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

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No. 9196

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2013

CERTIFYING 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 November 2013 were provided with the following documents:

- New Zealand Building Code Clause E2 External Moisture
- New Zealand Building Code Clause G4 Ventilation
- 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 = $0.7854 \times D^2 \times H$

$$\text{Heating time} = \frac{\text{mass of water (kg)} \times 4.2 \times \text{temp diff (°C)} \times 100}{\text{heat energy input per hour in kJ} \times \text{efficiency (\%)}}$$

$$\text{Correction factor} = \frac{\text{atmospheric pressure + supply pressure}}{\text{atmospheric pressure}}$$

$$\text{Gas rate (m}^3\text{)} = \frac{\text{volume (m}^3\text{)} \times 3600}{\text{time (seconds)}}$$

SECTION A

QUESTION 1

A decorative flame-effect fire has been installed and sealed into a fireplace using the existing chimney as the flue. A cowl is fitted to the top of the chimney. While the heater is operating, products of combustion are spilling into the room.

(a) Give TWO reasons for this to occur in relation to the construction of the chimney.

1 _____

_____

2 _____

_____

(2 marks) ☐

(b) Give TWO ways in which the situation could be remedied.

1 _____

_____

2 _____

_____

(2 marks) ☐

Total 4 marks ☐

QUESTION 2

(a) State the TWO effects of excessive heat loss on the operation of a natural draught flue.

1 _____

_____

2 _____

_____

(2 marks) ☐

(b) Give TWO factors that affect heat loss in the design and installation of a flue.

1 _____

_____

2 _____

_____

(2 marks) ☐

(c) Give FOUR factors other than heat loss that influence flue design.

