

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

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No. 9192



Plumbers,  
Gasfitters and  
Drainlayers Board

## REGISTRATION EXAMINATION, JUNE 2008

# 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, 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

List TEN safety precautions that should be considered when excavating a trench to a maximum depth of 1m.

- 1 \_\_\_\_\_  
\_\_\_\_\_
- 2 \_\_\_\_\_  
\_\_\_\_\_
- 3 \_\_\_\_\_  
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- 4 \_\_\_\_\_  
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- 5 \_\_\_\_\_  
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- 6 \_\_\_\_\_  
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- 7 \_\_\_\_\_  
\_\_\_\_\_
- 8 \_\_\_\_\_  
\_\_\_\_\_
- 9 \_\_\_\_\_  
\_\_\_\_\_
- 10 \_\_\_\_\_  
\_\_\_\_\_

**Total 5 marks**

**QUESTION 2**

(a) (i) Explain how an acetylene cylinder should be positioned when stored or when in use.

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(ii) State what may occur if an acetylene cylinder is incorrectly stored or operated.

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(3 marks)

(b) Name the chemical that is added to the porous material contained in cylinders used for the storage of acetylene gas under pressure.

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(1 mark)

**Total 4 marks**

**QUESTION 3**

- (a) State when and how water supply piping should be tested to meet the requirements of the New Zealand Building Code G12/AS1. Include in your answer the minimum test pressures and test time.

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(4 marks)

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

(i) under gardens, lawns or other areas not subjected to traffic.

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(ii) under residential driveways subjected to occasional heavy traffic.

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(2 marks)

**Total 6 marks**

**QUESTION 4**

The following questions relate to the pumping of water by a hydraulic ram pump.

- (a) List the TWO conditions relating to the water supply that must be met for the hydraulic ram to operate efficiently.

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

(2 marks)

- (b) Describe the operational sequence of the hydraulic ram.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

(7 marks)

**QUESTION 4 (cont'd)**

(c) List FOUR system requirements that must be met to ensure the successful operation of the hydraulic ram. (Exclude the ram itself.)

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

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

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

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

(4 marks)

**Total 13 marks**

**QUESTION 5**

(a) Explain how the life of galvanised pipe can be extended when it is laid in acidic soil.

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(1 mark)

(b) State FIVE factors that must be considered when installing a compressed air system and associated equipment in a commercial building.

1 

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2 

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3 

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4 

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5 

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(5 marks)

**Total 6 marks**

**QUESTION 6**

- (a) Calculate the volume of a circular cylinder having a height of 1.500m and a radius of 550mm. Show all working and give your answer to three decimal places.

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

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(3 marks)

- (b) A rectangular tank measures 3.600m long by 1.400m wide by 2.500m deep. The tank is filled with water to 60% of its total capacity. Calculate the volume of the water in the tank. Give your answer in litres.

Formula:  $V = L \times W \times D$

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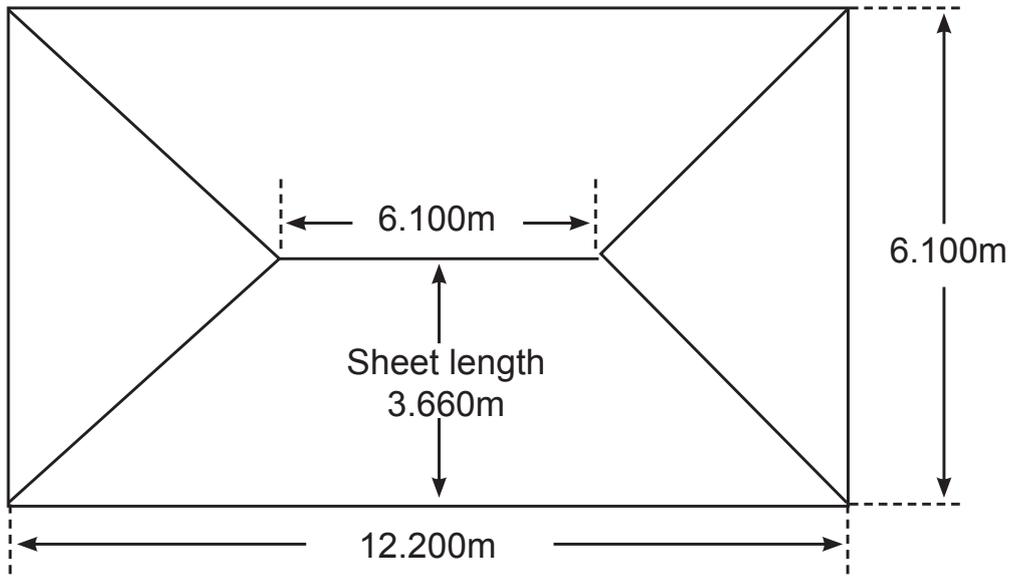
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(3 marks)

**Total 6 marks**

**QUESTION 7**

The diagram below shows a plan view of a hipped roof.



