

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

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No. 9193



Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2013

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 2013 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

SECTION A

QUESTION 1

- (a) AS/NZS 5601 Part 1 gives general requirements that must be met in relation to the installation of gas appliances.

Give FIVE of these requirements.

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

(5 marks)

- (b) Give FOUR reasons why the gas pressure in an installation may be insufficient at times of high consumption.

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

(4 marks)

- (c) Give TWO reasons why natural gas and LPG are odourised.

- 1 _____
- 2 _____

(2 marks)

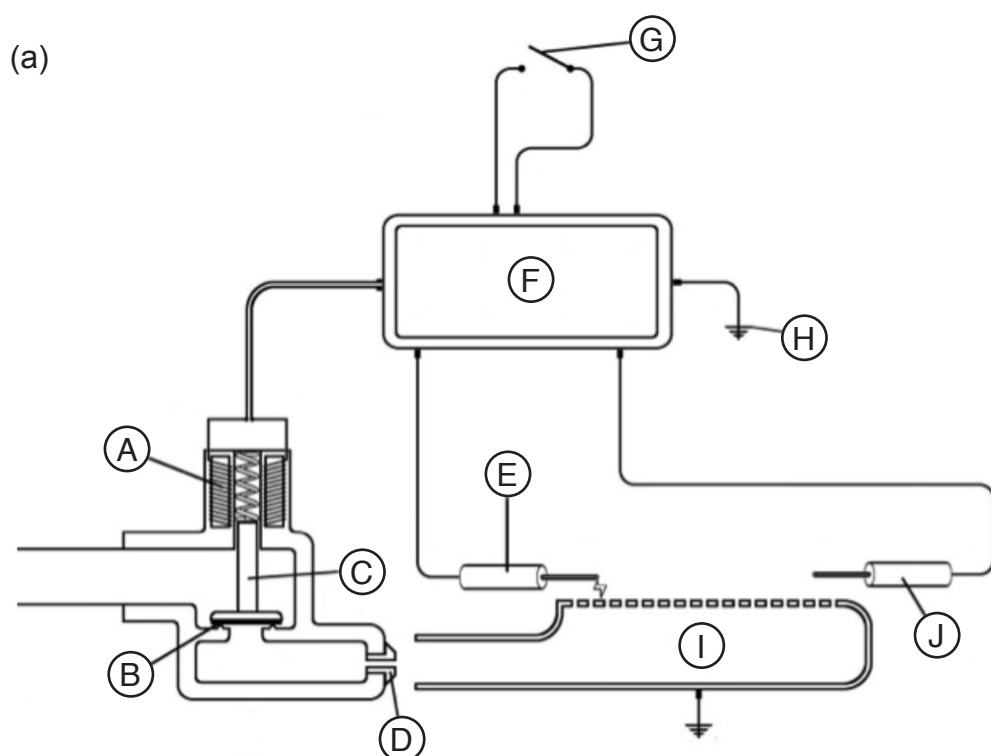
Total 11 marks

QUESTION 2

For each flame failure system/devices shown on pages 2 and 3:

- (i) name the system/device.
- (ii) complete the table by entering the number of the lettered component from the following table.

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



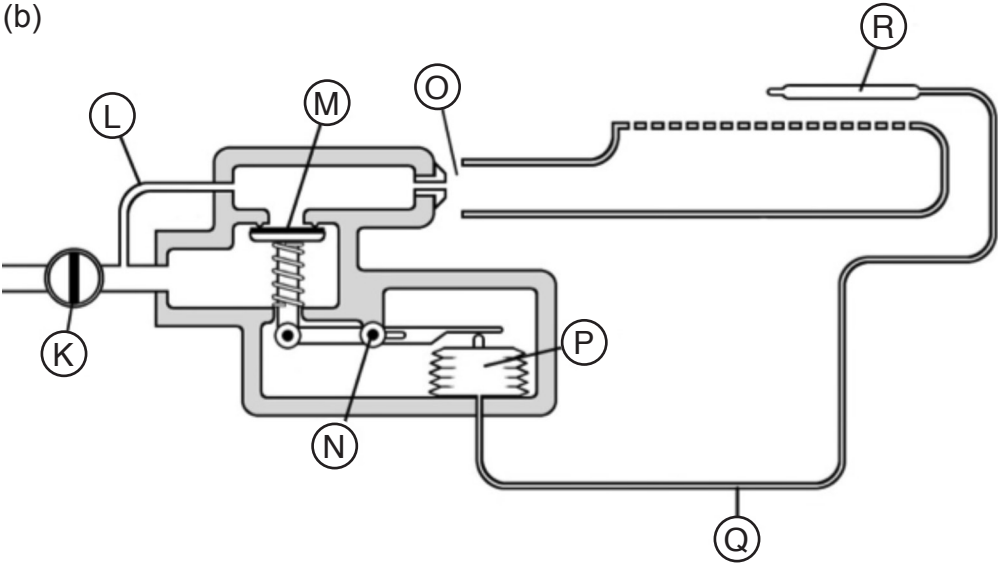
(ii)