1 _____

2 _____

3 _____

4 _____

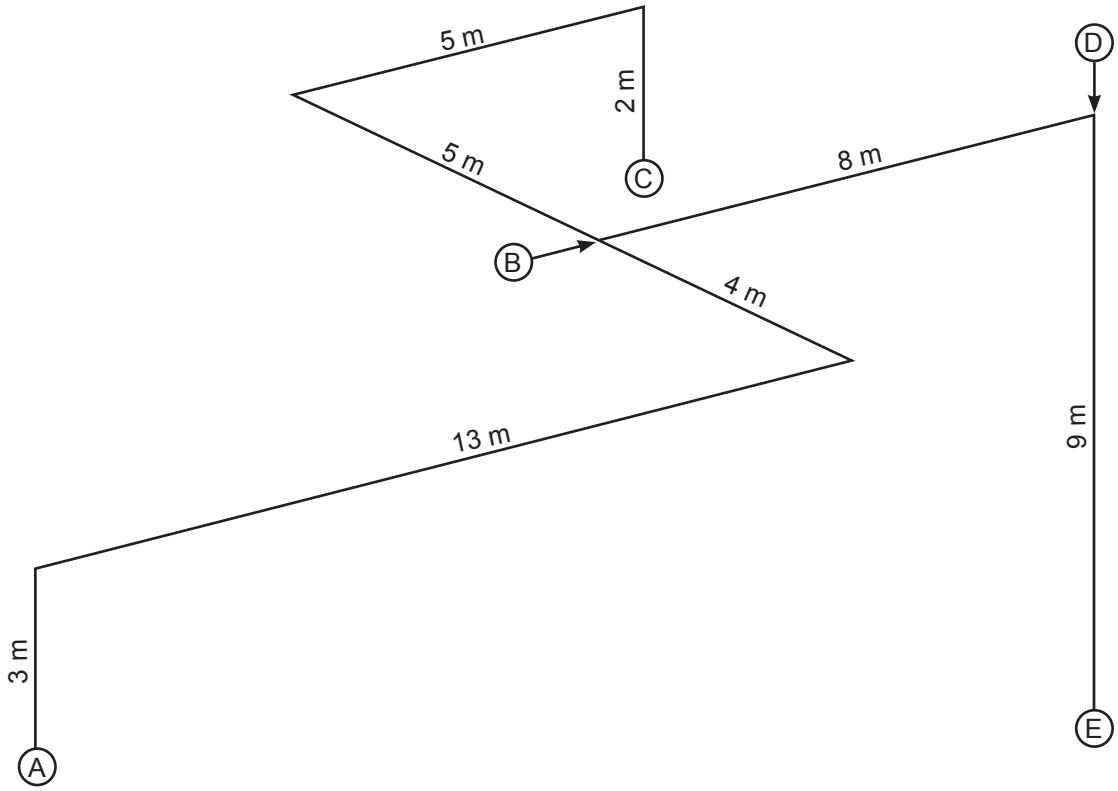
(2 marks) ☐

Total 6 marks ☐

QUESTION 3

The diagram below shows a schematic of steel pipework to be installed in a commercial building. Munson rings with wall brackets using rod hangers are to be used to support the pipework.

- Support is to be provided 100 mm from the end of each pipe.
- Three clips are to be included for each tee, each located 100 mm from the tee.
- Two clips are to be included for each bend, each located 100 mm from the bend.



Complete the following table to show the number of clips and the rod hanger sizes required for the pipework. The clips are to be installed to comply with the minimum requirements of AS/NZS 5601 Part 1.

Pipe Section	Number of clips	Rod hanger size
A – B 100 mm diameter pipe		
B – C 32 mm diameter pipe		
B – D 65 mm diameter pipe		
D – E 40 mm diameter pipe		

Total 8 marks

QUESTION 4

(a) When gas appliances receive their combustion air via a mechanical ventilation system, AS/NZS 5601 Part 1 requires that a particular safety device be installed.

Name this device and explain its purpose.

(2 marks)

(b) Answer the following with reference to the New Zealand Building Code Clause G4/AS1 Ventilation.

A plant room is fitted with mechanical supply ventilation and natural exhaust ventilation. The plant room houses a 650 MJ/h induced draft boiler and two 40 MJ/h storage hot water cylinders with atmospheric burners.

(i) Determine the minimum volume of air per hour the ventilation system must be able to supply.

(5 marks)

(ii) Calculate the minimum size of the high level opening required.

(2 marks)

QUESTION 4 (cont'd)

(iii) A mechanical exhaust is to be fitted to the plant room.

Calculate the minimum volume per hour the exhaust must be capable of moving. Give your answer in m^3/h.

(1 mark)

Total 10 marks

QUESTION 5

(a) A natural gas appliance is to be converted to operate on LPG.

List SIX items that must be checked and that may need changing in the conversion.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(6 marks)

(b) If the conversion in (a) was from LPG to natural gas, give TWO factors relating to the installation pipework that must be checked and that may need changing.

1 _____

2 _____

(2 marks)

(c) Give FIVE factors that need to be specified when selecting a regulator for a gas installation.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks)

Total 13 marks

QUESTION 6

(a) AS/NZS 5601 Part 2 gives the purpose of ventilation of compartments where gas appliances are installed.

Give TWO conditions the ventilation is designed to prevent.

1 _____

_____

2 _____

_____

(1 mark)

(b) Two 6 kW gas cookers are to be installed in a boat which is designed for the occupancy of five people.

Using AS/NZS 5601 Part 2, calculate the minimum free area of the ventilation required for the area.

_____

_____

_____

_____

(4 marks)

(c) According to AS/NZS 5601 Part 2, high and low ventilation is required in compartments of a boat where gas appliances are installed.

Give TWO systems/devices that may be used to assist the ventilation of the compartments.

1 _____

2 _____

(1 mark)

