

Affix label with Candidate Code
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Number if known

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No. 9196



Plumbers,
Gasfitters and
Drainlayers Board

CRAFTSMAN EXAMINATION, NOVEMBER 2008

GASFITTING

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 the blank pages at the back of this booklet. Clearly write the question number 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

The following are NOT permitted in the examination room:

Any publications, Acts, Regulations, Codes of Practice, or Standards

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

QUESTION 1

- (a) A gasfitter is to replace an existing domestic low pressure electric water heater with a mains pressure gas water heater.

Name THREE Acts the gasfitter would need to have a working knowledge of in order to carry out this installation.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

- (b) Certifying craftsman gasfitters accept legal responsibilities under self certification. State these responsibilities.

- _____
- _____
- _____
- _____

(2 marks)

- (c) A craftsman gasfitter issues a gas certification certificate for completed work. List the FOUR parties who must have a copy.

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

(4 marks)

Total 9 marks

QUESTION 2

(a) An LPG system is to be installed in a caravan or boat. List SIX of the requirements that must be met for the installation of the pipe work to comply with NZS 5428.

- 1 _____

- 2 _____

- 3 _____

- 4 _____

- 5 _____

- 6 _____

(6 marks)

(b) In addition to the installation requirements in (a), pipe work in caravans is subject to special installation requirements. List THREE of these.

- 1 _____

- 2 _____

- 3 _____

(3 marks)

QUESTION 2 (cont'd)

(c) In addition to the installation requirements in (a), pipe work in boats is subject to special installation requirements. List THREE of these.

- 1 _____

- 2 _____

- 3 _____

(3 marks)

(d) Metallic pipe work is to be used in an LPG installation in a caravan or boat. State TWO precautions, other than separation distances, that must be taken to avoid a potentially dangerous situation between the pipe work and the electrical system.

- 1 _____

- 2 _____

(2 marks)

Total 14 marks

QUESTION 3

A gas-fired hot water storage system is to be installed. List SIX specific factors that should be considered when selecting the location for the water heater.

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

Total 3 marks

QUESTION 4

(a) List SIX locations where quick connect device sockets for gas hose assemblies are prohibited from being installed.

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

(3 marks)

(b) When installing quick connect device sockets and connection points for hose assemblies, state TWO methods that could be used to comply with NZS 5261: Part 2.

- 1 _____

- 2 _____

(2 marks)

(c) A gasfitter has been asked to install a new proprietary gas piping system.

(i) State how the gasfitter can check that the product to be installed meets compliance requirements.

- _____
- _____

(1 mark)

(ii) State the way in which the system must comply with the manufacturer's instructions.

- _____
- _____

(1 mark)

Total 7 marks

QUESTION 5

A customer wishes to convert from an electric storage hot water system to a continuous flow liquefied petroleum gas (LPG) fired hot water system. Two gas water heaters are required to supply the two areas of the house.

Area 1 water heater is to deliver 18 litres/hr of hot water at a 35°C temperature rise, and has a gas input rate of 55kW/hr.

Average daily water usage is 430 litres.

Area 2 water heater is to deliver 14 litres/hr of hot water at a 35°C temperature rise, and has a gas input rate of 43kW/hr.

Average daily water usage is 140 litres.

The price of LPG is \$2.83/kg excluding GST.

1kg of LPG will deliver 250m³ of gas.

The calorific value (heating value) of the LPG is 96MJ/m³.

(a) Calculate the GST exclusive cost for each kWh of energy. Show all working.

(2 marks)

QUESTION 5 (cont'd)

(b) Calculate the GST inclusive energy price for a 31 day monthly period. Show all working.

(7 marks)

Total 9 marks

QUESTION 6

(a) State THREE effects on the operation of a gas appliance where the combustion process may be compromised by the operation of a range hood, air distribution system or ventilation system.

1 _____

2 _____

3 _____

(3 marks)

(b) A gas heater is installed in an area where excessive dust, lint or flammable vapours may be present. Explain the TWO installation requirements that must be met.

1 _____
2 _____

(2 marks)

(c) An automatic commercial clothes drier with an exhaust fan has been installed. Give TWO electrical safety devices that must be included in the installation.

1 _____

2 _____

(2 marks)

QUESTION 6 (cont'd)

(d) List TWO requirements relating to the exhaust duct from the clothes drier in (c) that must be met.

- 1 _____

- 2 _____

(2 marks)

Total 9 marks

QUESTION 7

Answer the following questions in relation to the design of a domestic gas installation.

- (a) State TWO factors relating to safety that need to be considered when deciding the position for a wall mounted flueless heater.

1 _____
2 _____

(2 marks)

- (b) State TWO requirements that must be met when a flued space heater is installed in a bedroom.

1 _____
2 _____

(2 marks)

- (c) State TWO likely effects on the performance of a gas appliance if the air for combustion is vitiated.

1 _____
2 _____

(1 mark)

- (d) State TWO requirements a joint in a gas pipe that is concealed in a wall must meet.

1 _____
2 _____

(1 mark)

- (e) State the distances that combustible material must be from the burners in a gas hob installed in a bench-top.

(2 marks)

Total 8 marks

QUESTION 8

(a) List THREE locations in a residence where the installation of gas lights is prohibited.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) A room measures 4.500m by 3.100m and has a ceiling height of 2.400m.

Gas lights are to be installed in the room.
Each gas light has an input rating of 0.396MJ/h.
NZS 5261 states that the maximum total input rating of gas lights must not exceed 0.2MJ/h/m³ of room volume.

Calculate the maximum number of lights that can be installed in the room.

Show all working.

(3 marks)

Total 6 marks

QUESTION 9

An existing non-condensing natural gas hot water central heating boiler in a commercial building is to be replaced with a new condensing (recuperative) gas boiler.

- (a) Explain how the operation of the condensing boiler differs from that of the non-condensing gas boiler.

(3 marks)

- (b) Give THREE advantages the replacement boiler has.

1

2

3

(3 marks)

QUESTION 9 (cont'd)

(c) Give THREE disadvantages the replacement boiler has.

- 1 _____

- 2 _____

- 3 _____

(3 marks)

(d) State the TWO atmospheric factors that may affect the efficiency of the condensing boiler.

- 1 _____

- 2 _____

(2 marks)

Total 11 marks

QUESTION 10

(a) Explain fully how a flame rod controls the gas flow to a burner.

(3 marks)

(b) An existing regulator controlling the gas supply to a burner train is to be modified to supply a greater volume of gas at a higher pressure. Identify which components of the regulator need to be replaced and give a reason for each. (Assume all other equipment is suitable for the increased throughput.)

(4 marks)

QUESTION 10 (cont'd)

(c) Explain the meaning of the following terms in relation to an industrial gas burner.

(i) Inspiration: _____

(ii) Aspiration: _____

(2 marks)

(d) Describe how the double block valves fitted to a large industrial boiler should be tested to determine if they are leaking when closed.

(4 marks)

Total 13 marks

QUESTION 11

(a) An industrial gas boiler fitted with a package burner has been installed. Give the reasons why it is important that the amount of flue draught should be correctly set and monitored.

(4 marks)

(b) State FOUR factors, other than cost and material, that must be taken into account when designing a power flue for a gas appliance.

1

2

3

4

(4 marks)

Total 8 marks

QUESTION 12

A flued gas appliance is to be installed. Give THREE requirements to be met for the ventilation.

- 1 _____

- 2 _____

- 3 _____

Total 3 marks

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Question number _____

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Question number _____

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Question number	Marks	Marks
1		
2		
3		
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11		
12		
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