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Number if known

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No. 9193



Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2011

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 24–25 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 25 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 2011 were provided with the following documents:

- NZS 5261 Gas installation

SECTION A

QUESTION 1

A service regulator on a meter set commonly includes within its construction other devices and features in addition to the regulator.

List FOUR devices/features that may be included.

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

Total 4 marks

QUESTION 2

(a) An LPG installation has been designed to operate at 3.0 kPa.

- (i) State the minimum pressure the **pipework** must be tested to before the walls are lined and the appliances are connected.

(1 mark)

- (ii) State the minimum pressure the **installation** must be tested to after the appliances have been connected.

(1 mark)

- (iii) If this was an existing installation, state the pressure the existing installation should be tested to prior to commencing work to ensure soundness.

(1 mark)

(b) An 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)

Total 4 marks

QUESTION 3

- (a) Sketch and label a diagram showing the components of a solenoid valve used to control gas flow in an appliance.

(3 marks)

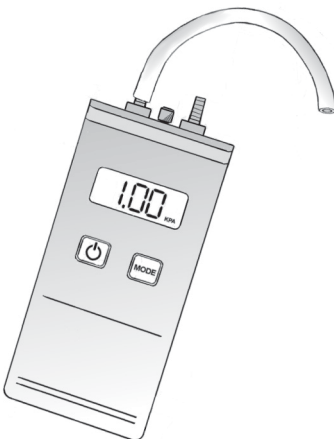
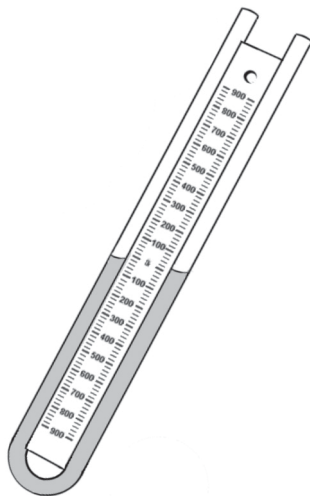
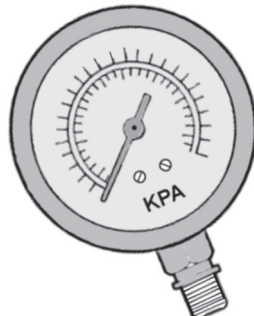
- (b) List the steps in the operational sequence of the solenoid valve in (a).

(2 marks)

Total 5 marks

QUESTION 4

Complete the table below to give the details of each instrument.

	Name
	An advantage of this gauge
	A disadvantage of this gauge
	Name
	An advantage of this gauge
	A disadvantage of this gauge
	Name
	An advantage of this gauge
	A disadvantage of this gauge

Total 9 marks

QUESTION 5

Give the process followed for each of the tests below.

(a) Smoke Test.

(2 marks)

(b) Spillage Test.

(2 marks)

Total 4 marks

QUESTION 6

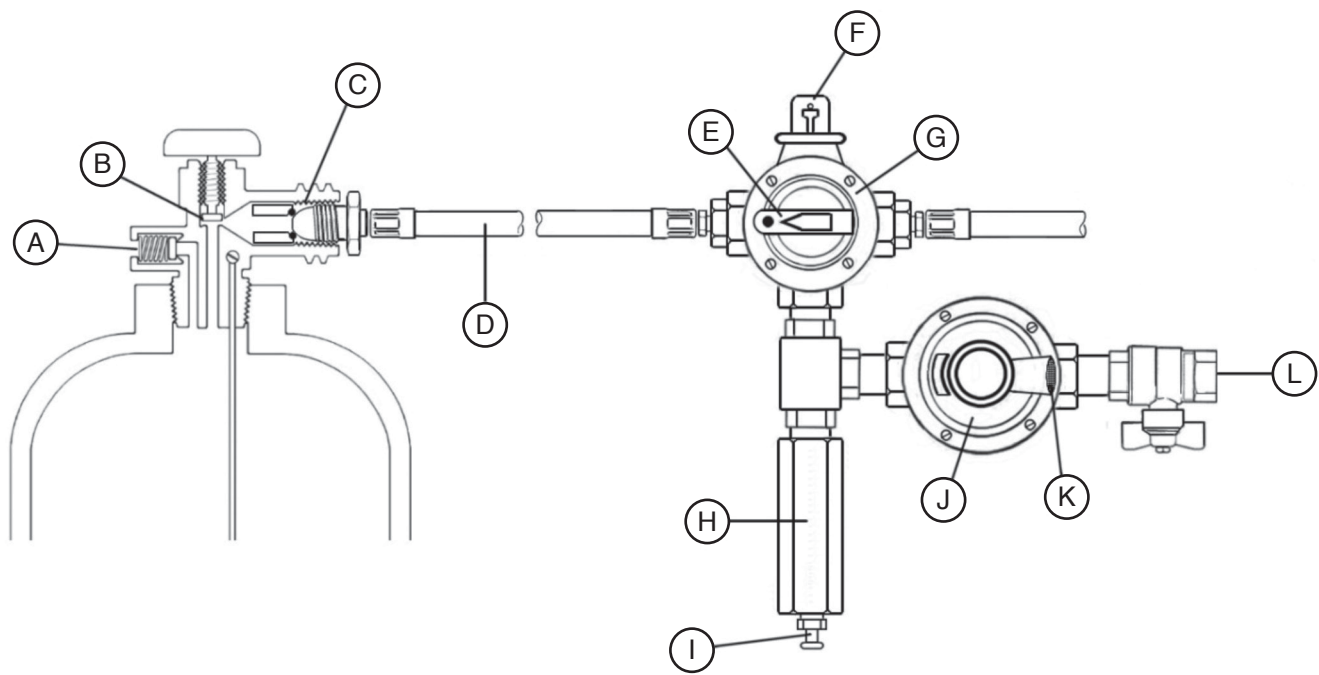
Give SIX factors to be considered when deciding the location for an external continuous flow water heater that is to be attached to an existing commercial building.