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

(i) Name: _____

QUESTION 2 (cont'd)

(b)

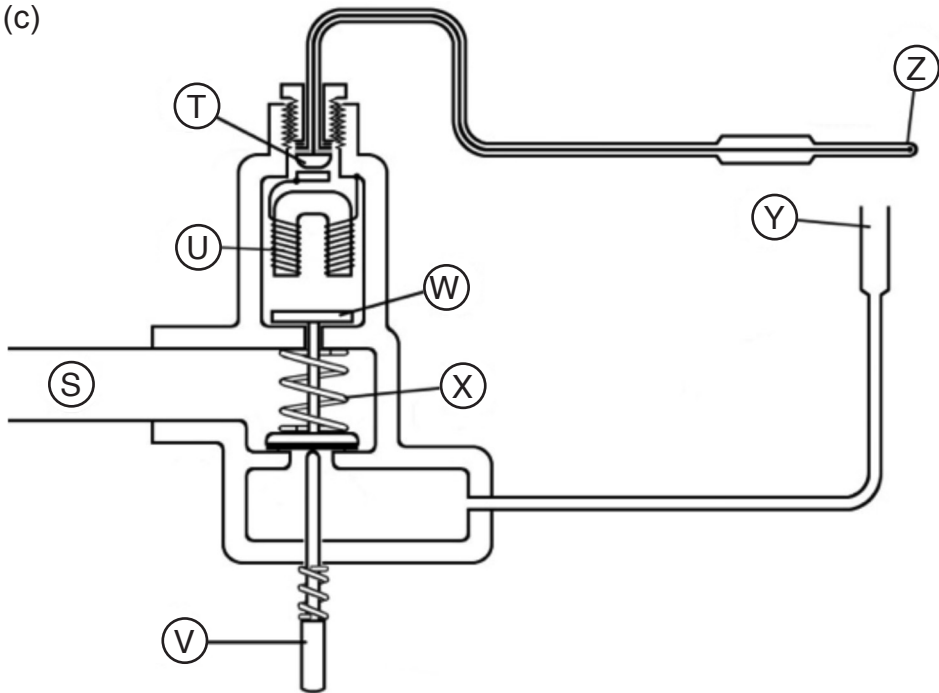


(ii)

Letter	Number
K	
L	
M	
N	
O	
P	
Q	
R	

(i) Name: _____

(c)



(ii)

Letter	Number
S	
T	
U	
V	
W	
X	
Y	
Z	

(i) Name: _____

Total 16 marks

QUESTION 3

(a) Using AS/NZS 5601 Parts 1 and 2, complete the table for each of the following situations.

- (i) An existing installation at a house with a pipework volume of 15 litres is to be tested before work begins.

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

(3 marks)

- (ii) A new refrigerator and associated pipework with a volume of 10 litres installed in a caravan.

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

(3 marks)

- (iii) New appliances have been connected to pipework with a volume of 10 litres after the house has been painted.

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

(3 marks)

QUESTION 3 (cont'd)

- (iv) New piping with a volume of 15 litres has been installed in the timber frame of a house prior to lining.

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

(3 marks)

- (b) An existing installation with a pipework volume of 20 litres is to be tested before work commences.

The installation has an operating pressure of 6 kPa.

Complete the table below to show the successful completed test results.

Pressure of test			
Stabilisation time		Test time	
Permitted pressure loss			

(3 marks)

Total 15 marks

QUESTION 4

Give FOUR ventilation requirements an LPG locker must meet when installed on a boat.

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

Total 4 marks

QUESTION 5

- (a) The aeration port on the pilot of a gas-fired ducted central heating furnace has become blocked with lint.

The appliance is fitted with a millivolt flame failure system.

Give THREE probable consequences of the blockage.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

- (b) The baffle in a gas-fired storage water heater has collapsed and has blocked the flue.

The appliance is in operation.

Give THREE probable consequences of the situation.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

- (c) Give the THREE purposes of the air supply to a gas-fired storage water heater installed in a cupboard.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 9 marks

QUESTION 6

- (a) Materials used for gas pipework may require protection to prevent corrosion or environmental damage.

Give THREE different methods of protection, and for each method identify the pipe material it is suitable to protect.

