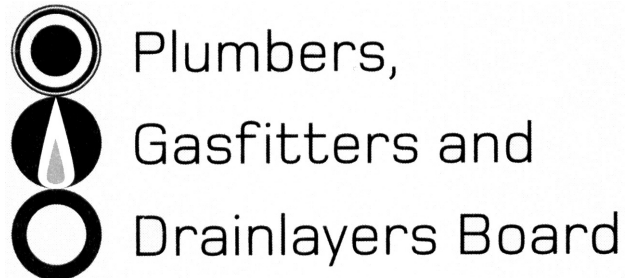


No. 9192



REGISTRATION EXAMINATION, JUNE 2013
LICENSED PLUMBER

ANSWER SCHEDULE

ANSWER 1

Provide a sleeve.

Wrap the pipe in protective tape or similar.

Fix a supporting bar to the pipe to prevent it being knocked over or moving out of position.

Total 3 marks

ANSWER 2

(a) High pressure, valve vented, storage hot water.

(1 mark)

(b) A Name: Isolating valve

Function: Turns the water supply on and off.

B Name: Filter/strainer

Function: Removes any particles that may be present in the water supply to protect downstream components.

C Name: Pressure limiting valve

Function: Limits supply pressure to match the working pressure of the other components in the system.

D Name: Non-return valve

Function: Prevents water from returning to the supply pipework from the cylinder.

E Name: Tempering valve

Function: Mixes hot and cold water to a safe temperature for fixtures used for personal sanitation.

F Name: Cold water expansion valve

Function: Relieves pressure from the system due to thermal expansion.

G Name: Temperature Pressure relief valve.

Function: Reliefs water from the cylinder if the pressure or temperature reaches a point higher than the valve rating, to protect the system.

H Name: Tundish

Function: (Any TWO, ½ mark each) Prevents a vacuum occurring within the drain pipe siphoning contents of cylinder. Also provides an overflow point in the event of the drain pipe becoming blocked.

Provides air gap if drain is connected to a sanitary system.

(½ mark each name, 1 mark each function), (12 marks) (12 marks)

Total 13 marks

ANSWER 3

Cold feed supplied after PRV

Hot feed supplied

Mixed to outlet

Vent remains open

Total 4 marks

ANSWER 4

(a) Any EIGHT (½ mark each)

- Compatibility of the water with the material.
- Its suitability for the pressure that it may be subjected to.
- Resistance to ultra violet rays.
- Ease of installation.
- Environment (e.g. temperature, UV, mechanical damage).
- Electrolysis.
- Noise.
- Frictional resistance.
- Aesthetics.
- Temperature rating.
- Insulation.
- Expansion/contraction.

(4 marks)

(b) (i) ANY ONE

- In a building that has an electrical supply and metallic pipework.
- When cutting through a metallic pipe that may have been used to earth an electrical supply to a building.

(1 mark)

(ii) ANY ONE

Fixing a conductor to the pipework and connecting it to the earth stake.

Clamping a bonding strap each side of the proposed cut in the metallic pipework.

(1 mark)

Total 6 marks

ANSWER 5

Room and fixtures drawn with correct layout and scale.

Total 5 marks

ANSWER 6

(a) Any FIVE (1 mark each)

- The scaffold is firm with braces fitted correctly
- The mobile scaffold is on firm level ground
- All wheels on the scaffold are locked with the wheels turned out
- The decking on the scaffold is secure
- Access ladders are fitted within the frames of the scaffold
- Check for overhead power lines
- Another means of fall prevention (such as a safety harness) is used where guardrails can't be fitted.
- Kick guards/toe boards are still in place
- Safety tag is in place and is current

(5 marks)

(b) (i) Any THREE (1 mark each)

- Weather – wet soil, dry soil
- Soil type
- Vibration/ground movement
- Water table level

(3 marks)

(ii) Any FOUR (½ mark each)

- Ensure the face of the excavated trench is cut back and battered to a slope that could be considered adequate enough to prevent the collapse of the trench in all anticipated work and weather conditions.
- Provide adequate shoring appropriate to the ground conditions.
- Provide an approved and appropriate mobile safety cage or box. (While this may not prevent the trench collapsing, it will protect the workers inside the cage or box from the collapse.)
- Provide adequate steps to the side or end of the trench as appropriate which would reduce the likelihood of a collapse (benching).
- Remove excess ground water.
- Avoid conditions that overload the edge of the trench (eg depositing spoil near the edge or allowing vehicles near the edge).

