

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, NOVEMBER 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 19 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) Give TWO reasons for temporarily capping open pipe ends.

1 _____

2 _____

(1 mark)

(b) State FOUR ways in which noise within a high pressure water supply system can be reduced.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(c) State FOUR considerations that should be given to the siting of a domestic water meter.

1 _____

2 _____

3 _____

4 _____

(2 marks)

Total 5 marks

QUESTION 2

- (a) State SEVEN safety precautions that should be observed to prevent injury to yourself and others when using arc-welding equipment.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

(7 marks)

- (b) State TWO safety precautions that should be observed with regard to the lead that supplies current to an arc-welding machine.

1 _____

2 _____

(2 marks)

Total 9 marks

QUESTION 3

- (a) State the difference between the principle of action on which a centrifugal pump operates and the principle of action on which a reciprocating pump operates.

(2 marks)

- (b) Explain how water pressure is obtained and pulsations can be absorbed on a reciprocating pump system.

(2 marks)

Total 4 marks

QUESTION 4

(a) State the exact figure which a head of water measured in metres is multiplied by to determine pressure in kPa.

(1 mark)

(b) Briefly explain why polybutylene plumbing systems must not be used in places where they are permanently exposed to sunlight.

(1 mark)

(c) State the term used to describe the attraction between molecules of the same kind.

(1 mark)

(d) State the term used to describe the ability of a metal to deform permanently under compression without rupture.

(1 mark)

(e) Name the recommended flux for tinning copper bits.

(1 mark)

(f) State what a psychrometer measures.

(1 marks)

Total 6 marks

QUESTION 5

(a) State FOUR separate causes of corrosion in metal pipes.

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

(2 marks)

(b) State the reason for providing seismic restraint for water storage tanks.

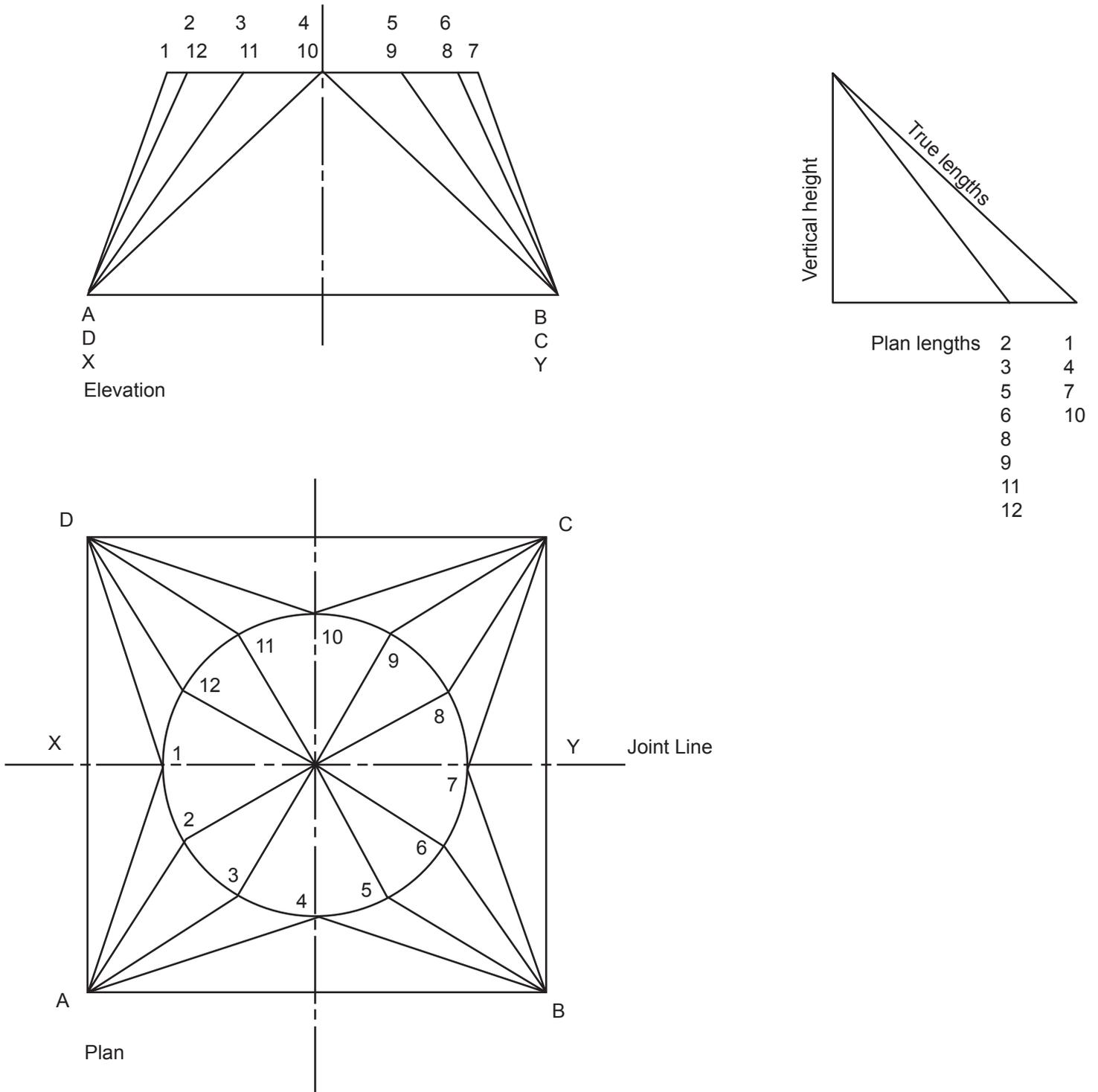
(1 mark)

