

Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known, or name here.
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(Supervisor's Code only)

No. 9192



Plumbers,
Gasfitters and
Drainlayers Board

In cooperation with
New Zealand Qualifications Authority

REGISTRATION EXAMINATION, 2005 PLUMBING

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.

The pass mark for this examination is 60 marks.

Write your answers and draw your sketches in this booklet. If you need more paper, ask the Supervisor for extra sheets. Write your Candidate Code Number and the number 9192 on any extra sheets used, and attach them to this booklet. **NO SEPARATE ANSWER BOOKLET IS TO BE USED.** Write the number of extra sheets used in the box on the last page of this booklet. Write NIL if you have not used any.

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 16 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 THREE hazards you may encounter when working with gases.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Describe EIGHT basic rules regarding the care and operation of electrical leads and appliances that you must follow at all times to safeguard yourself against shock or electrocution.

- 1 _____

- 2 _____

- 3 _____

- 4 _____

- 5 _____

- 6 _____

- 7 _____

- 8 _____

(4 marks)

Total 7 marks

QUESTION 2

- (a) Fully describe, in the correct sequence, the method of testing water supply piping which meets the minimum requirements of the New Zealand Building Code 1991. Include in your answer the minimum test pressures and test time.

1 _____

2 _____

3 _____

4 _____

(4 marks)

- (b) For buried pipes of 50 mm diameter or less, state the minimum cover required in each of the following situations:

1 Under garden lawns or other areas not subjected to traffic

2 Under residential driveways subjected to occasional heavy traffic

(2 marks)

Total 6 marks

QUESTION 3

What training and qualification must a person have to be authorised to safely remove any asbestos products which may be encountered on a building site?

(2 marks)

Total 2 marks

QUESTION 4

(a) Where would a primary water meter usually be located?

_____ (1 mark)

(b) Who would supply the primary water meter?

_____ (1 mark)

(c) Explain what is required before a new water main can be brought into service.

_____ (3 marks)

(d) Name SIX materials that are acceptable for use as water mains.

1 _____
2 _____
3 _____
4 _____
5 _____
6 _____ (3 marks)

(e) State THREE items of equipment that may be installed at the boundary on a large water main supplying a commercial/industrial complex.

1 _____
2 _____
3 _____ (3 marks)

Total 11 marks

QUESTION 5

Fully describe the following terms:

(a) **Maximum head**, including how it is expressed and measured.

(3 marks)

(b) **Dew-point**

(2 marks)

(c) **Diffusion**

(2 marks)

(d) **Galvanic action**

(3 marks)

Total 10 marks

QUESTION 6

All working must be shown for each question.

(Your answers are to be correct to **three decimal places**).

- (a) A cylindrical supply tank is to pass through a **500 mm** square ceiling opening. The tank is to have a capacity of **180 litres**.

Transpose the following formula to calculate the height of the tank to allow **25 mm** clearance on all sides when passing through the ceiling opening.

(3 marks)

Formula

$$\text{Capacity} = 0.7854 \times D^2 \times H \times 1000$$

Where

Capacity = Capacity of cylinder.

D = Diameter of the cylinder.

H = Height of cylinder.

QUESTION 6 (contd)

- (b) A cylindrical outer sleeve is required in a ceiling space to allow a **300 mm** diameter flue to pass through. The sleeve requires a **50 mm** clearance all round and needs to be 1.2 m long. Add an additional **20 mm** to the circumference to allow for a lap.

Use the following formulae to calculate the area of the sheet-metal required, in square metres.

(2 marks)

Formulae

$$\text{Circumference} = \pi \times D$$

Where

$$\pi = \text{Pi}$$

D = Diameter of outer sleeve

$$\text{Area} = (\text{Circumference} + \text{Lap}) \times \text{Height}$$

Where

H = Height of sleeve

Total 5 marks

QUESTION 7

Using your knowledge of the acceptable solutions E1/AS1 to the New Zealand Building Code:

- (a) State the minimum cross-sectional area of any roof gutter.

_____ (1 mark)

- (b) State the THREE factors that are used when calculating the size of roof gutters.

1 _____

2 _____

3 _____ (3 marks)

- (c) State when it is necessary to provide overflow outlets to roof gutters.

_____ (1 mark)

- (d) State FOUR conditions which apply to the installation of overflow outlets to internal gutters.

1 _____

2 _____

3 _____

4 _____ (4 marks)

Total 9 marks

QUESTION 8

(a) State FOUR circumstances where indirect water heating systems may be used.

1 _____

2 _____

3 _____

4 _____

(2 marks each)

(8 marks)

(b) Name another word commonly used in the plumbing industry to describe an indirect hot water heater.

(1 mark)

(c) There are three common methods used for heat exchange in indirect systems. Name **two** of these.

(1 mark)

Total 10 marks

QUESTION 9

(a) Define the following terms in relation to sanitary plumbing.

Water seal _____

Fixture pair _____

Vertical pipe _____

Ventilating pipe _____

Surcharge _____

Soil pipe _____

Floor waste gully trap _____

Relief vent _____

Discharge pipe _____

Graded pipe _____

(10 marks)

QUESTION 9 (contd)

(b) Describe a **single stack** system of sanitary plumbing.

(1 mark)

(c) Describe a **single stack modified** system of sanitary plumbing.

(2 marks)

Total 13 marks

QUESTION 10

- (a) State THREE factors to be considered in the treatment and disposal of industrial liquid waste.

1 _____

2 _____

3 _____

(3 marks)

- (b) Where should an interceptor trap be installed?

(1 mark)

- (c) What type of industrial liquid waste requires the installation of an interceptor trap?

(2 marks)

Total 6 marks

QUESTION 11

- (a) When are pressure reducing valves or pressure limiting valves required at a hot water cylinder?

(1 mark)

- (b) What is a service pipe?

(1 mark)

- (c) Explain how the air gap is maintained in a supply tank and state the required measurements.

(2 marks)

- (d) The following table lists FOUR properties of water that plumbers/gasfitters should be aware of. Briefly **describe EACH property** and **state an effect** of each on the pipework and metal fittings.

Property	Description	Effect
(1) Potability		
(2) Turbidity		
(3) Softness		
(4) Hardness		

(8 marks)

Total 12 marks

QUESTION 12

With regard to the Plumbers, Gasfitters and Drainlayers Act 1976 and current amendments answer the following:

- (a) List **three** groups of people who are required to hold a limited certificate to do plumbing and/or gasfitting.

1 _____

2 _____

3 _____

(3 marks)

- (b) What restriction is initially placed on a person who has been granted a limited certificate, and for how long does the restriction apply?

(3 marks)

- (c) What is the minimum continuous period that a person (other than an apprentice) who wishes to sit the examination for registration as a plumber and/or gasfitter is required to hold a limited certificate?

(1 mark)

- (d) Who is required to countersign every application for a limited certificate?

(2 marks)

Total 9 marks