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If no label, enter candidate
Number if known

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No. 9192



Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2010

LICENSED PLUMBER

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.

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

(a) Describe FOUR methods of preventing the collapse of a trench.

- 1 _____

- 2 _____

- 3 _____

- 4 _____

(2 marks)

(b) State TWO precautions that 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) List SIX potential dangers to be aware of when gas welding or gas cutting pipes or tanks.

- 1 _____

- 2 _____

- 3 _____

- 4 _____

- 5 _____

- 6 _____

(3 marks)

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

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

(7 marks)

QUESTION 1 (cont'd)

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

(1 mark)

- (ii) State TWO likely consequences of using an acetylene cylinder immediately after it has been stored incorrectly.

1

2

(2 marks)

Total 16 marks

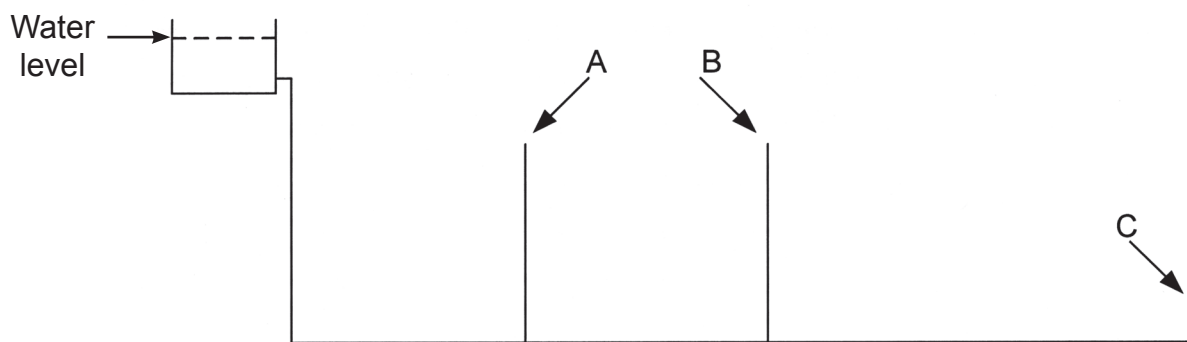
QUESTION 2

- (a) Give the meaning of the term hydraulic gradient.

(1 mark)

☐

- (b) On Fig 1 below, draw a line showing the hydraulic gradient if outlet C is open.



All pipework is 15 mm

Fig 1.

(1 mark)

☐

- (c) For Fig 1 state what happens to the flow of water at each of the intermediate draw-off points, labelled A and B, when the outlet at the lowest point C is flowing at full volume.

(2 marks)

☐

QUESTION 2 (cont'd)

- (d) A pipeline is supplied from a storage tank in a low pressure system.

It is not possible to alter the pressure of the supply or the gradient of the pipe.

Describe how a reoccurring air lock in the pipeline can be permanently eliminated.

(1 mark)

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

(1 mark)

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

(1 mark)

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

(1 mark)

- (h) State what a psychrometer measures.

(1 mark)

Total 9 marks

QUESTION 3

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

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

- 1 _____

- 2 _____

(2 marks)

QUESTION 3 (cont'd)

- (d) State how and when water supply piping should be tested to meet the requirements of the New Zealand Building Code Clause G12/AS1.

Include in your answer the minimum test pressures and test time.

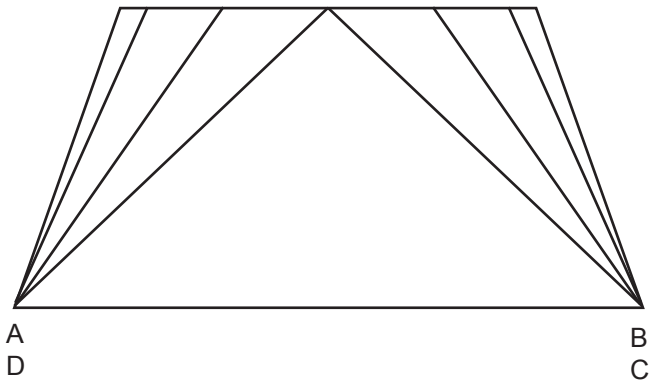
(4 marks)

