

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

No. 9192



Plumbers,  
Gasfitters and  
Drainlayers Board

## REGISTRATION EXAMINATION, JUNE 2007

# 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.

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, 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 20 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) Describe FOUR methods of preventing the collapse of a trench.

- 1 \_\_\_\_\_  
\_\_\_\_\_
- 2 \_\_\_\_\_  
\_\_\_\_\_
- 3 \_\_\_\_\_  
\_\_\_\_\_
- 4 \_\_\_\_\_  
\_\_\_\_\_

(2 marks)

(b) State TWO precautions which should be taken to ensure members of the public do not fall into an excavated trench at night-time.

- 1 \_\_\_\_\_  
\_\_\_\_\_
- 2 \_\_\_\_\_  
\_\_\_\_\_

(1 mark)

**QUESTION 1 (cont'd)**

(c) Water supply installations may require earth (equipotential) bonding to be provided.  
Give THREE situations where this is required.

1 \_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

(3 marks)

**Total 6 marks**

## QUESTION 2

State the meaning of the word 'determination' as used in the New Zealand Building Act.

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Total 2 marks

**QUESTION 3**

(a) List SIX dangers to be aware of when gas welding or cutting pipes or tanks.

1 \_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_

5 \_\_\_\_\_  
\_\_\_\_\_

6 \_\_\_\_\_  
\_\_\_\_\_

(3 marks)

**QUESTION 3 (cont'd)**

(b) List THREE safe methods of transporting and storing oxygen and acetylene cylinders that are used for gas welding.

1 \_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

(3 marks)

**Total 6 marks**

**QUESTION 4**

(a) Describe TWO outcomes of insufficient hydraulic gradient in a low-pressure water system.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

(b) Describe how head has an effect on a water supply system.

\_\_\_\_\_

\_\_\_\_\_

(1 mark)

(c) State TWO factors (other than frictional loss) that determine the amount of water discharged through a pipe.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

**Total 5 marks**



**QUESTION 5**

(a) State TWO causes of excessive noise in a pressure pumped water system, and give a remedy for each.

Cause \_\_\_\_\_

Remedy \_\_\_\_\_

\_\_\_\_\_

Cause \_\_\_\_\_

Remedy \_\_\_\_\_

\_\_\_\_\_

(2 marks)

(b) Give TWO reasons why a pump or a pressure system may continue to stop and start whether or not water is being used, and give a remedy for each.

Reason \_\_\_\_\_

Remedy \_\_\_\_\_

\_\_\_\_\_

Reason \_\_\_\_\_

Remedy \_\_\_\_\_

\_\_\_\_\_

(4 marks)

(c) State TWO methods of automatically controlling the water level in a supply tank from a pumped system.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

(2 marks)

**QUESTION 5 (cont'd)**

(d) Explain what is meant by the term positive suction head in a pump system.

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(1 mark)

(e) State the purpose of a foot valve on a suction line and explain why it is required.

Purpose 

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Explanation 

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(2 marks)

(f) Name ONE type of pump best suited for each of the following situations on a water supply.

(i) A pump required for suction and pumping.

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(ii) A pump installed at water level and required to pump water only.

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(1 mark)

**Total 12 marks**

## QUESTION 6

- (a) With the exception of cost, state SIX factors to be considered when choosing pipe material for the design of a cold water system.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_

(3 marks)

- (b) State FOUR requirements of properly designed pipe supports.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_

(2 marks)

**Total 5 marks**

**QUESTION 7**

- (a) A cylindrical supply tank is to have a capacity of 270 L. The tank is required to pass through a manhole that is 615 mm x 615 mm. How high will the tank be after allowing 20 mm clearance on each side of the tank to allow it to pass through the manhole? (Show all working and give your answer to 3 decimal places.)

Formula:  $V = D^2 \times 0.7854 \times H$

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(3 marks)

- (b) Calculate, in litres, the amount of water that would fall on a roof with an area of 155 m<sup>2</sup> when subjected to a rainstorm having an intensity of 75 mm/hour for a period of 45 minutes.

