO methods of protecting from physical damage a gas meter that is to be installed in a vehicle access area.

1 _____

2 _____

(2 marks)

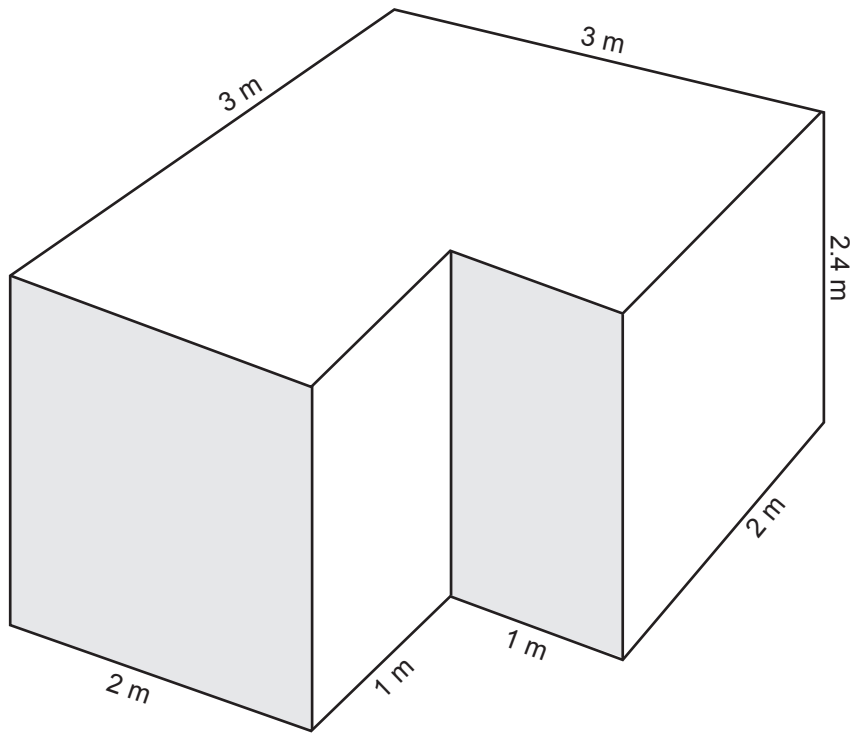
Total 5 marks

QUESTION 8

(a) The diagram below shows a room.

An open flued, decorative fire is to be installed in the room.

Calculate the maximum MJ/h of the fire that is permitted to be installed in the room without the need for additional ventilation.



(4 marks)

QUESTION 8 (cont'd)

(b) (i) Name the toxic gas produced during incomplete combustion.

(1 mark)

(ii) List FOUR symptoms of exposure to this toxic gas.

1 _____

2 _____

3 _____

4 _____

(4 marks)

Total 9 marks

QUESTION 9

List THREE factors that determine the suitability of materials and fittings to be used on a gas installation according to NZS 5261 Gas Installation.

