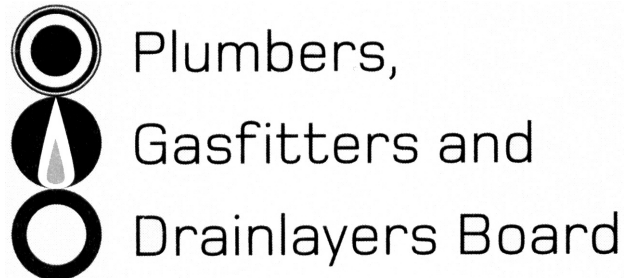


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9192



REGISTRATION EXAMINATION, 2006

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 17 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, in the correct order, the FOUR actions to be taken if a fellow worker receives an electric shock, becomes unconscious and stops breathing.

1 _____

2 _____

3 _____

4 _____

(4 marks)

- (b) State TWO safety precautions that should be observed with the primary leads of an arc welding machine.

1 _____

2 _____

(2 marks)

QUESTION 1 (cont'd)

- (c) State FOUR safety measures that should be taken to protect your hands in the working environment.

1	<hr/>
	<hr/>
2	<hr/>
	<hr/>
3	<hr/>
	<hr/>
4	<hr/>
	<hr/>

(2 marks)

Total 8 marks

QUESTION 2

- (a) Describe how pipes in a large underground water main are prevented from moving at bends and junctions.

(2 marks)

- (b) State THREE requirements that must be met when a water main is run in a trench with other services.

1

2

3

(3 marks)

- (c) State THREE requirements that must be met for the trenching and back-filling of a UPVC water main.

1

2

3

(3 marks)

Total 8 marks

QUESTION 3

Give the meaning of the following terms:

(a) absolute pressure

(2 marks)

(b) bimetallic element

(2 marks)

(c) radiation

(2 marks)

(d) stratification

(2 marks)

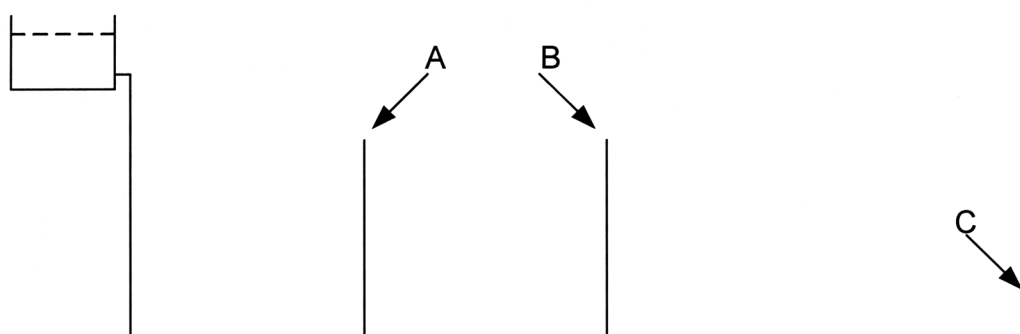
Total 8 marks

QUESTION 4

- (a) What does the term hydraulic gradient mean?

(1 mark)

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



DRAW OFF AT LOWEST POINT

Fig 1.

(1 mark)

- (c) For Figure 1 explain what happens to the flow of water at 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 4 (cont'd)

- (d) State the most frequent cause of airlocks in low pressure water supply systems, and explain how airlocks occur.

(3 marks)

- (e) 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 an air lock in the pipeline can be permanently eliminated.

(1 mark)

Total 8 marks

QUESTION 5

Name SIX pipe **materials** that can be joined by seal-ring compression joints.

1

2

3

4

5

6

(3 marks)

Total 3 marks

QUESTION 6

All working must be shown for each question

(your answers are to be correct to three decimal places)

- (a) The dimensions of a rectangular tank are 6.4m long (L) by 1.75m wide (W) and 1.45m high (H). Calculate the volume (V) of water in the tank if it is 80% full.

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

(2 marks)

- (b) Calculate the weight of water contained in the tank in (a).

(1 mark)

QUESTION 6 (cont'd)

- (c) A PVC fascia gutter is 14 m long. Its temperature rises from 7°C to 24°C. Given that the coefficient of linear expansion of PVC is 0.00005 m per °C, calculate the length in millimetres that the gutter expands.

Formula:

Linear expansion = total length x coefficient of linear expansion x
temperature difference in °C

(2 marks)

- (d) A cylinder has a volume of 2.4m³ and a diameter of 810mm. Calculate the height of the cylinder.