(2 marks)

(iii) Any FOUR (½ mark each)

- Erect a barrier of semi-permanent construction which would be difficult to remove.
- Provide adequate lighting.
- Erect adequate signs to warn of danger and construction site and no entry.
- Cover trench with steel plates to guard against unauthorised entry.
- Install flashing beacons.

(2 marks)

Total 12 marks

ANSWER 7

- (a) Flowing water tends to cause air to move with it. The more rapid the flow of water from a sanitary fixture into the pipe, the nearer to the full bore will be the flow in this pipe. If water does flow full bore in the pipe, air in the pipe will be driven before it. This air movement reduces air pressure in the pipe between the trap seal and the flow. If this situation is great enough, atmospheric pressure in the room will force the water out of the trap seal.
(2 marks)
- (b) When water flows down a vertical pipe, it forms a vortex and the water spirals down the wall of the pipe. The water flowing past a lower branch pipe reduces the pressure in the lower pipe to lower than the atmospheric pressure in the lower room. The atmospheric pressure differential will force the seal to siphon from the lower pipe trap.
(2 marks)
- (c) A discharge flowing full bore in a less graded section of a combined waste pipe if followed closely by a faster full bore discharge down a vertical section will cause air and gases between the two discharges to compress. This causes the water seal in any fixture trap in between to be forced back into the fixture allowing foul gases to enter the room.
(2 marks)
- (d) When a trap is fitted some distance from a sanitary fixture, the falling discharge gains momentum which can force the water seal over the trap resulting in a reduction or total loss of water seal.
(2 marks)
- (e) Depending on the location of the termination point of a vent pipe, wind gusts can cause a variation in the air pressure within the pipe. The result is a rising and falling action of the water seal in the trap, which may lead to trap seal loss.
(2 marks)

Total 10 marks

ANSWER 8

(a) Reduced Pressure zone device

(1 mark)

(b)

Name	Position
Inlet	E
Outlet	A
Relief valve	G
Diaphragm	F
Relief port	H
Check valve seat	B
Washer	D
Spring	C

(4 marks)

(c) Any THREE (1 mark each)

Hair salon

Dental surgery

Direct heat exchangers

Car and factory washing facilities

Chlorinators

Fire sprinkler system with toxic or hazardous water

Systems containing chemicals

Boiler, chiller and cooling tower make-up water

Plus other suitable examples

(3 marks)

Total 8 marks

ANSWER 9

- (a) $r = 2.6 \div 2 = 1.3$
 $H = 2.1 - (0.1 + 0.3) = 1.7$ (1 mark)
 $V = \pi \times r^2 \times H$
 $V = 3.142 \times 1.3^2 \times 1.7$ (1 mark)
 $= 9.027 \text{ m}^3$
 $= 9027 \text{ litres}$ (1 mark) (4 marks)
- (b) When a leak or overflow from the tank could cause damage to another occupancy within the same building. (1 mark)
- Total 5 marks**

ANSWER 10

- (a) Any THREE (1 mark each)
Felt
Wool
Closed cell elastomeric – foam
Foil tape
Fibreglass (3 marks)
- (b) Hot water pipework
Pipework installed in areas subject to freezing (2 marks)
- Total 5 marks**

ANSWER 11

(a)

Name	Position
Potable hot outlet	G
Low Pressure cold outlet	I
Radiator thermostat	F
Radiator bleed valve	H
Indirect heat exchanger	D
Primary flow pipe	B
Primary return pipe	C
High pressure cold outlet	E
Radiator	J
Boiler	A

(5 marks)

(b) An air gap on the inlet to the ceiling tanks.

(1 mark)

Total 6 marks

ANSWER 12

Identifying Coeff. Lin = 0.000081 (1 mark)

Temp diff = 20 – 4 = 16 (1 mark)

Expansion = $30 \times 0.000081 \times 16 = 0.038888 \text{ m}$ (1 mark)

= 39 mm (1 mark)

Total 4 marks

SECTION B

1. B The diameter of the pipe and the total discharge loading.
2. C 50 mm
3. A 3.5 m.
4. D 40 mm
5. E 1:60
6. C 65 mm
7. C 600 mm
8. D 100 mm
9. B 1.0 m
10. C 1.5 m
11. A The pump moves measured portion of liquid by a plunger or gear.
12. E Centrifugal pump.
13. D 10.3 m
14. E To ensure the pump remains primed.
15. D An air lock can occur.
16. A To stop an underground pipe from moving.
17. E The total discharge units from all fixtures discharging to the stack.
18. A Using brass and galvanised steel pipework for a water supply.
19. B A sacrificial anode.

Total 19 marks