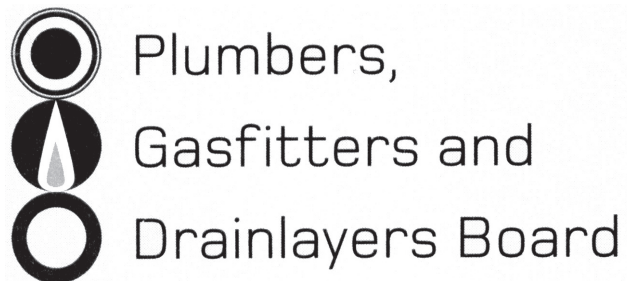


No. 9192



REGISTRATION EXAMINATION, NOVEMBER 2015  
**LICENSED PLUMBER**

**ANSWER SCHEDULE**

## ANSWER 1

- (a) Explanation      The ability of a metal to transfer electricity or heat.  
Material            Copper
- (b) Explanation      The ability of a metal to deform permanently under compression without breaking.  
Material            Lead
- (c) Explanation      The ability of a metal to resist breaking when pulled.  
Material            Copper

**Total 6 marks**

## ANSWER 2

- (a) (i) Points indicated at bottom of inlet valve and top of overflow pipe. (1 mark)
- (ii)  $20 + 20 = 40$   
 $40 \times 2 = 80 \text{ mm}$  (1 mark)
- (b) Toxic environment (1 mark)
- (c)  $\frac{1}{2}$  mark each  
A potable water supply system and a non-potable water supply system.  
A potable water supply system connected to a water main, and any water from another source including a private water supply.  
A potable water supply system and any bathing facilities including swimming, spa or paddling pools.  
A potable water supply system and pipes, fixtures or equipment (including boilers and pumps) containing chemicals, liquids, gases or other non-potable substances.

(2 marks)

**Total 5 marks**

## ANSWER 3

- (a) Disconnect energy supply (turn element or gas supply off) before water exceeds  $95^{\circ}\text{C}$ . (1 mark)
- (b) 1 mark each  
Safety  
Energy efficiency (2 marks)
- (c) Any TWO (1 mark each)  
The working pressure of the hot water cylinder.  
The flow rate of the cold water inlet.  
The cylinder connection diameter. (2 marks)

(d) A heating system that is designed to provide hot water at the outlet of a cylinder as quickly as possible. (1 mark)

(e)

The minimum distance between the hot outlet (A) and the tempering valve (B)	1 metre
The maximum distance between the hot outlet (A) and the pressure relief valve (C)	1 metre
The maximum length of pipe labelled (D)	12 metres
The minimum height of air gap to tundish (F)	25 mm
The minimum diameter of pipe labelled (H)	25 mm

(1 mark each, 5 marks)

**Total 11 marks**

#### **ANSWER 4**

(a) Self-siphonage

(b) Momentum

(c) Compression

(d) Capillary Attraction

(e) Oscillation

(f) Induced siphonage

(1 mark each)

**Total 6 marks**

## ANSWER 5

- (a) (i)  $0.9^2 + 4.3^2 = 19.3$  (1 mark)  
 $\sqrt{19.3} = 4.39$  (1 mark)  
 $4.39 + 0.05 = 4.44$  m (1 mark) (3 marks)
- (ii)  $16 \times 4.44 \times 0.05 = 3.55$  m<sup>3</sup> (1 mark)
- (b) (i) Lead  
Asbestos (2 marks)
- (ii) Bird/animal material  
Airborne pollutants  
Leaves/organic matter (3 marks)

**Total 9 marks**

## ANSWER 6

- (a) (i) Any FOUR (½ mark each)  
Diameter  
Length  
Material  
Changes of direction  
Valves (2 marks)
- (ii) Frictional loss. (1 mark)
- (b) (i) Water hammer/hydraulic shock (1 mark)
- (ii) Any TWO (1 mark each)  
Quick action tapware  
Loose pipework  
Worn washers/loose jumpers (2 marks)
- (iii) Seal holes where pipework travels through nogs and studs.  
Clip pipework adequately (1 mark)
- (iv) Any FOUR (½ mark each)  
Fasten exposed pipework  
Install a water hammer arrestor  
Install an expansion loop of pipework  
Replace washers or jumpers in tap ware  
Encourage users to turn off quick action tapware slowly  
Reduce system pressure (2 marks)