Total 11 marks

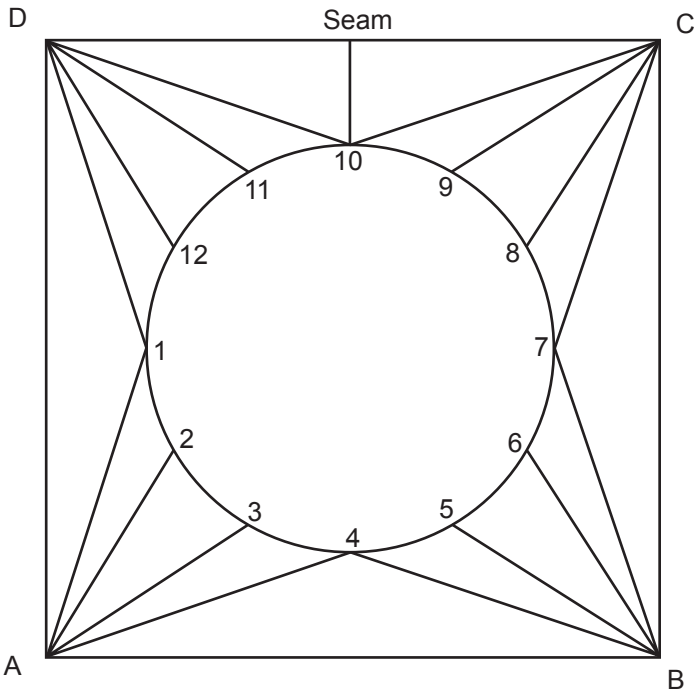
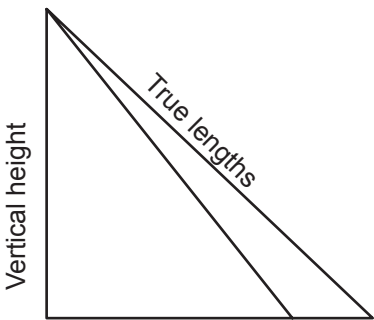
QUESTION 4

The drawings below show a square to round transition.

On the page opposite, develop the pattern from the information provided by using the triangulation method. Start the development from point A and the line drawn.



Elevation



Plan

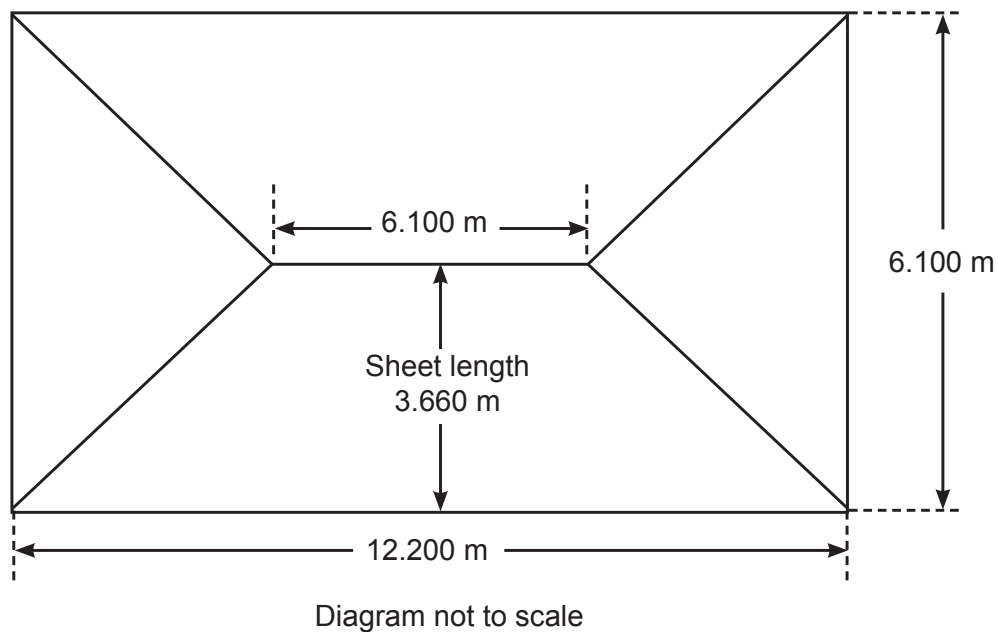
QUESTION 4 (cont'd)

A-----

Total 6 marks

QUESTION 5

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



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

(2 marks)

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

(2 marks)

QUESTION 5 (cont'd)

(b) A cylinder has a volume of 2.400 m³ and a diameter of 810 mm.

Calculate the height of the cylinder. Show your working.

Formula:
Volume = 0.7854 × Diameter² × Height

(3 marks)

Total 7 marks

QUESTION 6

- (a) State SIX factors, other than cost, that should be considered when selecting the type of heating and air-conditioning for a room.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(6 marks)

- (b) State the basic principle on which the operation of a heat pump is based.

(2 marks)

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

(1 mark)

- (d) State TWO consequences of the ducting for an air heating system being undersized.

