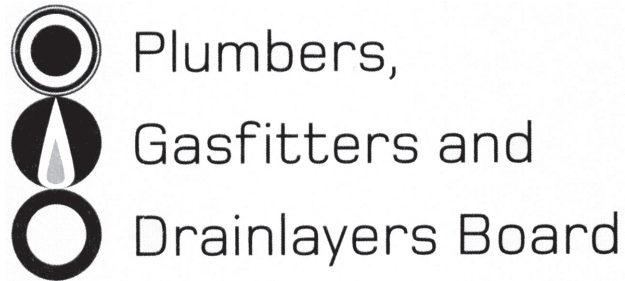


No. 9192



REGISTRATION EXAMINATION, NOVEMBER 2016
LICENSED PLUMBER

ANSWER SCHEDULE

ANSWER 1

- (a) Trap (1 mark)
Discharge pipe diameter (1 mark)
Gradient (1 mark)
Vent or air admittance valve (1 mark)
Vent diameter (1 mark) (5 marks)
- (b) Any THREE (1 mark each)
Incorrectly installed wastepipe.
Not running enough water when using the waste disposal.
Not leaving the water running for a period of time after the food has been chopped up to flush it through the waste pipe.
Disposal of unsuitable waste in the disposal unit.
The blades on the waste disposal unit are worn.
Outlet end of waste pipe restricted. (3 marks)

Total 8 marks

ANSWER 2

- (a) Drawing to be cross sectional. (½ mark)
Drawing to show operational valve with rising gate. (2 marks)
Drawing to show direction of flow. (½ mark) (3 marks)
- (b) Drawing to show washer and seat. (½ mark)
Drawing to show under and over water flow path. (1½ mark)
Drawing to show direction of flow. (1 mark) (3 marks)
- (c) Function 1
A probe inside the valve expands as the temperature rises inside a hot water cylinder. If the temperature reaches an unsafe level the probe will have expanded enough to push the valve off its seat. (2 marks)

Function 2

The TPR is spring loaded to hold the valve shut, if the pressure inside the valve increases above the spring rating the pressure inside the cylinder will force the valve off the seat and the spring to compress until the pressure inside the cylinder drops to a safe level.

(2 marks)

Total 10 marks

ANSWER 3

- (a) Identifying coeff. lin expansion = 0.0000166 (1 mark)
Temp diff = 59 – 15 = 44 (1 mark)
Expansion = 25 × 0.0000166 × 44 = 0.01826 m (1 mark)
= 18 mm (1 mark) (4 marks)
- (b) The copper can become fatigued/work hardened causing it to fracture or split. (1 mark)
- (c) (i) Galvanised steel. (1 mark)
- (ii) Corrosion of the bracket. (1 mark)

Total 7 marks

ANSWER 4

- (a) (i) 15 years (1 mark)
(ii) 50 years (1 mark)
(iii) 5 years (1 mark)
(iv) 15 years (1 mark)
(v) 5 years (1 mark)
- (b) Any THREE (1 mark each)
- Wind speed of area.
 - Size of penetration.
 - Width of roofing profile.
 - Distance to ridge.
 - Pitch of roof.

(3 marks)

Total 8 marks

ANSWER 5

Any FOUR (1 mark each)

Incoming cold water pressure.

Make and model of tapware (esp shower mixer) and shower rose.

Space required and location available for installation/proximity to outlets.

Type of fuel/energy (gas, power etc).

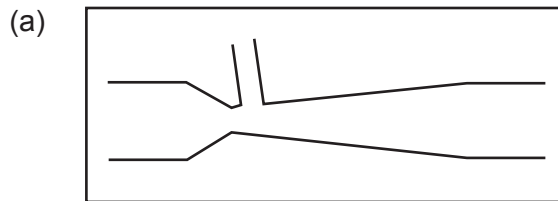
Required flow rate.

Suitability of existing pipework.

Suitability of proposed location for the heater.

Total 4 marks

ANSWER 6



(1 mark)

(b) The velocity of the main water increases as the pipe narrows, as it enters the wider part of the tube it creates a suction effect pulling water in from the branch supply.

