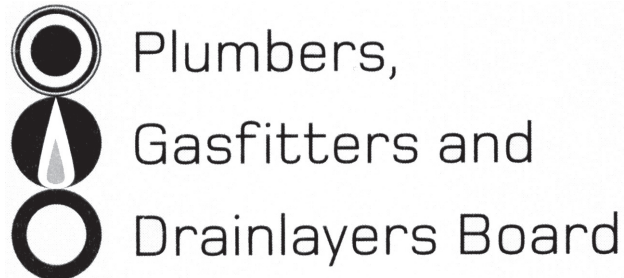


Affix label with Candidate Code
Number here.
If no label, enter candidate
Number if known

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No. 9192



REGISTRATION EXAMINATION, NOVEMBER 2017

TRADESMAN 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.

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 pages 18–21 at the back of this booklet. Clearly write the question number(s) 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, document(s) provided.

Publications, Acts, Regulations, Codes of Practice, or Standards other than the ones provided are NOT permitted in the examination room.

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

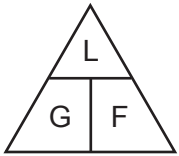
Candidates that sat this examination in November 2017 were provided with the following documents:

- New Zealand Building Code Clause G13 – Foul Water

USEFUL FORMULAE

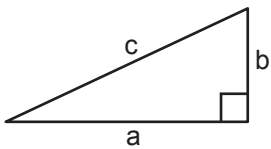
Circumference of circle = $2 \times \pi \times R$ or Circumference of circle = $\pi \times D$

Area of circle = $\pi \times R^2$ or Area of circle = $0.7854 \times D^2$



length = L
gradient = 1:G
fall = F

Volume of cylinder = $\pi \times R^2 \times H$ or Volume of cylinder = $0.7854 \times D^2 \times H$



$$a^2 + b^2 = c^2$$

Heat energy = mass \times specific heat \times temp diff

Litres of hot water \times temp diff cold to hot = litres of mixed water \times temp diff cold to mixed

Heating time (hours) =
$$\frac{\text{mass of water (kg)} \times 4.2 \times \text{temp diff (}^\circ\text{C)} \times 100}{\text{heat energy input per hour (kJ)} \times \text{efficiency (\%)}}$$

Box's formula:
$$q = \sqrt{\frac{H \times D^5}{25 \times L \times 10^5}}$$

where q = quantity discharged in litres per second

H = head in metres

D = diameter of pipe in mm

L = length of pipe in metres

SECTION A

QUESTION 1

Describe a floor waste and a floor waste gully to explain their fundamental differences.

Floor waste.

(2 marks)

Floor waste gully.

(2 marks)

Total 4 marks

QUESTION 2

Potable water is to be supplied to a dwelling.

The water is to be stored in a tank.

(a) Give FOUR sources from which potable water may be obtained.

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

(2 marks)

(b) Give FOUR precautions that should be taken to assist water being stored in the tank remaining potable.

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

(2 marks)

(c) The stored water needs to be pumped to outlets.

(i) Name FOUR types of positive displacement pumps that could be used for this purpose.

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

(4 marks)

(ii) Give the meaning of the term 'positive displacement' in relation to pumps.

(1 mark)

QUESTION 2 (cont'd)

(d) Name a type of non-displacement pump.

(1 mark)

Total 10 marks

QUESTION 3

A hot water cylinder supplying a shower is being fed from a ceiling tank.

- (a) Give FOUR ways in which the installation can be changed to increase the hot water pressure available in the shower.

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

(4 marks)

- (b) Give FOUR changes that could be made to the installation to increase the flow of water at the shower.

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

(4 marks)

- (c) When the shower is in use and a tap elsewhere in the house is turned on, the temperature in the shower changes.

Give the cause and a possible remedy for this situation.

Cause: _____

(1 mark)

Remedy: _____

(1 mark)

Total 10 marks

QUESTION 4

A sports club uses changing rooms and shower facilities every second weekend during the winter season.

In order to lower the water heating costs, it has been decided to only heat the hot water cylinder when required.

The hot water is supplied from a 300 litre hot water cylinder fitted with two 3 kW elements that have 95% efficiency.

The water temperature is to be raised from 9°C to 70°C.

The hot water for the showers is needed at 3.00 pm.