**Total 9 marks**

## ANSWER 7

- (a) Any FOUR (1 mark each)
- Contact with foul water
  - Heavy lifting of awkwardly shaped object (toilet pan)
  - Cuts from sharp objects or tools
  - Noise from drill if used for pan screw holes (especially if hammer drilling into concrete)
  - Breathing in dust from drilling or foul gases from drain
- (4 marks)
- (b) (i) Benching
- (ii) Shoring
- (iii) Safe slope
- (iv) Trench shield
- (4 marks)

**Total 8 marks**

## ANSWER 8

- Correct scale
- Correct location of pipework

**Total 6 marks**

## ANSWER 9

- (a) Positive displacement pumps displace a measured portion of liquid via a moving part such as a plunger or gear.
- (1 mark)
- (b) Any THREE (1 mark each)
- Hydraulic ram
  - Gear pump
  - Piston/reciprocating pump
  - Diaphragm pump
  - Gear pump
  - Worm (helical screw)
  - Rotary pump
- (3 marks)
- (c) Any THREE:
- |                |   |
|----------------|---|
| Reason         | A water logged pressure tank  |
| Any ONE remedy | Completely empty water from pressure tank and recharge with air                 |
|                | Re-pressurise the pressure vessel   |
| Reason         | Incorrectly set pressure control mechanism                                      |
| Remedy         | Recalibrate pressure control mechanism to appropriate on/off pressure switching |
| Reason         | Minor leak on delivery pipe or leaking taps                                     |
| Remedy         | Check for any leaks and repair  |

Reason	Leak or non-return fail on suction line
Remedy	Clean out or replace
Reason	Incorrect pipe size
Remedy	Increase pipe size
Reason	Faulty foot valve
Remedy	Repair or replace

(6 marks)

**Total 10 marks**

## ANSWER 10

- (a) Description  
Bonding wires connected to different parts of the plumbing system to complete a circuit to earth (1 mark)
- Purpose  
To prevent shock from stray electrical currents (1 mark)
- (b) Metallic water supply pipes  
Possible to touch shower tray and pipes (eg. via a tap) at the same time (2 marks)  
Power is supplied to the building  
The metal pipe is in contact with the ground and forms a continuous metallic link from the ground to those parts exposed to building users

**Total 4 marks**

## ANSWER 11

- (a) Total number of discharge units = 5  
(i) Min grad 1:30 (1 mark)  
(ii)  $4.5 \div 30 = 0.15 \text{ m} = 150 \text{ mm}$   
Fall = 1 (1 mark)
- (b) Total number of discharge units = 6  
(i) Min grad 1:40  
(ii) Fall =  $5.7 \div 40 = 0.1425 = 142/143 \text{ mm}$  (1 mark)
- (c) Any FOUR (½ mark each)  
Have a grating flush with the floor  
Have a trap  
Be a minimum of 40 mm diameter  
Discharge 50 mm above the gully dish grate  
Have a vent  
Charged to maintain water seal (2 marks)

- (d) Access marked in correct locations (3 marks)
- (e) Any TWO (1 mark each)  
Prevent oscillation – wind eddies entering vent pipe  
Prevent smell/pollution of habited spaces  
Prevent waste over flowing at vent terminal (2 marks)

**Total 11 marks**

## **ANSWER 12**

- Any FOUR (1 mark each)  
Install/use a water efficient washing machine  
Install a low pressure water system  
Have no bath  
Flow restrictors on outlets  
Have no waste disposal unit  
Use half-flush cisterns

**Total 4 marks**

## **SECTION B**

1. E An air lock can occur.
2. B A basin installed in an adjacent room
3. A 50 mm
4. A 15 minutes at 1500 kPa.
5. C 50 mm.
6. D 40 mm.
7. A 1.000 m.
8. E A vent that is connected to a discharge pipe downstream from the last fixture.
9. C 50 mm.
10. D 32 mm.
11. C 3.0 m.

**Total 11 marks**