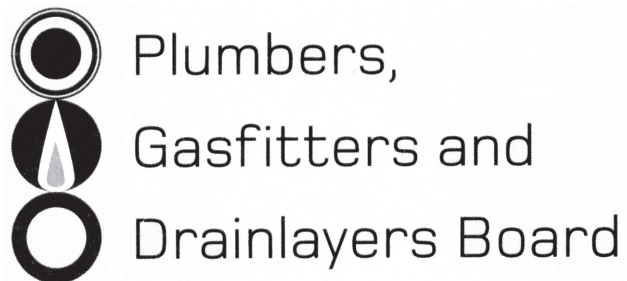


No. 9192



REGISTRATION EXAMINATION, JUNE 2010  
**LICENSED PLUMBER**

**ANSWER SCHEDULE**



## ANSWER 1

(a) Any FOUR:

- 1 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.
- 2 Provide adequate shoring appropriate to the ground conditions.
- 3 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.
- 4 Provide adequate steps to the side or end of the trench as appropriate which would reduce the likelihood of a collapse.
- 5 Remove excess ground water.
- 6 Avoid conditions that overload the edge of the trench (eg depositing spoil near the edge or allowing vehicles near the edge).

(½ mark each), (2 marks)

(b) Any TWO:

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

(½ mark each), (1 mark)

(c) Any SIX:

- 1 Flashback caused by the operator trying to light the torch when there is a mixture of oxygen and fuel gas in the one hose.
- 2 Fires caused by leakage of fuel gas usually from damaged or badly joined sections of hose.
- 3 Explosions or fires caused by welding or cutting pipe tanks or drums without taking appropriate precautions. (i.e. The tank is not an enclosed vessel and/or does not contain any flammable or explosive material even in small quantities.)
- 4 That oily or greasy clothes or clothes that have been used in connection with any flammable material are not worn while gas welding/cutting is being done.
- 5 That adequate precautions are taken to protect the eyes and the body from sparks or burns. (Eye damage.)
- 6 The inhalation of dangerous fumes during operations by the operator or any person in the vicinity.
- 7 That no flammable material is nearby.
- 8 Burns (if elaborated)

(½ mark each), (3 marks)

(d) Any SEVEN:

- 1 Wear a full shield for the face with approved colored glass to protect the eyes.
- 2 Wear appropriate protective clothing such as gloves, apron, long sleeve overalls, aprons and spats.
- 3 Do not use the end of an electrode to light a cigarette or any other appliance.
- 4 Always erect shields around the welding area to protect other people's eyes.
- 5 Never strike an electrode on a gas cylinder.
- 6 Always use safety glasses when chipping slag.
- 7 Take precautions against electric shock, check primary and secondary leads and earthing.
- 8 Take precautions against inhaling toxic fumes from any welding.
- 9 Take precautions against stray sparks starting a fire, always keep an appropriate fire extinguisher handy.

(1 mark each), (7 marks)

(e) (i) Upright and secured. (1 mark)

(ii) Any TWO:

If stored or used in a horizontal position, priming could occur which means the acetone could run to the cylinder outlet and be discharged to the atmosphere, which would allow the acetylene to collect within the cylinder to a dangerous proportion. Acetone if discharged during welding can have a deleterious effect on the weld. Acetone would damage the hoses.

(2 marks)