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

Total 3 marks

QUESTION 7

The following diagram shows part of an LPG installation.



Complete the table below by naming each component A – L.

A		G	
B		H	
C		I	
D		J	
E		K	
F		L	

Total 6 marks

QUESTION 8

- (a) Give THREE reasons why a thermocouple may not generate an electrical current while still located in a pilot flame.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

- (b) Give THREE reasons why a flame rectification flame failure system may shut off the gas supply to an appliance.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 6 marks

QUESTION 9

A 150 mm diameter flue is to penetrate a corrugated galvanised steel roof.

Flashing in addition to a dektite/boot flashing is required.

- (a) Name the type of additional flashing.

(1 mark) ☐

- (b) Name the New Zealand Building Code Clause that provides an acceptable solution for this installation.

(1 mark) ☐

Total 2 marks ☐

QUESTION 10

- (a) Give TWO reasons why safety/restraint chains or devices may need to be fitted to a free standing gas cooker.

1 _____

2 _____

(2 marks)

- (b) An isolating valve is required on gas pipework in the event of emergency.

Give FOUR other instances where pipework must include isolating valves according to NZS 5261 Part 1.

1 _____

2 _____

3 _____

4 _____

(2 marks)

Total 4 marks

QUESTION 11

Answer the following questions in relation to NZS 5261 Gas Installation.

- (a) State the condition under which the flue terminal of a gas appliance can terminate less than 1 m horizontally from a neighbouring structure.

(1 mark)

- (b) State the minimum distance that a flue terminal of a gas appliance can be vertically above a 10 m³/h gas meter that has a venting regulator relief valve.

(1 mark)

- (c) State the condition under which it is possible to locate the flue terminal of a gas appliance closer than clearance requirements given in NZS 5261.

(1 mark)

Total 3 marks

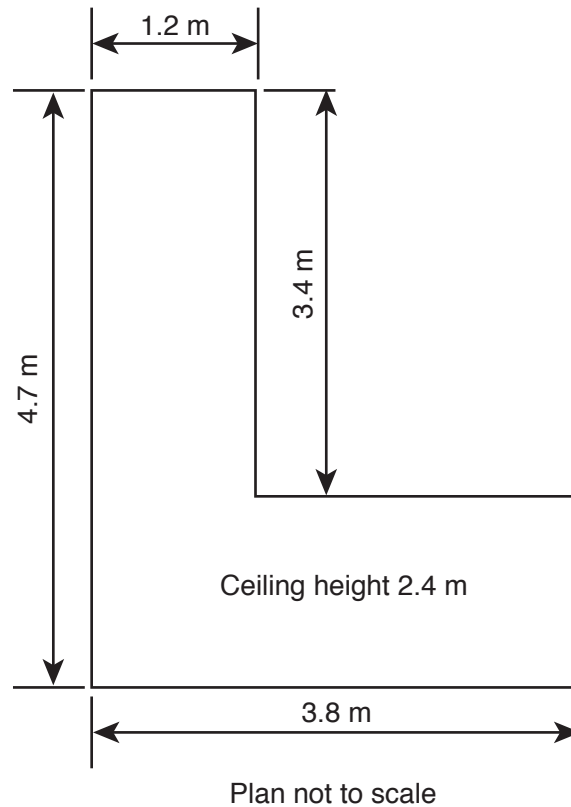
QUESTION 12

Describe how an air extract system could affect the operation of an open flued gas appliance located in the same area.