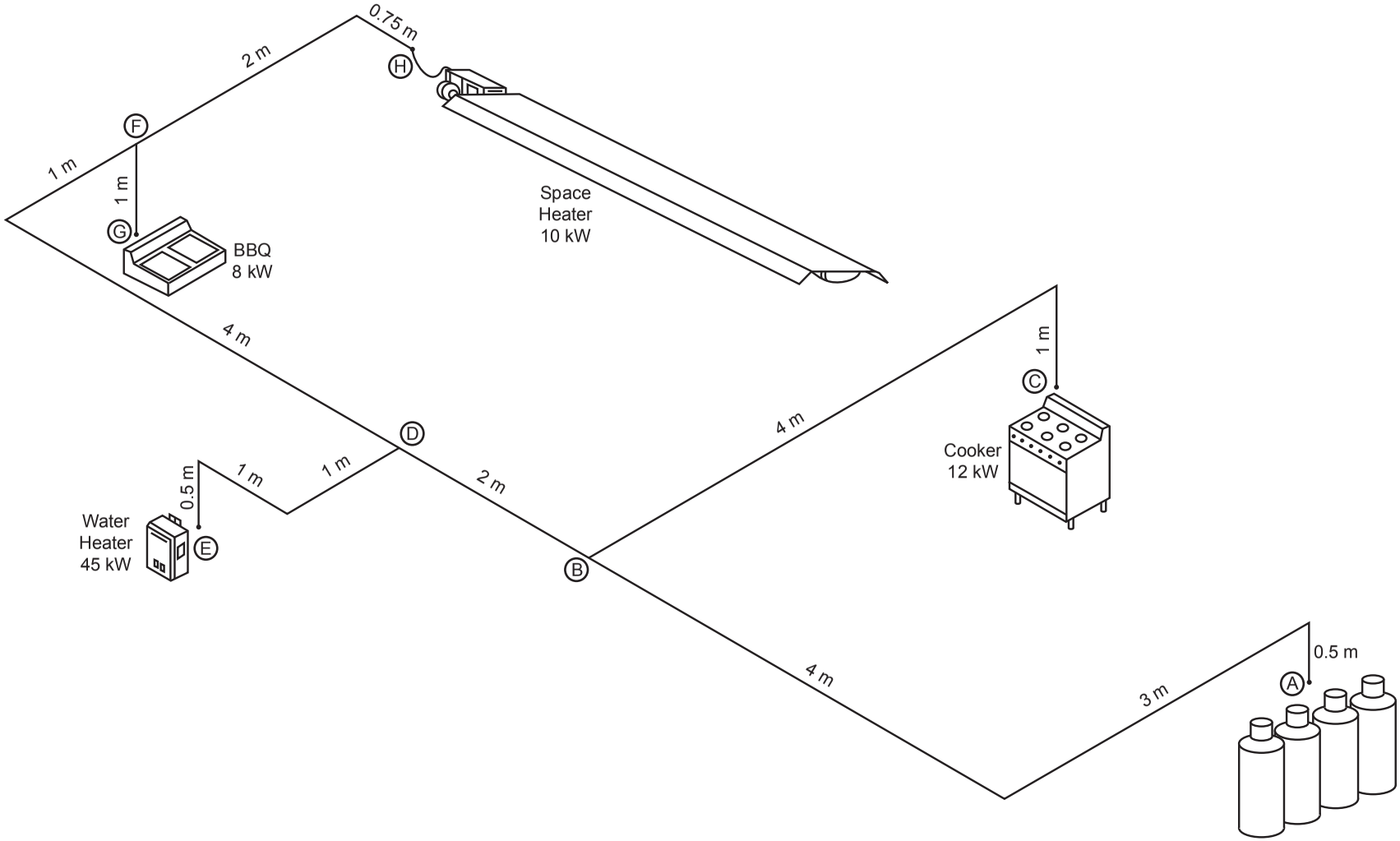
Total 6 marks

QUESTION 7

The diagram below shows the pipework and appliances for a gas installation on a river boat.

Installation details are as follows:

- LPG
- Copper pipe (NZS 3501)
- the installation supply pressure is 2.75 kPa.



QUESTION 7 (cont'd)

Use AS/NZS 5601 Part 2 Appendix D to complete the table below to pipe size the installation. You may use either the sizing tables or the sizing graphs to answer this question.

Main/Longest run	

Pipe Section	Length (metres)	Gas flow (MJ/h)	Nominal size
A – B			
B – C			
B – D			
D – E			
D – F			
F – G			
F – H			

Total 18 marks

QUESTION 8

Answer this question in accordance with New Zealand Building Code Clause E2/AS1 External Moisture.