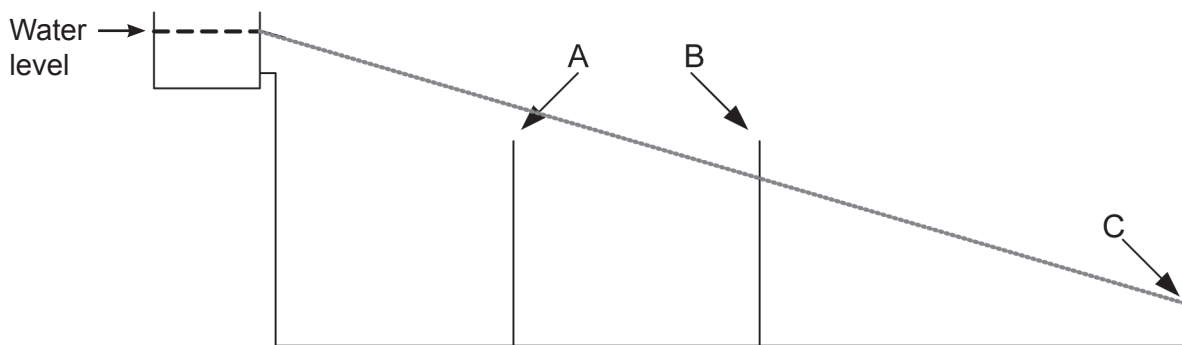
**Total 16 marks**

## ANSWER 2

(a) The term “hydraulic gradient”, sometimes referred to as the hydraulic grade line, is used to describe a line between the upper level of water in a water pipe system and the outlet through which it discharges.

(1 mark)

(b)



DRAW OFF AT LOWEST POINT

**Fig. 1**

(1 mark)

(c) When water is flowing at full volume from the outlet 'C' at the lowest point as shown in Fig 1 the water level will lower in each branch to follow the line of the hydraulic gradient, draw off point 'A' will have a reduction in flow while draw off point 'B' may not have any water available at outlet.

(2 marks)

(d) Connect a pipe to that part of the system where air would otherwise accumulate and extend the open end of the pipe in a vertical line to a point above the level of the water in the tank.

Or an automatic air vent.

(1 mark)

(e) UV degradation.

(1 mark)

(f) Cohesion.

(1 mark)

(g) Malleability.

(1 mark)

(h) Humidity.

(1 mark)

**Total 9 marks**

### ANSWER 3

(a) Any SIX:

- 1 Location of pipe work (environmental factors).
- 2 Compatibility of the water.
- 3 Its suitability for the pressure that it may be subjected to.
- 4 Resistance to ultra violet rays.
- 5 Ease of installation.
- 6 Durability.
- 7 Electrolysis.
- 8 Noise.
- 9 Frictional resistance.
- 10 Aesthetics.

(½ mark each), (3 marks)

(b) Any FOUR:

- 1 Pipe supports need to be able to support the weight of the pipe.
- 2 To ensure that the pipe is held in place.
- 3 Allow for expansion and contraction.
- 4 Compatible with the pipe to prevent corrosion or possible damage.
- 5 Need to be simple to install.

(½ mark each), (2 marks)

(c) Any TWO:

The potable and non-potable must be clearly identified by signs and all non-potable outlets must be identified with an appropriate safety sign.

Identify outlets.

Backflow protection for the potable supply must be provided if combined system.

(2 marks)