- 1 _____
- 2 _____
- 3 _____

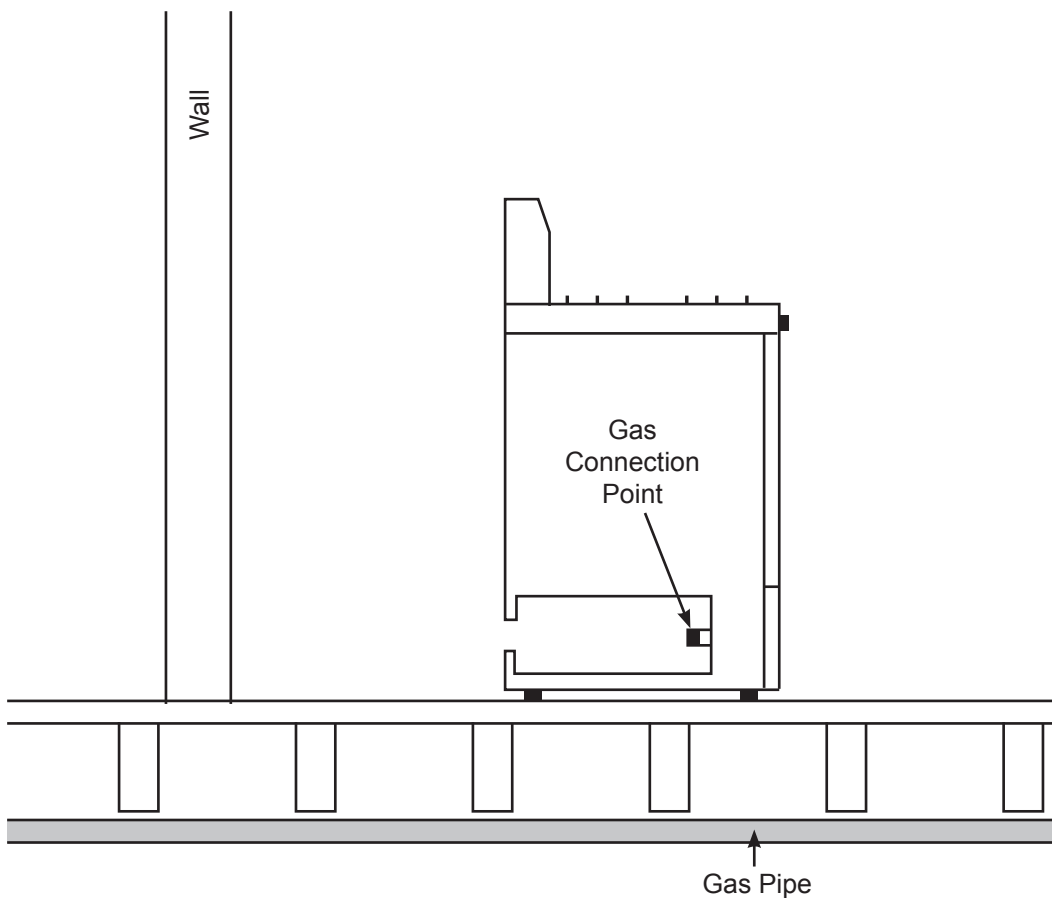
Total 3 marks

QUESTION 10

The diagram below shows an elevation of a free standing gas cooker which is to be installed.

The cooker is to be installed backing directly onto the wall shown, using a flexible hose and bayonet fitting.

Complete the starter drawing below to show and label the gas piping and associated equipment required to install the cooker. The installation is to comply with NZS 5261 Gas Installation.



Total 6 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.

Note that should your choice of answer be unclear in this section of the examination no marks will be awarded for that question.

1. Which of the following best describes the function of an insulator on a gas meter set?
- A To stop stray currents passing between the gas service pipe and the consumer pipework.
 - B Enables an impressed current to stop corrosion of the consumer pipework.
 - C Creates a barrier to stop moisture corroding the gas meter or service pipe.
 - D Eliminates the transmission of vibration from the meter into the consumer pipework.
 - E Allows for a flexible connection that is less likely to leak due to ground movement.

2. In what way does a thermopile differ from a thermocouple?
- A A thermopile is constructed of a copper coil rather than a platinum one.
 - B The core of a thermopile is removable for servicing.
 - C A thermopile generates ohms rather than millivolts.
 - D The lifespan of a thermocouple is twice that of a thermopile.
 - E A thermopile is a collection of thermocouples within one probe.

3. According to NZS 5261 Gas Installation, which of the following fittings is not permitted to be used for gas pipework?
- A Long screw connectors.
 - B Galvanised barrel nipples.
 - C Brass mac unions.
 - D Compression fittings with metallic olives.
 - E Flare fittings.