Method of protection #1	
Material being protected	

Method of protection #2	
Material being protected	

Method of protection #3	
Material being protected	

(6 marks)

- (b) State the TWO requirements that must be met when an underground gas service pipe crosses another service.

1 _____

2 _____

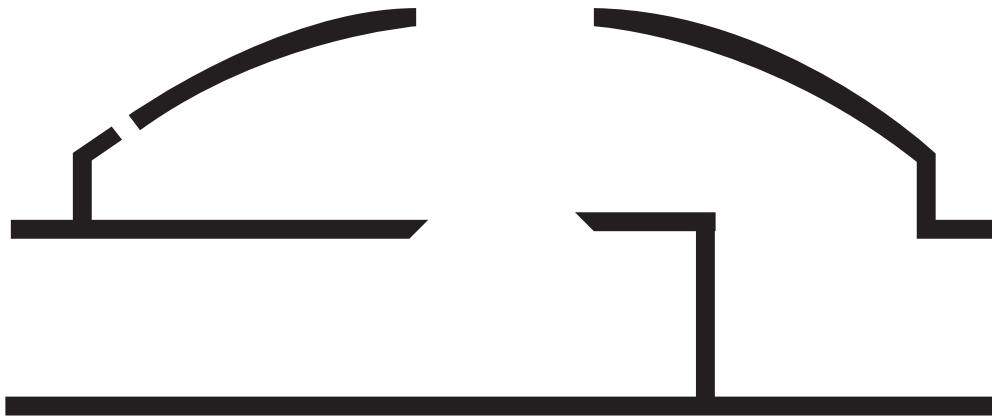
(2 marks)

Total 8 marks

QUESTION 7

The starter drawing below shows a cut away section of a spring-loaded constant pressure appliance regulator.

- (a) Complete the drawing to show all major components.
- (b) Label all parts of the regulator and show the direction of gas flow.



Total 6 marks

QUESTION 8

A natural gas water heater, hob and decorative fire have been installed.

The customer believes that the decorative fire is using too much gas.

(a) List FIVE steps in the procedure for accurately gas rating the appliance.

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

(5 marks) ☐

(b) Explain how it could be confirmed that the gas rate is higher than expected.

(1 mark) ☐

Total 6 marks ☐

QUESTION 9

- (a) Complete combustion is a result of a gas appliance working correctly.

State the TWO main flue gases produced under this situation, and give the chemical symbol for each.

1 _____

2 _____

(2 marks)

- (b) State TWO products of incomplete combustion, and give the chemical symbol for each.