Total 3 marks

QUESTION 6

The diagram below shows a plan and elevation of a square to round transition piece.

Develop to a scale of 1:1 the pattern for the transition piece. Draw your development on the opposite page, starting from the line and point A given.



A

Total 5 marks

QUESTION 7 (cont'd)

- (b) Calculate the number of litres of hot water stored at 65°C that would be required to produce 850 litres of water at 55°C when mixed with cold water at 15°C.
Show all working.

Formula:

$$\begin{array}{ccccccc} \text{Litres of hot} & & \text{temperature rise from} & & \text{litres of} & & \text{temperature rise from} \\ \text{water} & \times & \text{cold to hot water} & = & \text{mixed water} & \times & \text{cold to mixed water} \end{array}$$

(4 marks)

Total 9 marks

QUESTION 8

Answer all parts of this question in accordance with the acceptable solutions of the New Zealand Building Code.

(a) State the TWO minimum requirements for pressure testing a water supply installation.

- 1 _____
- 2 _____

(2 marks)

(b) State THREE considerations other than those in Question 8 (a) that must be part of the test procedure for a hot and cold water supply installation.

- 1 _____

- 2 _____

- 3 _____

(3 marks)

(c) State TWO requirements that must be met when a building contains both potable and non-potable water supply systems.

- 1 _____

- 2 _____

(2 marks)

Total 7 marks

QUESTION 9

(a) State how the air flow from a ducted air heating system in a house is adjusted so that the system is balanced.

(1 mark)

(b) State where a return air grill should be ideally situated in a two storey house.

(1 mark)

(c) State TWO consequences if the ducting for a circulating system is undersized.

1

2

(1 mark)

(d) List FOUR differences between a single-pipe system and a two-pipe system in relation to a low pressure hot water central heating installation.

1

2

3

4

(4 marks)

QUESTION 9 (cont'd)

- (e) State the major operational disadvantage of a single-pipe low pressure hot water heating system.

(2 marks)

- (f) In a single-pipe low pressure hot water heating system, state where the return branch from a radiator should enter the horizontal main circulating pipe.

(1 mark)

Total 10 marks

QUESTION 10

(a) State TWO functional requirements of a foul water plumbing system to comply with the New Zealand Building Code.

1 _____

2 _____

(2 marks)

(b) List FOUR performance requirements of a foul water system to comply with the New Zealand Building Code.

1 _____

2 _____

3 _____

4 _____

(4 marks)

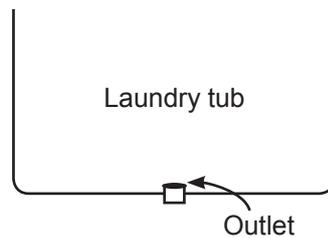
Total 6 marks

QUESTION 11

- (a) The diagram below shows a laundry tub. Waste water from a clothes washing machine discharges into the tub waste pipe. On the diagram, neatly sketch all pipework that is required for this installation.

In your answer include:

- 1 the minimum diameter of the waste pipe
- 2 the water trap
- 3 the maximum developed length acceptable from the air break to the seal of the water trap
- 4 the discharge pipe from the clothes washing machine