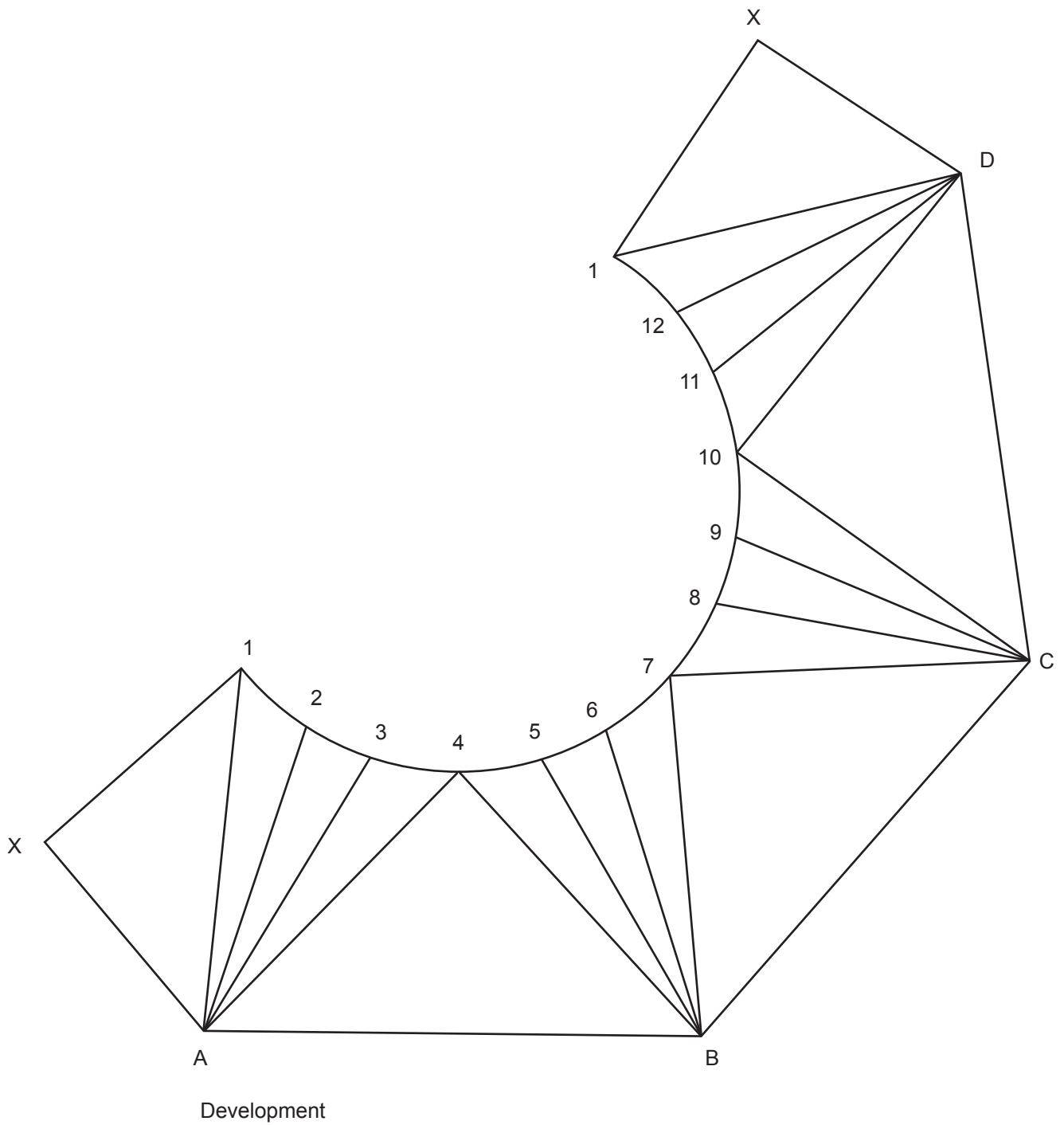
(d) An acceptable test method to meet the minimum requirements of G12 AS1 (NZ Building Code) is to:

- 1 carry out testing before concealing pipework behind interior linings, flooring, under or within concrete and before backfilling trenches
- 2 isolate all fixtures, appliances, water tanks and other equipment which may be damaged during testing
- 3 subject the pipework or system to a minimum test pressure of 1500 kPa for a period of not less than 15 minutes
- 4 inspect the system to ensure there are no leaks.