1 _____

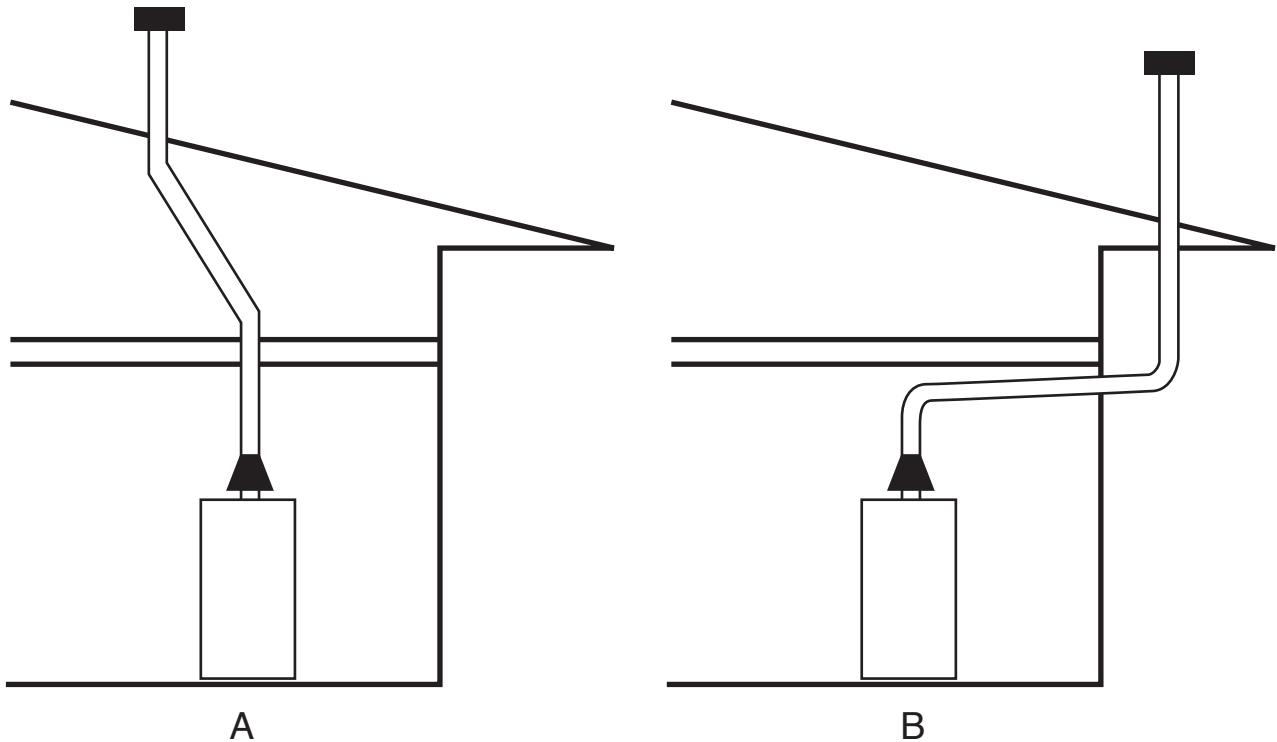
2 _____

(2 marks)

Total 4 marks

QUESTION 10

The diagram below shows two alternative methods of installing the flue for a gas fired storage water heater.



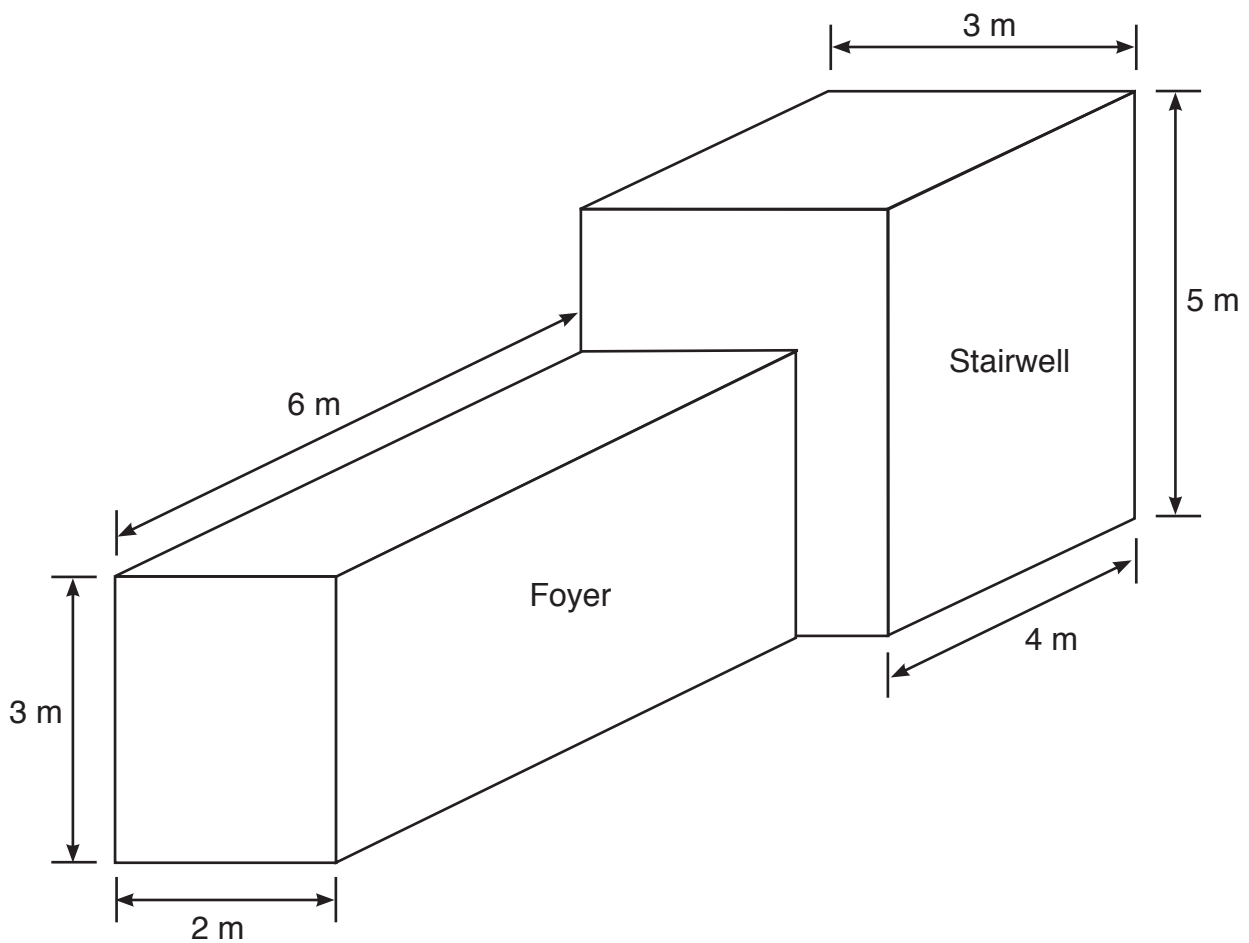
Give THREE advantages of method A compared with method B.