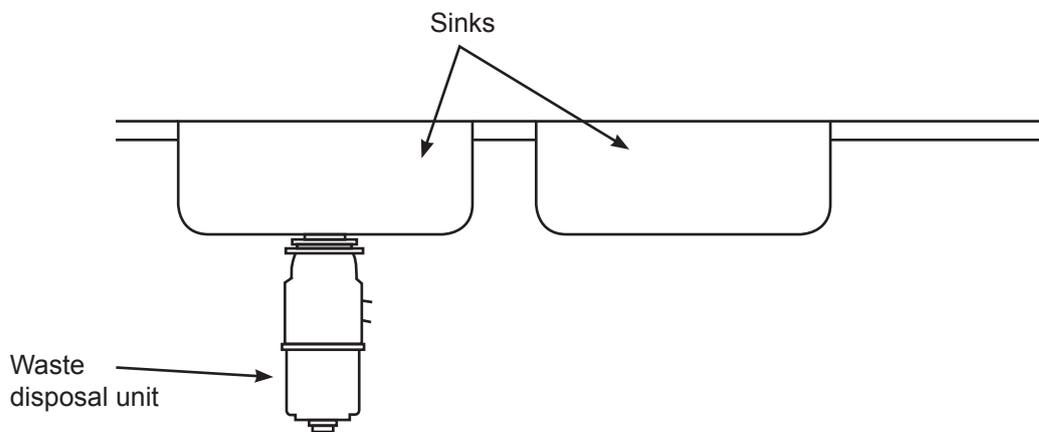
(4 marks)

QUESTION 11 (cont'd)

- (b) The diagram below shows two adjacent domestic kitchen sinks that discharge through a single water trap to a waste pipe. On the diagram, neatly sketch all pipework that is required for this installation.

In your answer include:

- 1 The minimum diameter of the waste pipe
- 2 The position of the water trap
- 3 The maximum developed length of the waste pipe from the untrapped outlet to the water seal



(3 marks)

QUESTION 11 (cont'd)

(c) Neatly sketch an acceptable water trap that would be used on a waste/discharge pipe connected to a drainage system via a disconnector gully trap.

In your answer:

- 1 show the required depth of water seal and its measurement
- 2 label the trap weir
- 3 label the crown of the trap
- 4 show the inlet and the outlet

(5 marks)

(d) Describe the venting arrangement in a single stack system of sanitary plumbing.

(1 mark)

(e) Describe the venting arrangement in a single stack modified system of sanitary plumbing.

(2 marks)

Total 15 marks

QUESTION 12

List TEN requirements for a hot water system, as set out in the New Zealand Building Code.

- 1 _____

- 2 _____

- 3 _____

- 4 _____

- 5 _____

- 6 _____

- 7 _____

- 8 _____

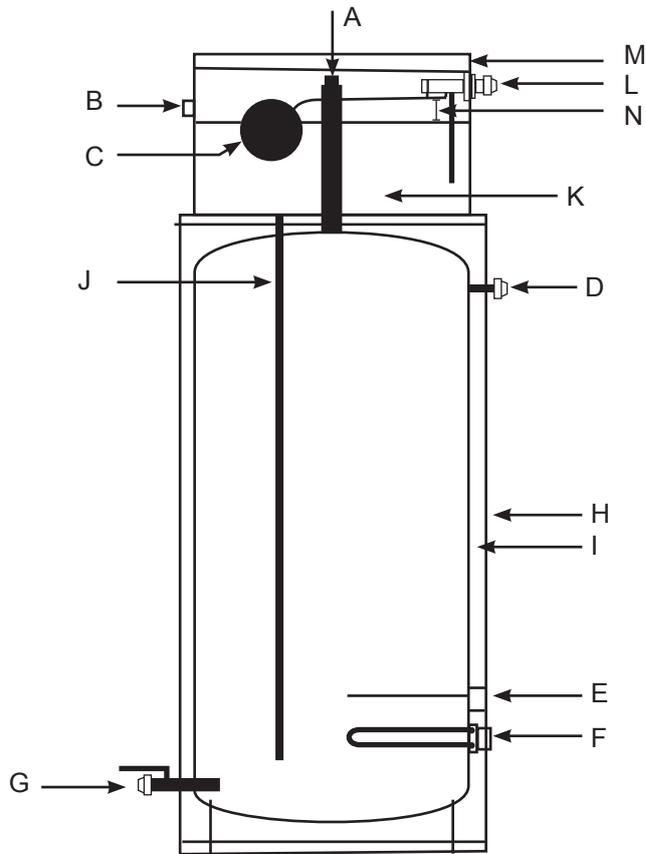
- 9 _____

- 10 _____

Total 10 marks

QUESTION 13

(a) The following diagram shows a cross-section of a cistern-type storage hot water cylinder. Name each of the labelled components.



- A _____
- B _____
- C _____
- D _____
- E _____
- F _____
- G _____
- H _____
- I _____
- J _____
- K _____
- L _____
- M _____
- N _____

(7 marks)

QUESTION 13 (cont'd)

- (b) Explain how the length of a hot water cylinder temperature and pressure relief valve drain is determined, and state the maximum value the drain length can have.

(3 marks)

- (c) State the minimum diameter that a relief drain serving a single temperature and pressure relief valve which discharges downstream of an air break can have, as set out in the New Zealand Building Code G 12 AS1.

(1 mark)

Total 11 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		
Total		