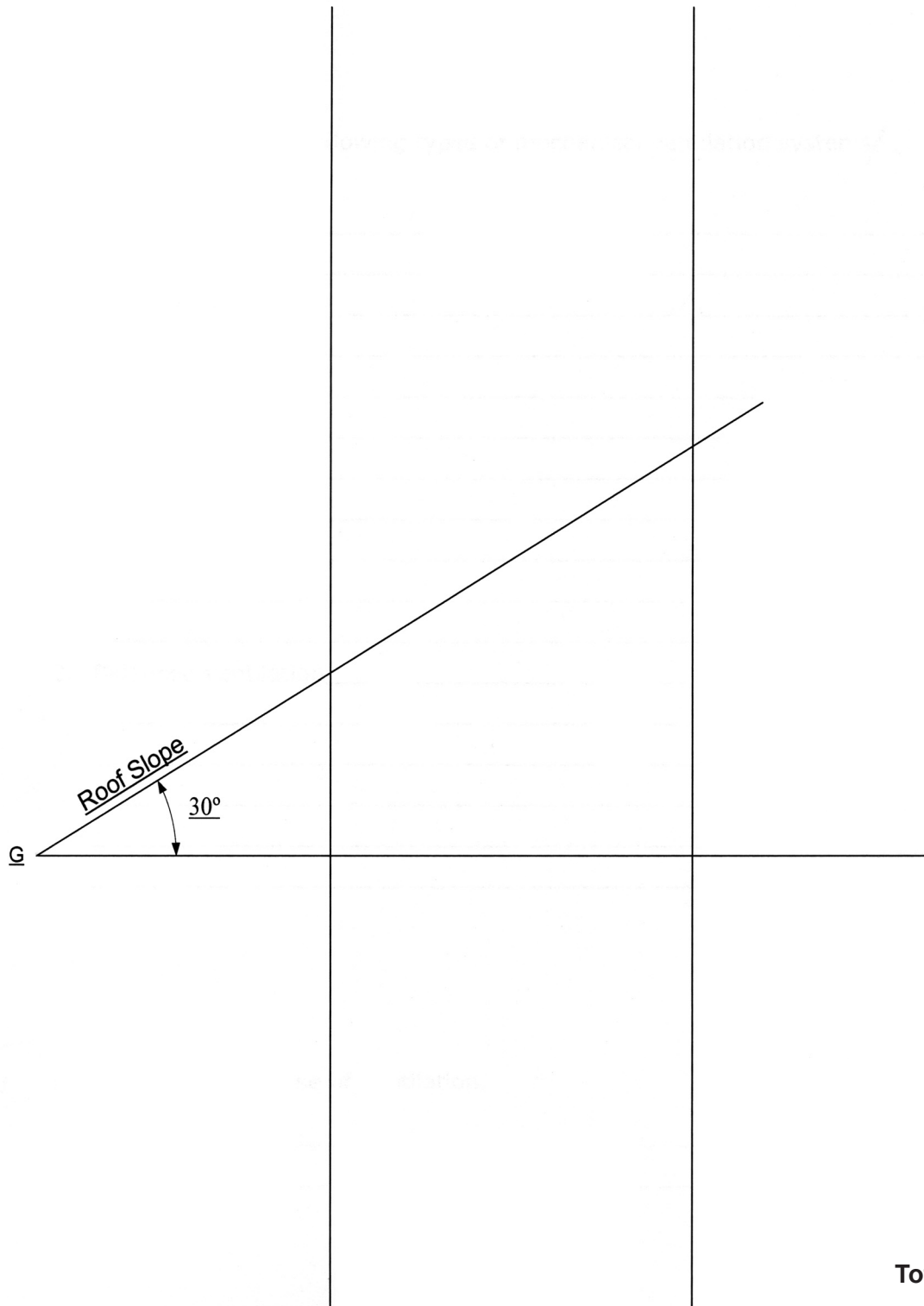
Formula: Volume = 0.7854 x Diameter² x Height

(3 marks)

Total 8 marks

QUESTION 7

A flue is to pass through a ceiling and roof. The roof has a 30° pitch. On the drawing on the following page develop the true shape of the hole required to form a neat opening through the roof for the penetration of the flue. Note the dimensions must be the same as the drawing provided and the coordinates must be indicated.



Total 10 marks

QUESTION 8

(a) Describe in detail the following types of mechanical ventilation systems.