- 1 _____
- 2 _____
- 3 _____

Total 3 marks

QUESTION 11

The foyer and stairwell of an office shown in the following diagram, requires heating.



Flueless, thermostatically controlled heaters are to be installed.

Using AS/NZS 5601 Part 1, calculate in MJ/h the maximum permitted appliance input for the area.

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.

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

1. A chimney is to be used as a flue for an appliance with a cowl fitted to the chimney top.
Which of the following states the minimum clearance from the cowl to the chimney according to AS/NZS 5601 Part 1?

- A 10 mm.
- B 25 mm.
- C 50 mm.
- D 100 mm.
- E 200 mm.

2. Which of the following is the relative density of natural gas?

- A 0.65
- B 0.95
- C 0.981
- D 1.2
- E 1.65

3. Which of the following gives the flammability range for LPG?

- A 2% - 10%.
- B 5% - 15%.
- C 2% - 25%.
- D 10% - 30%.
- E 25% - 70%.

4. According to AS/NZS 5601 Part 2, the lowest opening of a flue terminal installed on a caravan roof from the roof?

- A 10 mm.
- B 25 mm.
- C 50 mm.
- D 100 mm.
- E 200 mm.

☐

5. According to AS/NZS 5601 Part 2, what is the minimum distance between a flue terminal fitted to a motor home and the fuel tank vent outlet?

- A 500 mm.
- B 800 mm.
- C 1000 mm.
- D 1200 mm.
- E 1800 mm.

☐

6. Which of the following describes the operation of an induced draught appliance?

- A Combustion air and fuel gas are pushed through the burner by a fan located before the burner.
- B Combustion air and combustion products are drawn through the appliance by a fan located after the combustion chamber of the appliance.
- C Combustion air is drawn in from the outside atmosphere by a fan, which then pushes the air into the combustion chamber of the appliance, encouraging the fuel gas to flow.
- D An atmospheric burner is supplied air for combustion via natural cross ventilation located below the level of the burner and above the downdraught diverter.
- E A fan interlock is used to ensure that the appliance will not operate unless the air circulation fan for the area is operational, supplying air for combustion.

☐

7. According to AS/NZS 5601 Part 2, why should a change-over regulator be mounted above the level of the cylinder valves?
- A To allow for better vaporisation.
 - B So the regulator can be viewed.
 - C So the regulator will not be cooled by the cylinders.
 - D In case larger cylinders are temporarily fitted.
 - E To allow liquid to flow back into the cylinders.

☐

8. According to AS/NZS 5601 Part 2, above what pressure is an appliance on a boat not permitted to operate?
- A 2.75 kPa.
 - B 3.00 kPa.
 - C 3.50 kPa.
 - D 7.00 kPa.
 - E 10.00 kPa.

☐

9. According to AS/NZS 5601 Part 2, what must permanently fitted space heaters in a boat be?
- A Flueless.
 - B Power-flued.
 - C Room sealed.
 - D Open-flued.
 - E Convection.

☐

10. What is work that is deemed to be more than usually dangerous referred to as?
- A Dangerous work.
 - B High risk work.
 - C Notifiable work.
 - D Restricted work.
 - E Limited work.

☐

11. Which of the following is not a common type of thermostat used on a gas appliance?

- A Thermistor.
- B Bi-metallic.
- C Liquid expansion.
- D Rod and tube.
- E Electromagnetic.

☐

12. Which of the following gives the New Zealand Building Code clause that provides an acceptable solution for making a soaker flashing to suit a 150 mm roof penetration?

- A B2
- B E1
- C E2
- D G13
- E G14

☐

13. Which of the following is the heating value for LPG?

- A 25 MJ/h.
- B 40 MJ/m³.
- C 40 MJ/h.
- D 95 MJ/m³.
- E 95 MJ/h.

☐

14. What is the minimum clearance between a draught diverter relief opening and a wall surface as specified in AS/NZS 5601 Part 1?

- A 25 mm
- B 50 mm
- C 75 mm
- D 100 mm
- E 200 mm

☐

Total 14 marks

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For Examiner's use only

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