(2 marks)

(c) Any ONE

- Shower mixer
- Deep-well jet pump
- Ejector pump
- Embalming equipment

(1 mark)

Total 4 marks

ANSWER 7

(a)

Material	Quantity	Material	Quantity
15 mm Cu	12.5 – 13.7 (1 mark)	20 × 15 Cu tee	2 (½ mark)
20 mm Cu	7.5 – 7.7 (1 mark)	15 mm Cu tee	0 (½ mark)
20 mm crox nut	2 (½ mark)	Shower mixers	3 (½ mark)
15 mm crox nut	9 (½ mark)	15 mm hex nipples	9 (½ mark)
Bracket elbows	3 (½ mark)	20 mm hex nipples	2 (½ mark)

(6 marks)

(b) Carry out testing before concealing pipework behind interior linings.

Isolate all shower mixers that be damaged during testing.

Subject the pipework or system to a minimum test pressure of 1500 kPa for a period of not less than 15 minutes.

(4 marks)

Total 10 marks

ANSWER 8

- (a) To provide access for cleaning and clearing blockages. (1 mark)
- (b) At the junction of a soil discharge pipe with a discharge stack.
Where a number of changes of direction occur.
In a discharge pipe where access to junction or changes of direction are restricted.
At the base of any soil stack at the point of connection to the drain. (4 marks)
- (c) Any FOUR (1 mark each)
Must be external.
Must be 50 mm above the overflow level of the fixture they serve.
Must be 3 m above ground level.
Must be 600 mm above window or other opening.
Must be 3 m below or horizontally from window or other opening.
Must be 150 mm above roof.
Must be 3 m away from deck.
Must be 600 mm away from eaves and parapets.
Must be 5 m away from any air intakes.

(4 marks)

Total 9 marks

ANSWER 9

- (a) The system is in a no flow situation. The first check valve is fouled/faulty and the spring cannot close the valve, increasing the pressure in the middle chamber. The excess pressure opens the relief valve and water is released. (2 marks)
- (b) Supply pressure has dropped. (½ mark)
The second check valve has failed. (½ mark)
Any downstream excess pressure is relieved before it can enter the water main. (1 mark)
(2 marks)
- (c) Normal operation with water flowing. Check valve one and check valve two are both open, reduced pressure zone not relieving. (2 marks)

Total 6 marks

ANSWER 10

- (a) To provide a disconnection between waste discharge and the remainder of the sewerage installation. (1 mark)
- (b) Any THREE (1 mark each)
Urinal.
WC pan.
Kitchen sink.
Slop hopper.
Bedpan washer.
Dishwasher. (3 marks)
- (c) Any TWO (1 mark each)
Basin.
Drinking fountain.
Dental unit. (2 marks)
- (d) Any TWO (1 mark each)
Bath.
Shower.
Laundry tub.
Bar sink.
Bidet.
Cleaner's sink.
Ablution trough.
Washing machine.
Tundish. (2 marks)
- (e) Tundish. (1 mark)

Total 9 marks

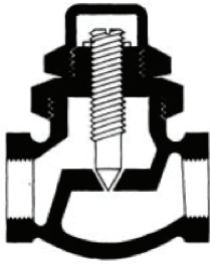
ANSWER 11

- (a) 1. Vent.
2. Non-return valve OR pump outlet.
3. Inlet.
4. Pump. (2 marks)
- (b) (i) Alarm will notify people of pump failure – stand by pump will come on.
(ii) Duty pump will start to empty chamber.
(iii) Duty pump will stop as chamber is now empty. (3 marks)

Total 5 marks

ANSWER 12

(a)



(2 marks)

(b) Urinal cistern.

(1 mark)

Total 3 marks

ANSWER 13

(a) Any FOUR (1 mark each)

Check the shower rose is not blocked with debris or calcium deposits.

Check pipework for blockages/airlocks.

Replace shower rose with a less restrictive model.

Replace shower mixer with a less restrictive model.

Increase diameter of pipework feeding the cylinder.

Increase the height of the vent/water level inside the vent.

Fit a pressure relief valve to the cylinder and increase pressure.

If a ceiling tank is fitted, replace with pressure relief valve.

(4 marks)

(b) Any THREE (1 mark each)

Protected from external corrosion and abrasion.

Allowance for expansion and contraction.

50 years durability.

Lagged/sleeved.

(3 marks)

Total 7 marks

SECTION B

1. B 1:4
2. C 1.000 m.
3. A Crox fitting.
4. C Polyethylene.
5. A Solvent cement welding.
6. D Raises the boiling point.
7. B A system where the water is circulated by a pump.
8. E A closed loop solar water heater system.
9. C 45°C.
10. D Air movement over the vent terminal causes the water seal to spill over the trap weir.

Total 10 marks