Total 1 mark

QUESTION 13

A passageway in a house has the dimensions shown in the following diagram.



A thermostatically controlled flueless gas heater is to be installed in the passageway.

Referring to NZS 5261, calculate in MJ/h the maximum permitted appliance input.

Total 4 marks

QUESTION 14

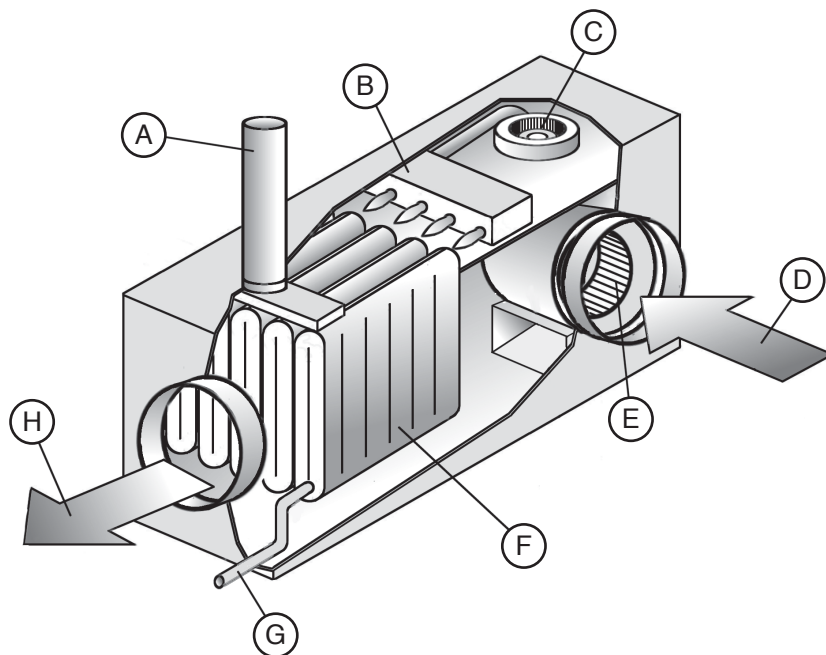
Give FOUR probable causes of gas pipework installed in a motorhome developing a leak.

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

Total 4 marks

QUESTION 15

The diagram below shows a warm air furnace.



Complete the following table by naming each component A – H.

A		E	
B		F	
C		G	
D		H	

Total 4 marks

QUESTION 16

(a) Describe what a gas vaporiser does.

(1 mark)

(b) Give a situation in which a gas vapouriser may be required.

(1 mark)

Total 2 marks

QUESTION 17

Name TWO gases produced by complete combustion.

1

2

Total 1 mark

QUESTION 18

A natural gas space heater has an hourly gas consumption of 10.2 kW.

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

1 kW = 3.6 MJ

Calculate in m³/h the gas rate of the appliance.

Total 2 marks

QUESTION 19

(a) Describe the process by which condensation forms on windows.

(2 marks)

(b) Explain why condensation increases while a flueless gas heater is being used.

(1 mark)

Total 3 marks

QUESTION 20

- (a) A liquid expansion thermostat on a space heater has become inaccurate at sensing room temperature.

Give THREE possible causes of this fault.

- 1 _____

- 2 _____

- 3 _____

(3 marks)

- (b) List FOUR safety devices commonly found in a portable gas-fired electronic space heater.

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

(2 marks)

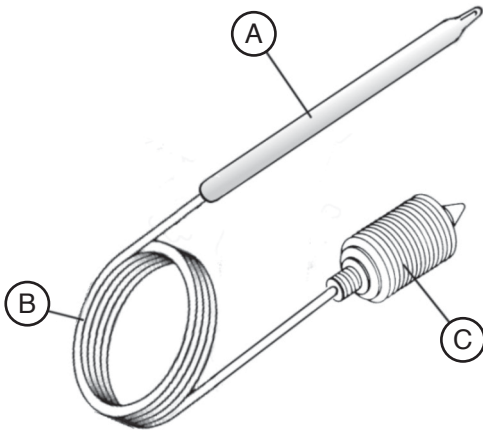
- (c) Give the meaning of the term fail safe in relation to flame failure devices and gas flow.

(1 mark)

Total 6 marks

QUESTION 21

The diagram below shows a liquid expansion thermostat.



In the following table, name each part labelled A, B, C.