Calculate the time of day that the power supply to the elements needs to be turned on to ensure that the water is heated for post-match showers.

1 kW = 3.6 MJ.

Total 6 marks

QUESTION 5

(a) Name TWO licensing category holders that a tradesman plumber is permitted to supervise.

- 1 _____
- 2 _____

(2 marks)

(b) Give THREE requirements that must be met by a tradesman plumber every year with regard to relicensing.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(c) Give the meaning of the term 'restricted plumbing work'.

(1 mark)

(d) Below is a table with a list of common tasks a plumber may complete.

Complete the table to indicate which tasks are restricted plumbing work.

Task	Restricted plumbing (Yes/No)	Task	Restricted plumbing (Yes/No)
Changing the washer in a kitchen sink tap		Replacing a low pressure hot water cylinder	
Replacing a toilet suite		Replacing a rubber boot flashing on a vent pipe	
Installing a water supply to an under-bench water filter		Moving a hand basin to another location within a bathroom	

(3 marks)

Total 9 marks

QUESTION 6

A polybutylene pipe is being installed on the outside of a building.

(a) Name TWO types of damage that the pipe should be protected from.

1 _____

2 _____

(2 marks)

(b) Name a jointing method that is used with polybutylene pipe material.

(1 mark)

(c) State where within a domestic dwelling plumbing system that polybutylene pipe must NOT be used.

(1 mark)

(d) Give THREE advantages polybutylene that pipe has compared with copper pipe.

1 _____

2 _____

3 _____

(3 marks)

(e) Give THREE advantages that copper pipe has compared with polybutylene pipe.

1 _____

2 _____

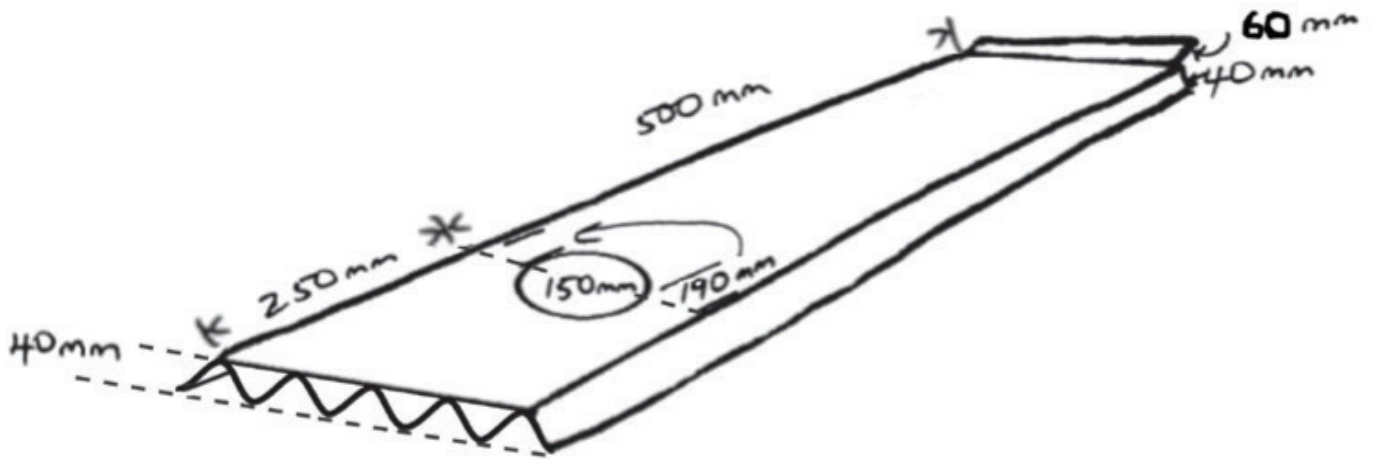
3 _____

(3 marks)

Total 10 marks

QUESTION 7

Below is a sketch of a soaker flashing used when sealing a roof penetration.



- (a) On the page opposite, draw to a scale of 1:5 a cutting and folding plan showing the sheet metal required to construct the soaker flashing.

