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, JUNE 2012

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.

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 20–21 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 June 2012 were provided with the following documents:

- New Zealand Building Code clause G1 Personal Hygiene
- New Zealand Building Code clause G12 Water Supplies

SECTION A

QUESTION 1

(a) (i) Name FOUR risks to personal safety that are present when GMAW (Mig welding).

1 _____

2 _____

3 _____

4 _____

(2 marks) ☐

(ii) List SIX items of personal protection equipment that should be used to protect yourself when GMAW (Mig welding).

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

(3 marks) ☐

QUESTION 1 (cont'd)

(a) (iii) Draw a cross-sectional view showing a completed fusion weld for joining two pieces of metal in the following methods.

(i) Fillet weld

(ii) Butt weld

(iii) Lap weld

(3 marks)

QUESTION 1 (cont'd)

(b) (i) Give TWO conditions that could make the atmosphere in a confined space unsafe.

1 _____

2 _____

(1 mark)

(ii) Give TWO methods that can be used to protect against an unsafe atmosphere in a confined space.

1 _____

2 _____

(2 marks)

(c) Acetylene cylinders should be stored upright and restrained.

Give THREE other requirements that should be met when choosing a safe location to store acetylene cylinders.

1 _____

2 _____

3 _____

(3 marks)

(d) A piece of flat sheet metal has been measured and cut to the correct dimensions.

Name FOUR sheet metal working tools that are required to make a section of socketed circular ducting from flat sheet metal.

1 _____

2 _____

3 _____

4 _____

(4 marks)

Total 18 marks

QUESTION 2

(a) A rectangular water tank has the following dimensions:

1400 mm long
1800 mm wide
1200 mm deep.

The water inlet is centred on the 1800 mm side and 150 mm from the top of the tank.

The water outlet is centred on the opposite 1800 mm side and is 80 mm from the bottom of the tank.

Draw to scale and label a three dimensional diagram of the water tank and indicate the centre point for the inlet and outlet locations with a cross (+). The tank is to be drawn at a scale of 1:20

(5 marks)

QUESTION 2 (cont'd)

(b) A lean-to roof has a span of 3.2 metres and the vertical rise to the ridge is 1.1 metres.

The roofing iron sheets are to overhang 60 mm into the spouting.

Calculate the length the roofing iron sheets will need to be.

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

(3 marks)

(c) A flat roof is 14 metres long and 8 metres wide.

The rainfall intensity during a storm is 34 mm/hour.

Calculate how many litres of rain water can be collected from the roof in 45 minutes during the storm.

(3 marks)

Total 11 marks

QUESTION 3

Give FOUR situations in which an isolating valve must be installed on the cold water pipework within a household.

1 _____

2 _____

3 _____

4 _____

Total 2 marks ☐

QUESTION 4

(a) State THREE factors contributing to human comfort that need to be considered when sizing a heating and ventilation system.

1 _____

2 _____

3 _____

(3 marks) ☐

(b) Give an advantage of installing an air-conditioning or heating unit that provides positive air pressure to a building.

_____

_____

(1 mark) ☐

(c) A central heating furnace is working correctly.

However, the customer has complained that some areas of the house are not being heated as well as they used to.

Give TWO likely reasons for this.

1 _____

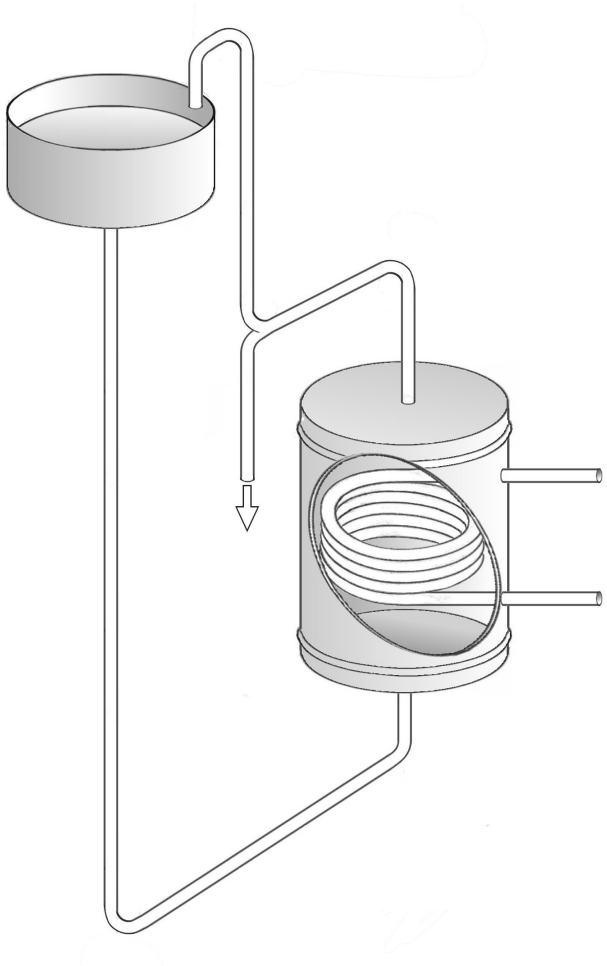
2 _____

(2 marks) ☐

Total 6 marks ☐

QUESTION 5

(a) The diagram below shows part of hot water supply installation.



