

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

No. 9195



Plumbers,
Gasfitters and
Drainlayers Board

CRAFTSMAN EXAMINATION, JUNE 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 9195 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 16 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) Other than repair or replacement of taps, ball valves, tap washers or plugs, give SIX examples of sanitary plumbing work which may be done without a building consent being required.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(6 marks)

QUESTION 1 (cont'd)

- (b) Under the New Zealand Building Code (section B2 – Durability) plumbing materials must have a minimum expected life span. State the minimum durability requirement for each of the following elements.

Weather proofing systems _____

Tapware (exposed) _____

Hot water cylinders _____

Pipework in walls _____

Discharge pipes and drains below floor slabs _____

Inbuilt tapware _____

(3 marks)

Total 9 marks

QUESTION 2

When operating, a direct action reciprocating pump fails to deliver any discharge at the delivery orifice. List FIVE possible causes of this failure, and give the appropriate remedy or corrective action required.

Cause _____

Remedy _____

Total 10 marks

QUESTION 3

- (a) Give the upper and lower pressure limits for a low pressure hot water supply to comply with the requirements of NZBC G12 ASI.

(2 marks)

- (b) Define each of the following terms in relation to water supply.

(i) Riser _____

(ii) Dry riser main _____

(iii) Wet riser main _____

(iv) Staging tank _____

(4 marks)

Total 6 marks

QUESTION 5

- (a) A reduced pressure zone device for back-flow protection is to be installed internally in a factory and sited in a concrete chamber recessed in the ground floor of the building. The factory requires a continuous uninterrupted water supply 24 hours a day.

State FIVE requirements that must be met when designing the system.

1 _____

2 _____

3 _____

4 _____

5 _____

(5 marks)

QUESTION 5 (cont'd)

(b) Name FOUR types of non-testable mechanical back-flow protection devices used on water supplies.

1 _____

2 _____

3 _____

4 _____

(4 marks)

(c) When installing a mechanical back-flow prevention device, state the TWO factors that determine where the device should be located when it is used as a means of individual protection.

1 _____

2 _____

(2 marks)

(d) Describe TWO essential component parts of a double check valve device that is installed in a potable water supply.

1 _____

2 _____

(2 marks)

QUESTION 5 (cont'd)

- (e) State where a back-flow device should be installed in a domestic water supply system that has a branch to an irrigation system incorporating a toxic fertiliser injector.

(1 mark)

- (f) Name the TWO acceptable mechanical back-flow devices, other than a reduced pressure zone device, that may be installed in a hairdressing salon when the water outlets to the rinse basins have flexible hoses with shower heads.

1 _____

2 _____

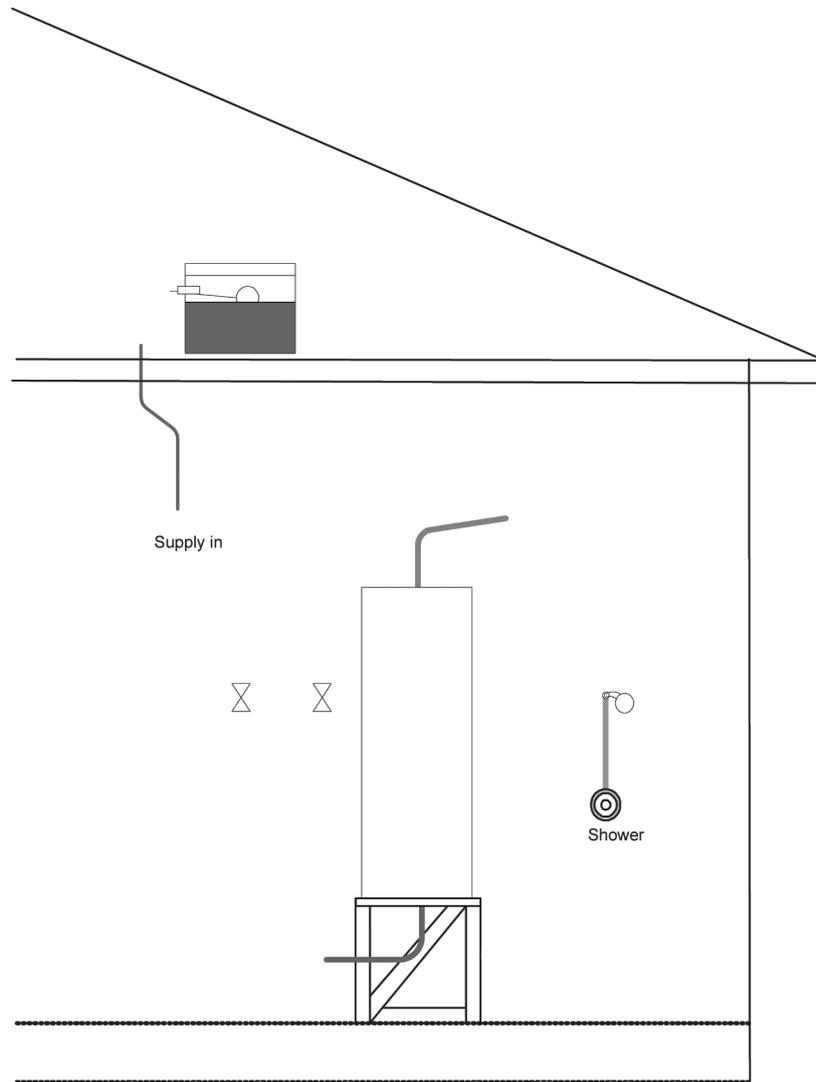
(2 marks)

