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Number if known

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No. 9196



Plumbers,
Gasfitters and
Drainlayers Board

CRAFTSMAN EXAMINATION, JUNE 2009

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 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

QUESTION 1

(a) State FOUR purposes of a Gasfitting Certification Certificate.

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

(2 marks)

(b) State for what period of time the person who signs a Gasfitting Certification Certificate must retain a copy.

(1 mark)

(c) State THREE matters relating to the gas supply that must be verified prior to commencing work on a new gas installation.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(d) State the steps necessary to ensure a gas appliance is safe for installation:

(i) if the appliance is supplied in large numbers.

(2 marks)

(ii) if the appliance is supplied as part of a batch of fewer than 11.

(2 marks)

Total 10 marks

QUESTION 2

A gas fired storage water heater of 240 litres capacity has a gas burner rated at 130 MJ/h.

The thermal efficiency of the appliance is 75%.

Calculate how long in minutes it will take to heat the water from 15°C to 70°C.

Show all working.

Assume water has a specific heat capacity of 4.2 kJ/kg.°C

Formula:

Heat energy = mass × specific heat × temperature rise

Total 3 marks

QUESTION 3

An existing liquefied petroleum gas (LPG) fired storage water heater is installed in a cupboard. The water heater is the only gas appliance in the premises. The appliance is to be converted to operate on natural gas.

Identify TWELVE steps in the work associated with the appliance and the existing pipework that must be carried out to complete the conversion.

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____
- 8 _____
- 9 _____
- 10 _____
- 11 _____
- 12 _____

Total 6 marks

QUESTION 4

- (a) A 50mm natural gas pipe, operating at 10kPa, is to be laid under a private roadway between two buildings.

Provide details for each of the following.

Pipe material: _____

Protection: _____

Depth: _____

Back-filling: _____

Marking: _____

Risers at each end: _____

(6 marks)

☐

- (b) A vented gas pressure regulator is to be installed.

State the minimum size of the vent pipe in the following situations.

- (i) The vent line does not exceed 10m in length.

- (ii) The vent line is between 10m and 30m in length.

(2 marks)

☐

QUESTION 4 (cont'd)

- (c) An LPG system is to be installed in a caravan.

List TWO methods of minimising the effects of vibration on gas pipework adjacent to the pressure regulator.

- 1 _____
- 2 _____

(2 marks)

- (d) A gas pipe is to be installed at high level through a warehouse.

State THREE factors to be considered when specifying the installation of the pipe.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

- (e) Name FOUR items to be specified when selecting the primary gas meter for a large industrial site.

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

(2 marks)

Total 15 marks

QUESTION 5

- (a) State, in sequence, EIGHT steps in the procedure to purge and commission just the gas pipework downstream from a primary meter.

- 1 _____

- 2 _____

- 3 _____

- 4 _____

- 5 _____

- 6 _____

- 7 _____

- 8 _____

(6 marks)

- (b) There are two ways in which a gas space heater can be installed in a bedroom or bathroom for the installation to comply with NZS 5261.

State, in full, the TWO requirements that must be met for the two ways.

- 1 _____

- 2 _____

(2 marks)

Total 8 marks

QUESTION 6

A gas fired warm air central heating system is to be designed for a house.

(a) Give an ideal position for a warm air outlet in the lounge if it is located in the:

(i) floor

(ii) wall

(iii) ceiling.

(3 marks)

(b) Explain why an indirect warm air furnace must be used for the system.

(1 mark)

(c) Give TWO factors to be considered when deciding where to position the room thermostat.

1

2

(1 mark)

(d) List the steps the installer should take to balance the system.

(2 marks)

Total 7 marks

QUESTION 7

- (a) A domestic gas hob is to be positioned in a kitchen workbench.

Specify FOUR installation criteria that must be met.

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

(2 marks)

- (b) A gas wall oven is to be installed in a domestic kitchen.

Give SIX requirements that must be met in relation to the installation of the oven.

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

(3 marks)

QUESTION 7 (cont'd)

(c) A gas wall oven has been installed as an addition to an existing installation.

List TWELVE steps in the procedure to commission and certify the new installation.

1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
9	_____
10	_____
11	_____
12	_____

(6 marks)

Total 11 marks

QUESTION 8

- (a) The position for a gas regulator meter station is to be determined.

State SIX requirements that must be met in relation to the positioning of the station.

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

(3 marks)

- (b) Identify TWO likely causes of each of the following faults discovered during the commissioning of a new gas installation.

- (i) The gas pressure at the appliance is too high.

- 1 _____
- 2 _____

(2 marks)

- (ii) The gas pressure at the appliance is too low.

- 1 _____
- 2 _____

(2 marks)

QUESTION 8 (cont'd)

(c) A new gas system is being installed for a high rise block of flats. The working pressure is less than 7kPa.

- (i) Specify the conditions under which copper gas pipes that are concealed in a wall may be jointed.

(2 marks) ☐

- (ii) List TWO conditions under which the gas riser pipe can be installed in a vertical duct with other services.

1

2

(2 marks) ☐

Total 11 marks ☐

QUESTION 9

- (a) An installation which contains a mechanical ventilation system for a gas fired boiler is to be certified.

State THREE checks that must be carried out on the ventilation system.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

- (b) A gas fired air curtain is to be installed in a warehouse.

Specify the most suitable location for the air curtain.

(1 mark)

Total 4 marks

QUESTION 10

Gas is to be used in several separate buildings on a large industrial site.

(a) State SIX facts that are needed before the pipework can be designed.

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

(3 marks)

(b) Briefly describe the steps to be taken to determine the pipe diameters for the installation.

(3 marks)

(c) A new 100m section of 40mm underground steel gas pipe having a maximum working pressure of 5kPa is to be subjected to a pipework pressure test.

List SIX steps to carry out this test.

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

(3 marks)

Total 9 marks

QUESTION 11

A flame monitoring system which does not rely on the temperature effect of the flame is to be used on an industrial installation.

- (a) Describe the operation of the flame monitoring system.

(3 marks)

- (b) Give TWO reasons, other than relying on the temperature effect of the flame, why this type of flame monitoring system would have been selected for industrial use.

1

2

(2 marks)

Total 5 marks

QUESTION 12

A boiler fitted with a package burner operates on natural gas.

- (a) Identify the THREE flue gas measurements that are critical to establish the boiler efficiency (flue gas analysis).

1 _____

2 _____

3 _____

(3 marks)

- (b) For each of the measurements identified in (a), indicate a value if efficiency is maximised.

1 _____

2 _____

3 _____

(3 marks)

- (c) If it is suspected that there is no excess air, state what other measurement should be made and give the reason for this.

(2 marks)

- (d) Give THREE conditions that must be met for accurate flue gas analysis.

1 _____

2 _____

3 _____

(3 marks)

Total 11 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		
12		
Total		