Name THREE features that determine the type of hot water system pictured.

1 _____

2 _____

3 _____

(3 marks)

(b) State the maximum allowable capacity for a hot water cylinder before a cylinder drain must be fitted.

_____

_____

(1 mark)

Total 4 marks

QUESTION 6

(a) A pump has been installed to supply potable water to a building.

The pump is rated to supply a maximum of 400 kPa.

1 m head = 9.81 kPa.

Calculate the height above the pump the water will reach if the pump is working to maximum efficiency.

_____

_____

(1 mark) ☐

(b) Excluding friction losses such as bends, diameter and length of pipe, give TWO factors that will reduce the head a centrifugal pump will be able to supply water to. The water supply is clean and plentiful.

1 _____

2 _____

(2 marks) ☐

Total 3 marks ☐

QUESTION 7

(a) (i) Describe a close-coupled toilet suite.

_____

_____

(1 mark)

(ii) The layout for the pipework for an S trap close-coupled toilet suite in a new house is being determined.

Give THREE measurements relating to the suite that must be obtained to ensure that the pipework is located correctly.

1 _____

2 _____

3 _____

(3 marks)

(iii) Give a reason the measurements in (ii) are critical when installing a close-coupled suite.

_____

_____

(1 mark)

Total 5 marks

QUESTION 8

List FOUR possible faults that should be checked for during the service of a screw-down stop tap.

1 _____

2 _____

3 _____

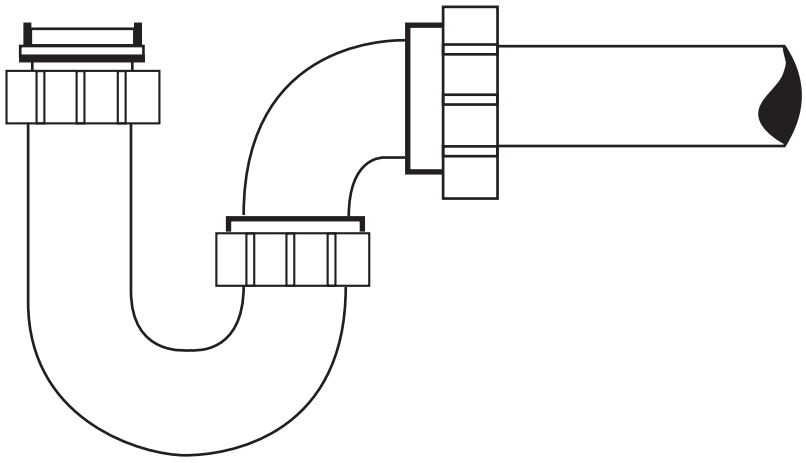
4 _____

Total 2 marks

QUESTION 9

The diagram below shows a water trap connected to a section of discharge pipe.

Label the drawing below to show the following:
Weir
Water seal depth
Soffit
Invert
Crown



Total 5 marks

QUESTION 10

(a) Give FOUR criteria that must be met by water supply pipe and fitting materials so they comply with New Zealand Building Code G12/AS1 Water Supplies.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(b) State the FOUR conditions that must be present for equipotential bonding to be required on pipework within a building.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(c) Explain fully how heavy frosts can cause damage to unprotected water pipes.

_____

_____

_____

(2 marks)

(d) Give THREE installation requirements complying with New Zealand Building Code Clause G12/AS1 Water Supplies that must be met to reduce the likelihood of damage when a hot water cylinder is to be installed in an area which is subject to freezing.

_____

_____

_____

(3 marks)

Total 9 marks

QUESTION 11

Name SIX properties a silicon sealant should have to be suitable for sealing any type of external flashing.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

Total 3 marks ☐

QUESTION 12

(a) Complete the table below to give the definition and an example of each of the listed terms.

	Definition	Example
Sanitary fixture		
Soil fixture		
Sanitary appliance		

(6 marks) ☐

(b) Give TWO reasons for the restrictions on the location of the termination of a foul water vent pipe.

1 _____

2 _____

(2 marks) ☐

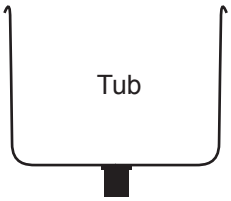
QUESTION 12 (cont'd)

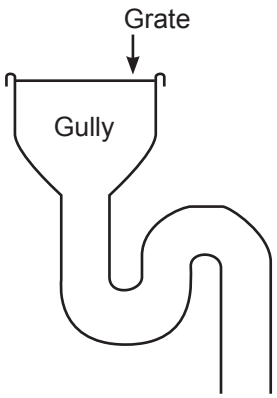
(c) The starter drawing below shows a laundry tub and a gully dish.

A clothes washing-machine is to discharge into the laundry tub discharge pipe.

Complete the drawing to show the pipework required for the waste from the laundry tub and clothes washing machine to the gully dish so the installation complies with New Zealand Building Code G13/AS1 Foul Water.