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(2 marks)

**QUESTION 7 (cont'd)**

- (c) A pipe 750 mm long contains 13.254 L of water. Calculate the diameter of the pipe in millimetres.

Formula:  $V = D^2 \times 0.7854 \times L$

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(3 marks)

- (d) Calculate the length of the hypotenuse of a right-angled triangle with a base of 6.500 m and a height of 1900 mm. (Answer to 3 decimal places.)

Formula: Hypotenuse squared = base squared + vertical height squared

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(2 marks)

**Total 10 marks**

## QUESTION 8

The following terms are used in relation to construction drawings.  
Give a brief description of each.

(i) Plan

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(ii) Cross section

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(iii) Isometric projection

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(iv) Elevation

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Total 4 marks

**QUESTION 9**

(a) State SIX factors that have to be considered when selecting the type of heating and air-conditioning required in a room.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_

(6 marks)

(b) State where the air/dust filter is usually located on a ducted warm air central heating system.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(1 mark)

(c) (i) State the device used to prevent a central heating furnace from overheating should the control thermostat fail.

\_\_\_\_\_

(ii) State the outcome if this device is activated.

\_\_\_\_\_

(2 marks)

**QUESTION 9 (cont'd)**

(d) State the effect of ducting return air back to the furnace.

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(1 mark)

(e) State where an air supply grill should be positioned in a bedroom to provide the most efficient distribution of heated air.

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(1 mark)

**Total 11 marks**



**QUESTION 10**

(a) Describe THREE methods for the disposal of condensate waste from a refrigeration unit.

- 1 \_\_\_\_\_  
\_\_\_\_\_
- 2 \_\_\_\_\_  
\_\_\_\_\_
- 3 \_\_\_\_\_  
\_\_\_\_\_

(6 marks)

(b) State TWO discharge requirements associated with sinks in a commercial kitchen.

- 1 \_\_\_\_\_  
\_\_\_\_\_
- 2 \_\_\_\_\_  
\_\_\_\_\_

(2 marks)

(c) Name THREE distinct types of flushing apparatus that may be used when designing a system for flushing water closet (WC) pans.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_

(3 marks)

**Total 11 marks**

**QUESTION 11**

(a) (i) Define a floor waste gully.

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(ii) State the purpose of a floor waste gully.

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(2 marks)

(b) State the requirements of the New Zealand Building Code Approved Document G13 AS1 for the location of a water trap serving a sanitary fixture or appliance.

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(1 mark)

(c) Give FOUR examples where a single water trap may serve more than one outlet from sanitary fixtures or appliances.

1 

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2 

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3 

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(4 marks)

(d) State the minimum depth of water seal, as per the New Zealand Building Code Approved Document G13 AS1, for a waste pipe that discharges over a gully trap.

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(1 mark)

**Total 8 marks**

## QUESTION 12

- (a) Draw an elevation of an above ground installation of a reduced pressure zone device (RPZD) for the protection of a potable water supply.

(1 mark)

- (b) On your diagram in (a) label all the components and show the direction of flow.

(4 marks)

- (c) State TWO requirements for the relief valve outlet to comply with the New Zealand Building Code G12 AS1.

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(2 marks)

**Total 7 marks**

### QUESTION 13

State FOUR conditions that must be met when installing cold water expansion valves to comply with NZBC G12 AS1.

1 \_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_

Total 4 marks

**QUESTION 14**

(a) State FIVE requirements of the New Zealand Building Code G12 AS1 for the installation of storage water heaters of up to 360 litres capacity.

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(5 marks)

**QUESTION 14 (cont'd)**

(b) Describe the TWO methods for securing water storage heaters against seismic action.

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(4 marks)

**Total 9 marks**



For Candidate's use

Number of EXTRA sheets used (write NIL if none have been used).	
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For Examiner's use only

Questions Answered	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
Total		