1 _____

2 _____

(1 mark)

Total 10 marks

QUESTION 7

- (a) State the requirements of the New Zealand Building Code Clause G13/AS1 for the location of a water trap serving a sanitary fixture or appliance.

(1 mark)

- (b) Give FOUR functions of a ventilating pipe from a foul water system.

1

2

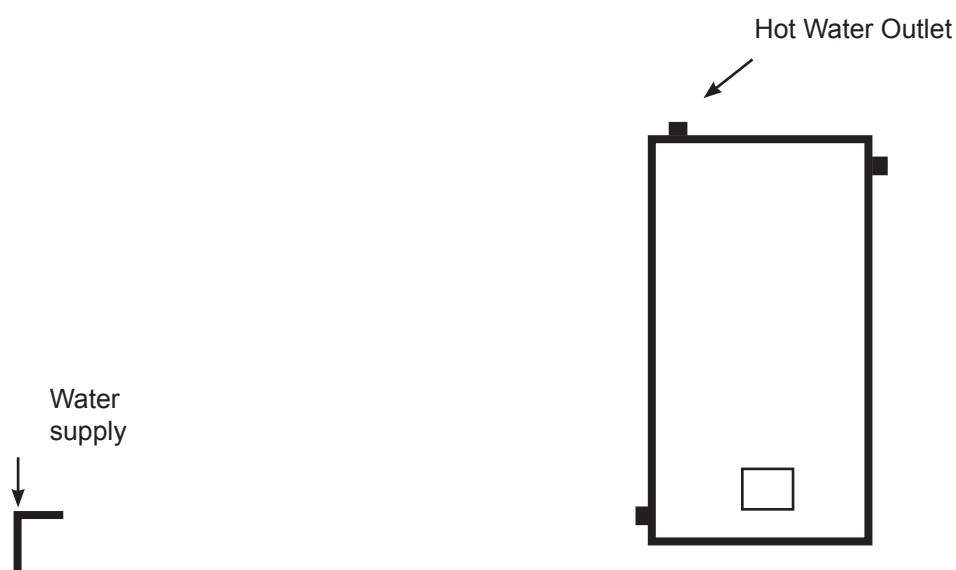
3

4

(2 marks)

- (c) The starter drawing below shows a mains pressure valve-vented hot water storage cylinder for personal hygiene.

Show and label all valves and components to complete the drawing so that the system complies with the New Zealand Building Code. Show all valves individually.



(4 marks)

Total 7 marks

QUESTION 8

(a) Define the following terms:

(i) Discharge stack.

(2 marks) ☐

(ii) Fixture discharge pipe.

(2 marks) ☐

(iii) Branch discharge pipe.

(2 marks) ☐

(iv) Air admittance valve.

(2 marks) ☐

QUESTION 8 (cont'd)

- (b) (i) 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)

- (ii) State the purpose of a foot valve on a suction line of a water pump, and explain why it is required.

Purpose: _____

Explanation: _____

(2 marks)

- (c) (i) Define the term floor waste gully.

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

(2 marks)

Total 16 marks

QUESTION 9

- (a) The following three items relate to a mains pressure valve-vented electric hot water system.

Explain the specific purpose of each item and state the circumstances under which it will operate.

- (i) Pressure limiting or pressure reducing valve.

Purpose: _____

Circumstances: _____

(2 marks)

☐

- (ii) Cold water expansion valve.

Purpose: _____

Circumstances: _____

(2 marks)

☐

- (iii) Temperature and pressure relief valve.

Purpose: _____

Circumstances: _____

(2 marks)

☐

- (b) Using your knowledge of the New Zealand Building Code, answer the following questions in regard to water supply.

- (i) Give the meaning of the term cross-connection.

(1 mark)

☐

- (ii) State the purpose of back-flow prevention.

(1 mark)

☐

QUESTION 9 (cont'd)

(c) State TWO methods of preventing backflow from a sanitary fixture in a domestic dwelling.

1 _____

2 _____

(2 marks)

(d) Using your knowledge of the New Zealand Building Code Clause G12/AS1

(i) state the minimum diameter of a relief drain serving combined relief valve drains from a valve-vented hot water cylinder

(ii) state the drain size in relation to the largest relief valve outlet where the drain serves more than one relief valve.

(1 mark)

Total 11 marks

QUESTION 10

- (a) A plumber has applied to the Plumbers, Gasfitters, and Drainlayers Board for registration and his/her first practising licence.

State what is then required of the plumber on an annual basis under the Plumbers, Gasfitters and Drainlayers Act in order to carry out sanitary plumbing.

(2 marks)

- (b) 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

(5 marks)

Total 7 marks

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For Examiner's use only

Question number	Marks	Marks
1		
2		
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