A corrugated iron roof has a pitch of 25°. The maximum wind speed expected for the location is 35 metres per second.

A 250 mm gas appliance flue has been installed penetrating 600 mm below the ridge.

Sketch a diagram showing the support and flashing requirements for the installation. Show all measurements.

Total 8 marks

QUESTION 9

(a) State who Notifiable Work forms should be submitted to.

_____

(1 mark) ☐

(b) State how long before work commences a Notifiable Work form should be submitted.

_____

(1 mark) ☐

(c) Give FIVE items of information that are to be provided on a Notifiable Work form.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks) ☐

(d) Give EIGHT items of information that should be recorded on an accident record when an accident has occurred.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

(4 marks) ☐

Total 11 marks ☐

QUESTION 10

A pipe is to be installed through the roof of an industrial building while the roof is being constructed. The roofing contractor has stated that a safety mesh or a safety net will be in place.

(a) Describe each of these two options.

(i) Safety mesh

(ii) Safety net

(4 marks)

(b) Give FOUR factors that can shorten the life of fall arrest equipment.

1

2

3

4

(2 marks)

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. According to AS/NZS 5601 Part 2, what is the minimum allowable clearance between gas piping and electrical services?

   A 10 mm.

   B 25 mm.

   C 50 mm.

   D 100 mm.

   E 150 mm.

   ☐

2. According to AS/NZS 5601 Part 2, what is the maximum distance that a pipe support can be from an elbow?

   A 25 mm.

   B 50 mm.

   C 100 mm.

   D 150 mm.

   E 250 mm.

   ☐

3. A gas appliance is installed under a floor and is located over 2 m from the access opening.

   What is the minimum allowable clearance between the lowest part of the floor structure and the ground from the access opening to the appliance?

   A 600 mm.

   B 800 mm.

   C 1000 mm.

   D 1200 mm.

   E 1500 mm.

   ☐

4. According to AS/NZS 5601 Part 2, what is the nominal lower explosive limit of LPG?

A 2%

B 5%

C 7%

D 9%

E 15%

☐

5. According to AS/NZS 5601 Part 1, permanent access or another means of access is required where the base of the appliance mounted on a wall of a commercial building is more than what distance from the ground?

A 2.4 m.

B 2.5 m.

C 2.7 m.

D 3.0 m.

E 5.0 m.

☐

6. According to AS/NZS 5601 Part 1, what is the maximum size notch or hole permitted where a notch or hole is cut into a 75 mm wide timber stud?

A 19 mm.

B 25 mm.

C 30 mm.

D 32 mm.

E 40 mm.

☐

7. An open-flued gas appliance is to be installed in a garage without a vapour proof wall.

What is the minimum allowable distance between the floor and the air intake and burners?

A 200 mm.

B 250 mm.

C 300 mm.

D 400 mm.

E 450 mm.

☐

8. A certifying practitioner ceases to supervise a person by notifying the Plumbers, Gasfitters and Drainlayers Board in writing.

When does the certifier's responsibility for the work of the supervised person cease?

A When the certifier informs the supervised person.

B When the notification is signed by the certifier.

C When the notification is received by the Board.

D When the licensing year finishes.

E When the notification is signed by the supervised person.

☐

9. There is a gas that occurs in the ground and naturally smells like rotten eggs. When exposed to large concentrations of this gas, peoples' sense of smell is lost so that the gas cannot be readily detected by its smell.

What is the gas?

A Methane.

B Propane.

C Ethane.

D Carbon dioxide.

E Hydrogen sulphide.

☐

10. Which of the following is the definition of an alternative solution in relation to the New Zealand Building Code?

A A performance based standard that states how completed work and its parts must perform.

B A custom designed method that is not included in the Building Code but will fulfil the requirements of the code.

C A pre-approved method of compliance that is included in the Building Code.

D A design solution, calculation or test procedure that has been approved and, if used, will guarantee an installation will comply with the Building Code.

E A statement supplied by or on behalf of any applicant for a building consent.

☐

Total 10 marks ☐

For Examiner's use only

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