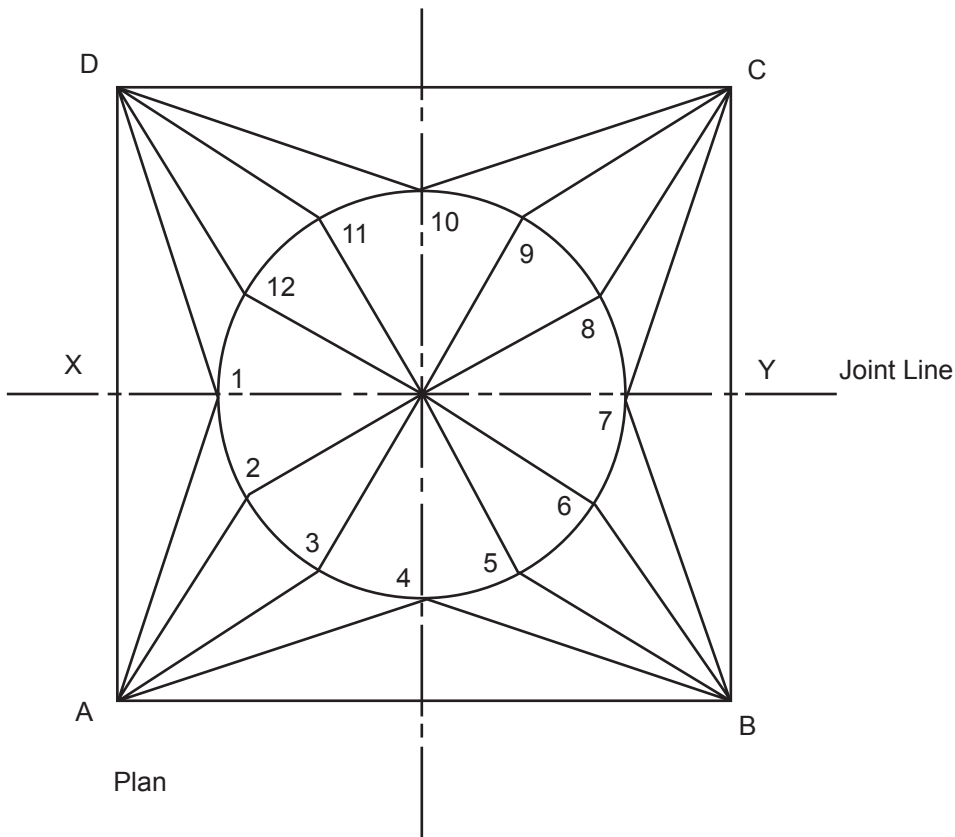
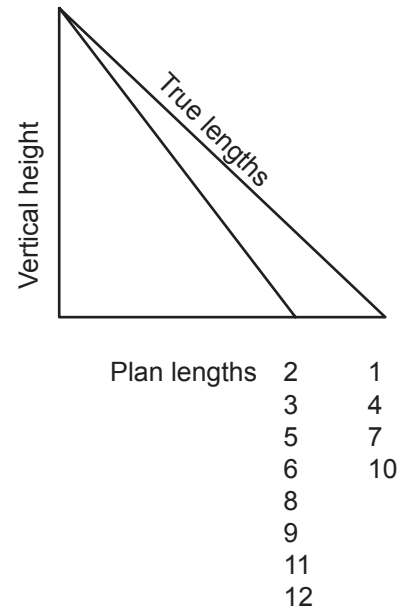
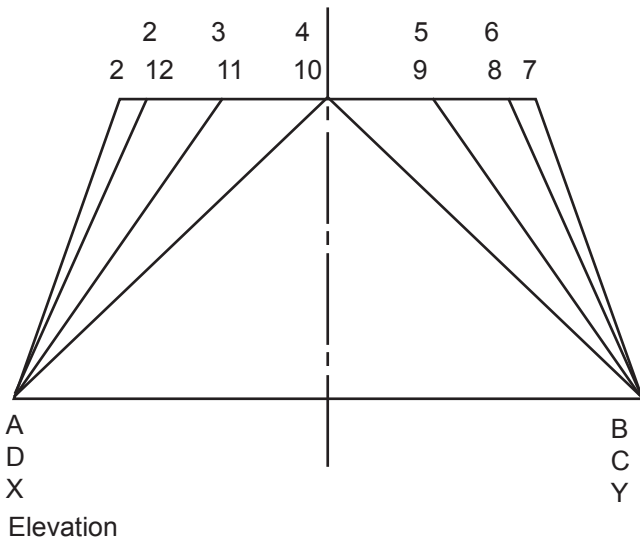
(4 marks)

**Total 11 marks**

## ANSWER 4



(3 marks for coordinates, 1 mark for the outer straight edges, 1 mark for the triangles,  
1 mark for overall drawing)



**Total 6 marks**

## ANSWER 5

(a) (i)  $12.200 \times 3.660 \times 2$  (1 mark)  
 $= 89.304\text{m}^2$  (1 mark)

(ii)  $12.200 \times 2$   
 $= 24.400 \div 0.762$  (1 mark)  
 $= 32.021$  (accept 33) (1 mark)

(b) Formula Transposed

$$\text{Height} = \frac{\text{Volume}}{0.7854 \times D^2} \quad (1 \text{ mark})$$

$$= \frac{2.4}{0.7854 \times 0.81 \times .081}$$

$$= \frac{2.4}{0.5153} \quad (1 \text{ mark})$$

$$= 4.657 \text{ m ANS} \quad (1 \text{ mark})$$

(Accept 4.66m) (3 mark)

**Total 7 marks**



## ANSWER 6

(a) Any SIX:

- 1 Size of room.
- 2 Number of occupants.
- 3 Activity of occupants.
- 4 Type of establishment, i.e. church, theatre, public bar.
- 5 Number and position of doors and windows.
- 6 Amount of natural air movement.
- 7 Temperature differential, i.e. inside to outside.
- 8 Type and degree of air conditioning.
- 9 Relative humidity.
- 10 Location of dwelling-sun, exposure.
- 11 Energy source.
- 12 Ease of installation.