- (a) Calculate the area of the roofing material required to cover the roof.

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(2 marks)

- (b) Each sheet of roofing material used to cover the roof has an effective cover of 762mm. Calculate the minimum number of sheets of roofing material required to cover the roof.

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(2 marks)

**QUESTION 7 (cont'd)**

- (c) Calculate the total length of ridging needed for the roof, including the hips. Allow an extra 7.5% for laps and wastage.

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(4 marks)

- (d) Roofing materials costs are as follows:  
Corrugated roofing material \$9.20 per lineal metre.  
Ridging \$13.30 per lineal metre.

Calculate the net cost of the roofing materials. Allow an additional 22% for fixings and sundries.

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(4 marks)

**Total 12 marks**

**QUESTION 8**

(a) Describe the basic principle on which the operation of a heat pump is based.

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(2 marks)

(b) Explain briefly the function of each of the following components of a heat pump having a reverse cycle.

(i) The evaporator.

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(ii) The condenser.

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(iii) The compressor.

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(iv) The reversing valve.

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(v) The capillary tube.

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(5 marks)

**Total 7 marks**

## QUESTION 9

The following terms relate to the installation and operation of solid fuel burning heaters. Give the meaning of each term.

(a) Damper.

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(1 mark)

(b) Flue gases.

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(1 mark)

(c) Appliance collar.

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(1 mark)

(d) Flue pipe.

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(1 mark)

**Total 4 marks**

## QUESTION 10

State FOUR requirements that must be met when waste pipes discharge to a gully trap.

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

Total 4 marks

**QUESTION 11**

Answer each of the following to ensure compliance with the New Zealand Building Code G12/AS1.

(a) State when a safe tray must be installed under a storage water heater.

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(1 mark)

(b) State when a drain point must be fitted to a storage water heater.

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(1 mark)

(c) State the requirements for a drain point fitted to a storage water heater.

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(1 mark)

(d) Give TWO reasons for fitting a non-return valve on the cold water supply pipe to a mains pressure storage water heater.

1 

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2 

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(2 marks)

**Total 5 marks**

## QUESTION 12

The following six items relate to a mains pressure valve vented electric hot water system.

Explain the purpose of each item and how it functions.

(a) Pressure limiting or pressure reducing valve.

Purpose: \_\_\_\_\_

How it functions: \_\_\_\_\_

(2 marks)

(b) Filter.

Purpose: \_\_\_\_\_

How it functions: \_\_\_\_\_

(2 marks)

(c) Thermostat.

Purpose: \_\_\_\_\_

How it functions: \_\_\_\_\_

(2 marks)

(d) Energy cut out device.

Purpose: \_\_\_\_\_

How it functions: \_\_\_\_\_

(2 marks)

**QUESTION 12 (cont'd)**

(e) Cold water expansion valve.

Purpose: \_\_\_\_\_

How it functions: \_\_\_\_\_

(2 marks)

(f) Temperature and pressure relief valve.

Purpose: \_\_\_\_\_

How it functions: \_\_\_\_\_

(2 marks)

**Total 12 marks**

**QUESTION 13**

Give the meaning of each of the following terms as it applies to pumps and pumping.

(a) Total working head.

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(2 marks)

(b) Friction head.

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(2 marks)

(c) Static suction lift.

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(2 marks)

(d) Total delivery head.

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(2 marks)

**Total 8 marks**

## QUESTION 14

After due enquiry, a registered person may be found by the Plumbers, Gasfitters and Drainlayers Board to be guilty of improper and/or incompetent conduct in performing his or her work. State FIVE penalties that the Board may impose.

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

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

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

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

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

**Total 5 marks**

## QUESTION 15

- (a) Except for the specific exemptions referred to in the relevant sections of the Plumbers, Gasfitters and Drainlayers Act, state the legal requirement that must be met by any person wishing to undertake sanitary plumbing work.

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(1 mark)

- (b) Unless otherwise specifically provided for in a building consent, state the minimum number of hours notice required to be given to a territorial authority in each of the following circumstances:

- (i) before the date on which it is intended to commence work

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- (ii) before the covering up or closing in of any sanitary plumbing work.

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(2 marks)

**Total 3 marks**







For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Total		