Also include in your drawing:
the minimum diameter of the discharge pipe
the acceptable location of the outlet of the discharge pipe in relation to the gully dish grate.





(4 marks)

Total 12 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.

Note that should your choice of answer be unclear no marks will be awarded for that question.

1. Which of the following describes elasticity?

   A The ability of a material to deform permanently under compression without rupturing.

   B The ease with which a material may be melted.

   C The ability of a material to return to its original shape after being stretched.

   D A material's resistance to being deformed when placed under a load.

   E The ability of a material to be stretched without breaking.

   ☐

2. Which of the following describes malleability?

   A The ability of a material to deform permanently under compression without rupturing.

   B The ease with which a material may be melted.

   C The ability of a material to return to its original shape after being stretched.

   D A material's resistance to being deformed when placed under a load.

   E The ability of a material to be stretched without breaking.

   ☐

3. Which of the following correctly describes tenacity?

   A The ability of a material to deform permanently under compression without rupturing.

   B The ease with which a material may be melted.

   C The ability of a material to return to its original shape after being stretched.

   D A material's resistance to being deformed when placed under a load.

   E The ability of a material to be stretched without breaking.

   ☐

4. Which of the following materials can be joined by electro-fusion?

A Copper.

B Polypropylene.

C Cross-linked polyethylene.

D uPVC.

E Polybutylene.

☐

5. Which of the following is an acceptable method for joining uPVC?

A Crimp fittings.

B Electro-fusion.

C Solvent cement welding.

D Self threading fittings.

E Hose tail and clamp.

☐

6. Which of the following is the symbol for a unit of energy?

A MJ

B °C

C °F

D K

E m

☐

7. Which of the following can occur if a water pipe rises above the hydraulic gradient in a low pressure hot water system?

A The water pressure can increase.

B An air lock can occur.

C Air can enter the water supply.

D Back siphonage can occur.

E The installation can become noisy (water hammer).

☐

8. Why must a dishwasher drain hose rise above the level it connects to in a discharge pipe system?

A To prevent the dishwasher from syphoning.

B To stop any foul water returning to the machine in the event of a blockage.

C To prevent back flow to the potable water supply.

D To allow foul air and gases to escape.

E To prevent vermin from entering the dishwasher drain hose.

☐

9. Which of the following valves does not always have a spring?

A Pressure reducing valve.

B Tempering valve.

C Cold water expansion valve.

D Non return valve.

E Pressure limiting valve.

☐

10. Which of the following is not part of a 4 n 1 valve used on the inlet of a mains pressure hot water cylinder?

A Cold water expansion valve.

B Isolation valve.

C Non return valve.

D Filter.

E Pressure limiting valve.

☐

11. What is the purpose of a bypass fitted on a backflow prevention device installation?

A To allow greater volumes of water through in times of high demand.

B To maintain protection and an uninterrupted water supply during servicing.

C To provide a water supply to low risk areas within the installation.

D To allow a water meter to be installed on the main supply.

E To provide testing points for the annual testing of the device.

☐

12. Which of the following valves is NOT required on a low pressure, valve vented, hot water system?

A Isolating valve.

B Pressure relief valve.

C Pressure reducing valve.

D Temperature pressure relief valve.

E Non return valve.

☐

13. Which of the following is NOT a requirement when choosing a location for installing a backflow preventer?

A Accessible area.

B As near as possible to the source of contamination.

C Protected from freezing.

D Protected from physical damage.

E Above ground level.

☐

14. According to New Zealand Building Code Clause G12/AS1 Water Supplies, which of following is rated a medium backflow hazard?

A An in-lawn sprinkler system.

B A dental spittoon.

C A hairdresser's sink.

D A non-carbonated drink dispenser.

E A car wash.

☐

15. Which of the following is an advantage of installing a cold water expansion valve on a mains pressure hot water storage cylinder installation?

A Reduces the risk of backflow occurring.

B Reduces the pressure to within system limits.

C Increases the volume of cold water.

D Increases the rate of thermal expansion.

E Reduces the chance of calcium deposits fouling a temperature pressure relief valve.

☐

16. Which of the following backflow prevention methods provides NO protection against back pressure?

A Reduced pressure zone device.

B Air gap.

C Pressure type vacuum breaker.

D Double check valve assembly.

E Double check valve detector assembly.

☐

17. New Zealand Building Code Clause G1 Personal Hygiene does NOT require a shower to be installed at which of the following venues?

A A day care centre.

B A school.

C A gymnasium.

D A hostel.

E A tennis club.

☐

18. When sizing a continuous wall urinal, how many mm of wall must be allowed for per person?

A 450 mm.

B 500 mm.

C 550 mm.

D 600 mm.

E 650 mm.

☐

19. How high above floor level should the front lip of a wall hung urinal be when installed at a primary school?

A 350 mm.

B 375 mm.

C 400 mm.

D 425 mm.

E 450 mm.

☐

20. What is the minimum width of a room in which a toilet may be installed?

A 700 mm.

B 750 mm.

C 800 mm.

D 850 mm.

E 900 mm.

Total 20 marks

This page is available for additional working or answers

Question number _____

For Examiner's use only

Question number	Marks	Marks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Section B		
Total		