(1 mark each), (6 marks)

(b) A heat pump extracts heat from the air, water or ground, and transfers that heat via a heat exchanger to the medium to be heated.

(2 marks)

(c) Adjust the dampers under the outlet grills so that adjustments to the airflow at each grill can be made.

Or

Restrict the ducting.

(1 mark)

(d) Any TWO:

- 1 Excessive noise.
- 2 Lack of air flow.
- 3 Over temperature device activated (on and off cycling).

(½ mark each), (1 mark)

**Total 10 marks**

## ANSWER 7

(a) TWO of:

A water trap shall be located as close as possible to the sanitary fixture it serves.

Within 1.2m developed length (outlet to top of waterseal).

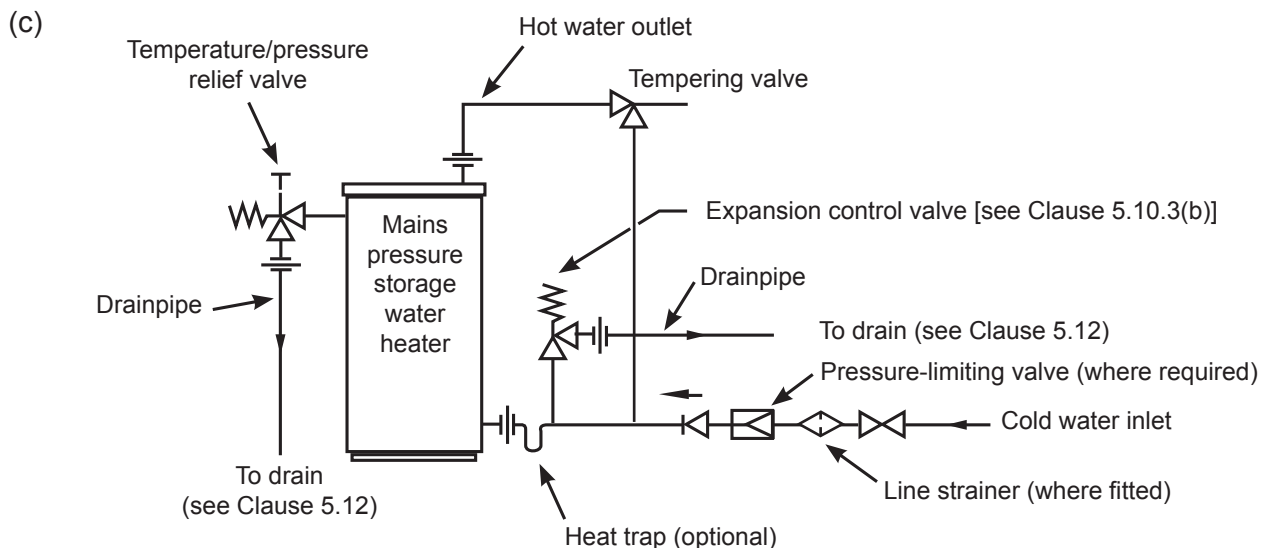
In the same room as the appliance.

(1 mark)

- (b)
- 1 To allow the organic matter to dry out.
  - 2 To allow foul air to escape.
  - 3 To prevent foul air from entering a building by compression.
  - 4 To prevent siphonage.

Note: Loss of seal (1 mark).

(2 marks)



NOTE: Expansion control valve may be combined with the pressure-limiting valve.

### Marks

Temperature/pressure relief valve.

Cold water expansion valve

Non return valve.

Pressure limiting valve.

Line strainer.

Isolation.

Tempering valve.