(6 marks)

- (b) Give THREE items of information that are required to determine the size of a soaker flashing.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 9 marks

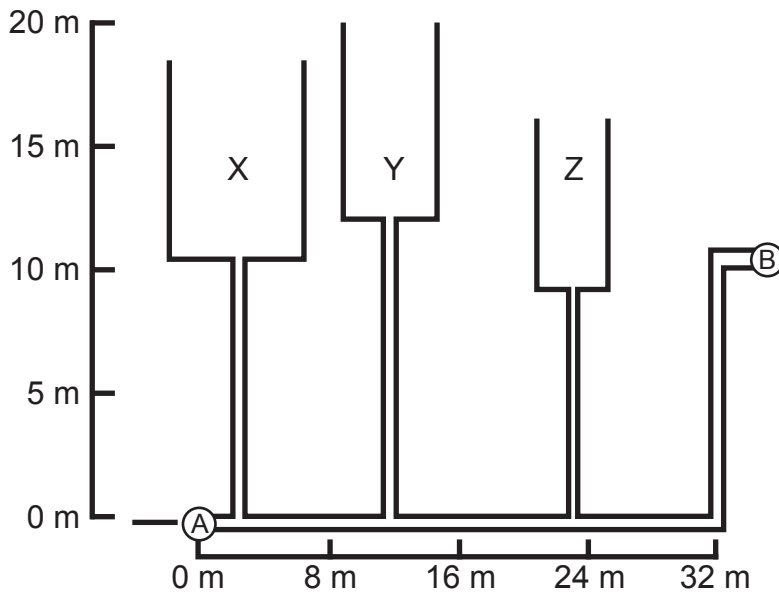
QUESTION 8

- (a) The diagram below shows part of a water supply system, including three storage tanks (X, Y and Z) and an outlet (B).

The available water pressure at point A is 150 kPa.

Show on the diagram the expected static water level for each tank.

(3 marks)



- (b) (i) Give the definition of potable in relation to water supply.

(1 mark)

- (ii) Name an outlet that is permitted to be supplied with non-potable water.

(1 mark)

- (iii) State the requirement that must be met at an outlet that is supplied with non-potable water.

(1 mark)

QUESTION 8 (cont'd)

(c) Give the meaning of the following terms in relation to hot water systems.

(i) Stratification.

(1 mark)

(ii) Uncontrolled heat source.

(1 mark)

(iii) Indirect.

(1 mark)

(iv) Convection.

(1 mark)

(v) Tempered.

(1 mark)

Total 11 marks

QUESTION 9

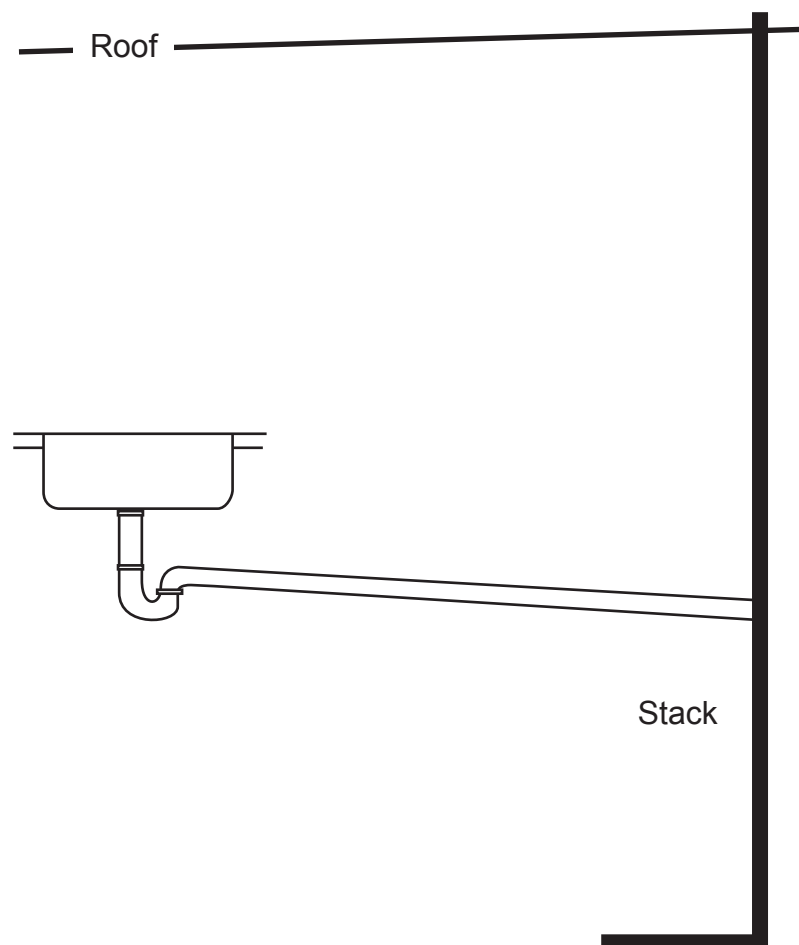
The starter drawing below shows a sink discharging into a stack.