4. According to NZS 5261 Gas Installation, in what situation may PVC-U (polyvinyl chloride) pipe be used to convey gas?

- A It is only used for vent piping.
- B It is sleeved in aluminium.
- C It is used above ground only.
- D It is larger than 20 mm diameter.
- E It is double walled.

5. According to NZS 5261 Gas Installation, 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

6. Which device is designed to shut off the gas supply if the mechanical ventilation for a room fails to operate?

- A Flame rectification.
- B Carbon dioxide detector.
- C Energy cut off.
- D Fan interlock.
- E Combustion air pressure switch.

7. Where will excess flow devices usually be located?

- A On gas meters.
- B On appliance control valves.
- C On regulator and pigtail valve connections.
- D On pipework where it enters a dwelling.
- E On bayonet fittings.

8. What is the purpose of a thermal nut on a QCC regulator?
- A It ensures gas is fully vapour before entering the regulator.
 - B It will melt when exposed to extreme heat.
 - C It increases the available latent heat for vaporisation.
 - D It allows excess heat generated by gas flow to dissipate safely.
 - E It stops the valve on the cylinder from icing up.

9. 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.

10. Clearances are required from gas cylinders to openings and ignition sources. When installing twin-pack 45 kg cylinders with change-over regulator, what else may require clearances from openings and ignition sources?
- A Regulator relief vent.
 - B Auto-change over valve.
 - C Second stage regulator.
 - D Excess flow devices.
 - E Back check modules.

11. What can allow propane liquid to be at a temperature above -42°C and not boil?
- A Being stored under pressure.
 - B Allowing excess pressure to vent off.
 - C Keeping the liquid constantly moving.
 - D Adding odorant to the gas.
 - E Being heated above 42°C .

12. Where does the heat for vaporisation of gas in a cylinder come from?
- A The heat is generated by the movement of liquid inside the cylinder.
 - B The heat is generated by the vapour as it escapes from the cylinder.
 - C The heat generated by the liquid boiling.
 - D The heat is created by static electricity on the regulator as gas passes through it.
 - E The latent heat from the metal surface of the cylinder.

13. What advantage does a two-stage regulator have over a single stage regulator?
- A Higher pressure capability.
 - B Smaller size diaphragm.
 - C Much longer lifespan.
 - D More accurate delivery pressure.
 - E More readily available.

14. Where does the condensation inside a flue come from?
- A The appliance being too efficient.
 - B The flue installed is too short.
 - C The water vapour contained in the combustion gases cooling.
 - D Rain entering the flue.
 - E Water trapped in the air touches the hot flue reaching dew point.

15. 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 Power flued appliances.
 - C Fan forced appliances.
 - D Natural draught appliances.
 - E Room sealed appliances.

16. According to NZS 5261 Gas Installation, what is the minimum clearance between the highest part of a gas hob and an overhead exhaust fan?

- A 550 mm.
- B 550 mm.
- C 600 mm.
- D 650 mm.
- E 750 mm.

17. According to NZS 5261 Gas Installation, a gas-fired air curtain requires an interlock in which of the following situations?

- A The outlet grille of the air curtain faces downwards.
- B The hourly gas consumption of the air curtains in the area exceeds 0.2 MJ/m^3 .
- C The air curtain is located less than 2 m above the floor.
- D The air curtain is installed above an internal door.
- E The air curtain is reliant on an air pressure switch to enable operation.

18. Which of the following is the vaporization temperature for butane?

- A -43°C
- B -25°C
- C -15°C
- D -10°C
- E 0°C

19. Which of the following is the theoretical air to gas ratio required for complete combustion of LPG?

- A 25:1
- B 15:1
- C 12:1
- D 10:1
- E 4:1

20. Which of the following is the minimum thickness of ceramic tiles installed directly on 10 mm gib board for protection of combustible material used as a cooker splash back?
- A 3 mm.
 - B 4 mm.
 - C 5 mm.
 - D 6 mm.
 - E 8 mm.

Total 20 marks

For Examiner's use only

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