Total 16 marks

QUESTION 6

An open vented, hot water system that uses a supply tank is being installed in an upper storey of a multi-unit complex. The system supplies a single unit located in an upper storey. The shower mixer in the unit is to be equal low pressure.

The following is a starter drawing of the system.



Using your knowledge of NZBC G12 AS1, show all pipework, valves and associated components to complete the system. Label all components.

Total 12 marks

QUESTION 7

Sketch an acceptable design for all the pipework necessary for the efficient operation of an over and under hot water system with a dual energy input (i.e. wet-back and electric storage).

Your sketch should show:

- (i) the storage unit
- (ii) the wet-back heat exchanger
- (iii) the recommended heights between the storage cylinder and the wet-back pipework
- (iv) venting
- (v) lagging / insulation requirements.

Total 7 marks

QUESTION 8

A free outlet (push through) electric storage water heater has a high pressure feed. Explain fully how the heater operates, including any safety features.

Total 5 marks

QUESTION 9

A bidet is being installed in a domestic situation. Answer the following questions using your knowledge of NZBC G13 AS1.

(a) State TWO acceptable methods of discharging the waste from the bidet.

- 1 _____
- 2 _____

(2 marks)

(b) The bidet has a water inlet below the rim level.

State the minimum requirements for providing a hot and cold water supply to the bidet.

- _____
- _____
- _____

(2 marks)

(c) State the minimum diameter of the discharge pipe.

- _____

(1 mark)

(d) State the discharge units applicable to a bidet.

- _____

(1 mark)

(e) State TWO circumstances in which the discharge pipe serving the bidet does not require a vent.

- 1 _____
- _____
- 2 _____
- _____

(2 marks)

Total 8 marks

QUESTION 10

(a) List FOUR performance outcomes that a building's foul water system must meet to comply with the New Zealand Building Code.

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

(2 marks)

(b) State THREE design restrictions on the use of air admittance valves in a foul water plumbing system.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(c) Explain the purpose of an untrapped floor waste.

(2 marks)

(d) State the THREE requirements that must be met when installing untrapped floor waste systems.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

Total 10 marks

QUESTION 11

MULTI-CHOICE

In the following multi-choice questions tick one box only per question

1 What is the minimum height above the highest fitting that the inverted U of a vacuum column must be extended?

- (a) 9.000 metres
- (b) 9.500 metres
- (c) 10.000 metres
- (d) 10.700 metres
- (e) 11.000 metres

(1 mark)

2 The minimum height from the flushing outlet of a urinal to the bottom of the flushing cisterns is:

- (a) 450 mm
- (b) 550 mm
- (c) 650 mm
- (d) 750 mm
- (e) 850 mm

(1 mark)

3 What is the minimum capacity of a flushing cistern serving a continuous wall urinal 3.000 metres long?

- (a) 12.5 litres
- (b) 15.0 litres
- (c) 20.0 litres
- (d) 27.0 litres
- (e) 33.5 litres

(1 mark)

4 What is the minimum gradient required for a 65 mm diameter discharge pipe?

- (a) 1 in 20 (5%)
- (b) 1 in 25 (4%)
- (c) 1 in 30 (3.33%)
- (d) 1 in 35 (2.86%)
- (e) 1 in 40 (2.5%)

(1 mark)

5 What is the maximum depth the surface of the water seal of a floor waste gully trap can be below the adjacent floor level?

- (a) 500 mm
- (b) 600 mm
- (c) 700 mm
- (d) 800 mm
- (e) 900 mm

(1 mark)

6 How should the discharge rate of a flushing valve or meter be adjusted?

- (a) Adjust the isolating valve.
- (b) Adjust the bypass screw.
- (c) Alter the diameter of the flush pipe.
- (d) Install a larger storage tank.
- (e) Change the water closet pan.

(1 mark)

7 Circulating pressure in a thermo-siphon hot water system is reliant on:

- (a) height of static head.
- (b) hydraulic gradient.
- (c) density differential.
- (d) potential energy.
- (e) calorific value.

(1 mark)

Total 7 marks

QUESTION 12

A gable roof has a vertical rise of 1.170 m. The building is 9.000 m wide to the outside face of the fascias.

Calculate the length of each sheet of corrugated profile roofing material required after allowing for a 65 mm projection into the spouting. (Show all workings.)

Total 4 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		
Total		