The drawing is not to scale.

Complete the drawing to include a relief vent and a fixture vent pipe.

On the drawing include the measurements to show the acceptable location for the following:

- fixture vent connection to discharge pipe,
- fixture vent termination height,
- relief vent connection to stack.



Total 6 marks

QUESTION 10

(a) Give the steps in the procedure for jointing a short length of uPVC waste pipe to a socket by solvent cement welding.

(3 marks)

(b) In addition to uPVC, name FOUR other materials that are permitted to be used for waste water discharge pipes.

1

2

3

4

(2 marks)

Total 5 marks

QUESTION 11

(a) Complete the table below to show the discharge unit rating and minimum discharge pipe diameter for each of the items listed.

Items	Discharge unit rating	Minimum pipe diameter
WC pan		
Commercial kitchen sink		
Bath		
Wall-hung urinal		
Double laundry tub		
Dishwasher		

(6 marks)

(b) Give TWO ways in which induced siphonage in a trap seal on a fixture discharge pipe can be avoided.

- 1 _____
- 2 _____

(2 marks)

(c) Explain how capillary attraction can cause the loss of the water seal in a trap.

(2 marks)

Total 10 marks

SECTION B

Answer the following multiple-choice questions by writing your answer (A, B, C, D or E) in the box provided after each one of the questions.

Each correct answer in this section of the examination is worth 1 mark.

Should your choice of answer be unclear no mark will be awarded.

1. What is the minimum size air gap permitted for a 20 mm diameter relief valve drain that is discharging over a tundish?

- A 20 mm.
- B 25 mm.
- C 32 mm.
- D 40 mm.
- E 50 mm.

2. What is the minimum height above ground level at which a vent pipe connected to a foul water drainage system must terminate?

- A 2.0 m.
- B 2.5 m.
- C 3.0 m.
- D 4.0 m.
- E 5.0 m.

3. Why is there a restricted zone at the base of a discharge stack?

- A To prevent trap seal loss due to compression.
- B To prevent trap seal loss due to oscillation.
- C To prevent blockages in the drain.
- D To prevent blockages in the discharge stack.
- E To prevent blockages in the drain and discharge stack.

4. A 150 mm uPVC vertical discharge stack is to be installed in a two-storey building. How far apart can the supports for the stack be spaced?

- A 1.000 m.
- B 1.200 m.
- C 1.800 m.
- D 3.000 m.
- E 3.500 m.

5. What is the minimum distance below a gully trap grate that a waste pipe should discharge?

- A 20 mm.
- B 30 mm.
- C 40 mm.
- D 50 mm.
- E 60 mm.

6. What is the minimum distance above a gully trap that a trapped floor waste should discharge?

- A 10 mm.
- B 20 mm.
- C 30 mm.
- D 40 mm.
- E 50 mm.

7. What is the maximum length a single waste pipe to a gully can be before a vent pipe must be fitted?

- A 3.5 m.
- B 3.8 m.
- C 4.2 m.
- D 4.5 m.
- E 4.8 m.

8. Which of the following is permitted to discharge to a floor waste gully in an adjacent room?
- A Dishwasher.
 - B Kitchen sink.
 - C Tundish.
 - D Urinal.
 - E Washing machine.

9. Which of the following is not permitted to discharge into a floor waste gully?
- A A washing machine.
 - B A urinal.
 - C A tundish from a hot water cylinder in an adjacent room.
 - D A bidet.
 - E A refrigerated cabinet drain.

10. Which of the following is trap seal loss that can occur when wind blows over the top of a vent pipe?
- A Compression.
 - B Evaporation.
 - C Momentum.
 - D Oscillation.
 - E Siphonage.

Total 10 marks

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
Section B		
Total		