TPR drain or cylinder drain

(½ mark each, 4 marks)

**Total 7 marks**

## ANSWER 8

- (a) (i) Discharge stack – a main vertical discharge pipe having two or more branch discharge pipe connections and which is vented to the atmosphere at one end via a discharge stack vent.  
(2 marks)
- (ii) Fixture discharge pipe – a discharge pipe which is used to convey waste from a single sanitary fixture or sanitary appliance to a branch discharge pipe, a discharge stack, or directly to a drain.  
(2 marks)
- (iii) Branch discharge pipe – a discharge pipe which serves one or more fixture discharge pipes from any one floor and discharges to a discharge stack.  
(2 marks)
- (iv) Air admittance valve – a valve that allows air to enter but not escape in order to limit pressure fluctuations within the sanitary plumbing or drainage system.  
(2 marks)
- (b) (i) Any TWO:
- |                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Cause:          | A water logged pressure tank                                                                           |
| Any ONE remedy: | Completely empty water from pressure tank and recharge with air.<br>Re-pressurise the pressure vessel. |
| Cause:          | Incorrectly set pressure control mechanism.                                                            |
| Remedy:         | Recalibrate pressure control mechanism to appropriate on/off pressure switching.                       |
| Cause:          | Minor leak on delivery pipe or leaking taps.                                                           |
| Remedy:         | Check for any leaks and repair.                                                                        |
| Cause:          | Leak or non-return fail on suction line.                                                               |
| Remedy:         | Clean out or replace.                                                                                  |
| Cause:          | Incorrect pipe size.                                                                                   |
| Remedy:         | Increase pipe size.                                                                                    |
| Cause:          | Faulty foot valve.                                                                                     |
| Remedy:         | Repair or replace.                                                                                     |
- (4 marks)
- (ii) The foot valve prevents the water in a suction pipe from draining to the level of the water being pumped, and prevents the need for re-priming the pump.  
(2 marks)
- (c) (i) A floor waste gully is an internal gully trap.
- (ii) A floor waste gully is used to collect waste in one room and is directly connected by means of a discharge pipe to a drain.  
(2 marks)

**Total 16 marks**

## ANSWER 9

- (a) (i) The pressure of the cold water supply is usually controlled by a pressure limiting or pressure reducing valve so the pressure limitations of the storage cylinders are not exceeded.

(1 mark purpose, 1 mark circumstances)

- (ii) An expansion valve is fitted at the cold water inlet at the bottom of the water heater to relieve water pressure ensuring that the pressure does not exceed the allowable limit discharging excess cold water rather than hot. Thus minimising dezincification of the hot water pressure relief. This is also the purpose of the pressure relief function of the temperature and pressure relief valve which is fitted to the top of the water heater.

(1 mark purpose, 1 mark circumstances)

- (iii) The temperature relief function of this valve is the vital safety control of the system relieving before the temperature reaches the danger point of 100°C. Relieves over pressure.

(1 mark purpose, 1 mark circumstances)

- (b) (i) A cross connection is an actual or potential connection between a potable water supply and any contaminant. (1 mark)

- (ii) To protect wholesome potable drinking water from contamination. (1 mark)

- (c) Air gap separation

Backflow prevention devices

(2 marks)

- (d) (i) 20 mm (½ mark)

- (ii) It must be one size larger than the largest relief valve outlet. (½ mark)

(1 mark)

**Total 11 marks**

## ANSWER 10

- (a) You must make application and pay the prescribed fee to the Plumbers, Gasfitters, and Drainlayers Board in order to be issued with a current practising license.

Accept CPD.

(2 marks)

- (b) Any FIVE:

- 1 Order the name of the registered person to be removed from the appropriate register. (1 mark)
- 2 Order that the registered person's registration be suspended for a period not exceeding 12 months. (1 mark)
- 3 Impose a fine on the registered person not exceeding \$10,000.00 (1 mark)
- 4 Order that the registered person be censured. (1 mark)
- 5 Order the person to pay the whole or any part of the costs and expenses of and incidental to the enquiry by the Board and the preceding investigation by an investigator.
- 6 Order the person to sit an exam.

(1 mark)

**Total 7 marks**