1 Extract ventilation _____

2 Plenum ventilation _____

3 Balanced ventilation _____

(9 marks)

(b) State the main purpose of ventilation.

(1 mark)

Total 10 marks

QUESTION 9

Give the meaning of the following terms:

(a) Discharge stack

(2 marks)

(b) Fixture discharge pipe

(2 marks)

(c) Branch discharge pipe

(2 marks)

(d) Discharge unit

(2 marks)

Total 8 marks

QUESTION 10

Using your knowledge of the NZ Building Code complete the following multi choice questions. **Tick one box only per question.**

1 A ventilating pipe may be omitted if the length of a single waste pipe to a gully trap is less than:

- a) 4.8 m ☐
- b) 4.5 m ☐
- c) 4.2 m ☐
- d) 3.9 m ☐
- e) 3.5 m ☐

2 The recognised term for the system where unventilated fixtures discharge foul water or waste water into a common discharge pipe is:

- a) the combined waste system. ☐
- b) the one-pipe system. ☐
- c) the two-pipe system. ☐
- d) the single-stack system. ☐
- e) the soil-waste system. ☐

3 Traps are fitted to waste pipes:

- a) to prevent vermin entering a building. ☐
- b) to reduce the velocity of discharge. ☐
- c) to prevent foul gases entering a building. ☐
- d) to exclude sewer gases from a waste pipe. ☐
- e) to provide aerial disconnection of a waste pipe. ☐

4 A drinking fountain is classed as:

- a) a sanitary fixture. ☐
- b) a sanitary appliance. ☐
- c) a public facility. ☐
- d) a soil fixture. ☐
- e) trade waste. ☐

5 When a vent pipe connects to a 50 mm urinal waste it must have a minimum diameter of:

- a) 20 mm ☐
- b) 25 mm ☐
- c) 32 mm ☐
- d) 40 mm ☐
- e) 50 mm ☐

QUESTION 10 (cont'd)

6 The minimum permissible gradient of a 50 mm diameter waste pipe is:

- a) 1 in 40 ☐
- b) 1 in 30 ☐
- c) 1 in 25 ☐
- d) 1 in 20 ☐
- e) 1 in 15 ☐

7 The minimum diameter of the outlet of a water closet pan is:

- a) 65 mm ☐
- b) 75 mm ☐
- c) 80 mm ☐
- d) 85 mm ☐
- e) 100 mm ☐

8 The function of a ventilating pipe is:

- a) to allow organic matter to dry out. ☐
- b) to allow foul air to escape. ☐
- c) to prevent foul air entering a building. ☐
- d) to prevent siphonage. ☐
- e) all of the above. ☐

9 The main purpose of a trap vent is:

- a) to allow foul smells to escape. ☐
- b) to prevent foul odours entering a building. ☐
- c) to prevent the loss of water seals. ☐
- d) to allow cleaning access. ☐
- e) to provide a quicker discharge rate. ☐

10 For five floor waste outlets connected to a common stack, the stack diameter is:

- a) 32 mm ☐
- b) 40 mm ☐
- c) 50 mm ☐
- d) 65 mm ☐
- e) 80 mm ☐

(1 mark each)

Total 10 marks

QUESTION 11

- (a) (i) State the purpose of a relief valve on a mains pressure hot water cylinder.

(1 mark)

- (ii) A mains pressure hot water cylinder has two relief valves. State which valve should operate first and explain why.

(2 marks)

- (iii) State where relief valves are fitted on a mains pressure hot water cylinder.

(2 marks)

- (b) Name TWO devices installed on a high pressure cold water supply to ensure that other components in the system are protected.

1 _____
2 _____
(2 marks)

- (c) Describe an alternative method to using a supply tank for a low pressure hot water cylinder that does not require an open vent pipe.

(2 marks)

- (d) (i) What is the minimum temperature at which hot water should be stored in a hot water cylinder

(1 mark)

- (ii) Give a reason for this.

(2 marks)

Total 12 marks

QUESTION 12

- (a) Name the NZ Act and the section of the Code that relates to the installation of sanitary plumbing.

(2 marks)

- (b) Who is responsible for ensuring a consent is obtained before work is carried out by a qualified plumber?

(1 mark)

- (c) Provide TWO examples of where a supply tank with an air gap on the water supply is used to prevent backflow.

1 _____

2 _____

(2 marks)

- (d) State the required distances for the minimum air gap to be maintained in a supply tank.

(2 marks)

Total 7 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
1	
2	
3	
4	
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7	
8	
9	
10	
11	
12	
Total	