A	
B	
C	

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.

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

1. Butane is part of which family of gases?

- A 1st family.
- B 2nd family.
- C 3rd family.
- D 4th family.
- E 5th family.

2. Which of the following shows the flammability range for natural gas?

- A 2.4% - 9.5%
- B 8% - 25%
- C 10% - 25%
- D 5% - 15%
- E 15% - 40%

3. What is the relative density of LPG?

- A 0.50
- B 0.65
- C 0.95
- D 1.25
- E 1.55

4. What are the main constituents of natural gas?

- A Ethane and methane.
- B Pentane and methane.
- C Methane and carbon dioxide.
- D Propane and methane.
- E Propane and butane.

☐

5. NZS 5261 Part 2 is described as a means of compliance with installation criteria set out in which of the following?

- A NZS 5262
- B AS/NZS 2430 Part 3.1
- C NZS 5261 Part 1
- D AS 1210
- E NZS 3604

☐

6. According to NZS 5261, what is the minimum permissible distance between the highest part of a gas hob and an overhead exhaust fan?

- A 400 mm
- B 500 mm
- C 600 mm
- D 650 mm
- E 750 mm

☐

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

- A 50% of the length of the hose assembly.
- B 70% 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.

☐

8. An access opening is required near a laundry dryer where the exhaust duct is longer than which measurement?

- A 0.6 m
- B 0.9 m
- C 1.0 m
- D 1.2 m
- E 1.8 m

☐

9. Which of the following situations would be most likely to activate the high limit switch on a laundry dryer?

- A A blockage in the lint trap.
- B Fluctuation in gas supply.
- C Flame failure.
- D Lack of combustion air.
- E Blocked burner injector.

☐

10. Which of the following statements best describes erosion of pipework?

- A Decay of pipework due to electrolysis.
- B Speed at which the particles flow in the pipework.
- C Disturbance of the laminar flow due to rough internal surfaces.
- D Particles scouring action on the internal bore of the pipe.
- E Decay of the pipe due to exposure to weather.

☐

11. 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.

☐

12. According to NZS 5261, what is the minimum permissible distance between the air intake of a gas fired air curtain and a neighbouring structure?

- A 150 mm
- B 200 mm
- C 500 mm
- D 600 mm
- E 900 mm

☐

13. Which of the following safety devices will shut off gas supply in the event of mechanical ventilation failing to operate?

- A Flame rectification.
- B Fire damper.
- C Carbon monoxide detector.
- D Oxygen depletion device.
- E Fan interlock.

☐

14. According to NZS 5261, what requirement must be met by plastic flow and return pipes of a gas fired pool heater?

- A They must have a straight run of at least 1 m before any change of direction.
- B They must be constructed of uPVC pressure pipe only.
- C They must be adequately lagged for at least 1 m.
- D They must have at least 1 m of unlagged metallic pipe connected to the heater.
- E They must be permanently affixed to the appliance.

☐

15. An overhead heater is rated at 16 MJ/h.

According to NZS 5261, what is the minimum permissible clearance between the heater and combustible material unless adequate protection is provided?

- A 600 mm
- B 750 mm
- C 900 mm
- D 1000 mm
- E 1100 mm

☐

16. A hob has been commissioned and is working correctly.
When a wok is used on the hob, the bottom of the wok turns black with soot.
Which of the following is the most likely cause of this?

- A The calorific value of the gas has altered.
- B The bottom of the wok is impinging on the burner flame.
- C The wok is getting too hot and should be used on a smaller burner.
- D The wok is positioned beyond the outer cone of the burner flame.
- E The wok has a copper base which heats too quickly.

☐

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

- A The contamination of air supply to a burner by the products of combustion.
- 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 flame of a burner lighting back to the injector.

☐

18. 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.

☐

19. Why should pool chemicals not be stored in a storage area containing an open-flued gas fired pool heater?
- A The chemicals can be contaminated by products of combustion.
 - B The fumes of the chemicals can damage the heater if they pass through the burner.
 - C Chemicals can react with water, creating heat which can affect the operation of the heater.
 - D The chemicals are all highly flammable.
 - E The chemicals are poisonous, and can be circulated where people are swimming.

☐

20. The efficiency of a gas appliance is expressed as a % and can be found using which calculation?
- A Appliance heat input \div heat output.
 - B Appliance MJ/h \times heating value of the gas.
 - C Appliance heat output \div heat input.
 - D Appliance MJ/m³ \div heating value of the gas.
 - E Appliance heat input \times heat input.

☐

Total 20 marks

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For Examiner's use only

Question number	Marks	Marks
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