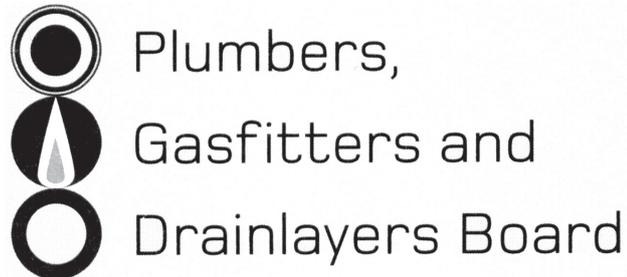


No. 9192



REGISTRATION EXAMINATION, JUNE 2009
PLUMBING

ANSWER SCHEDULE

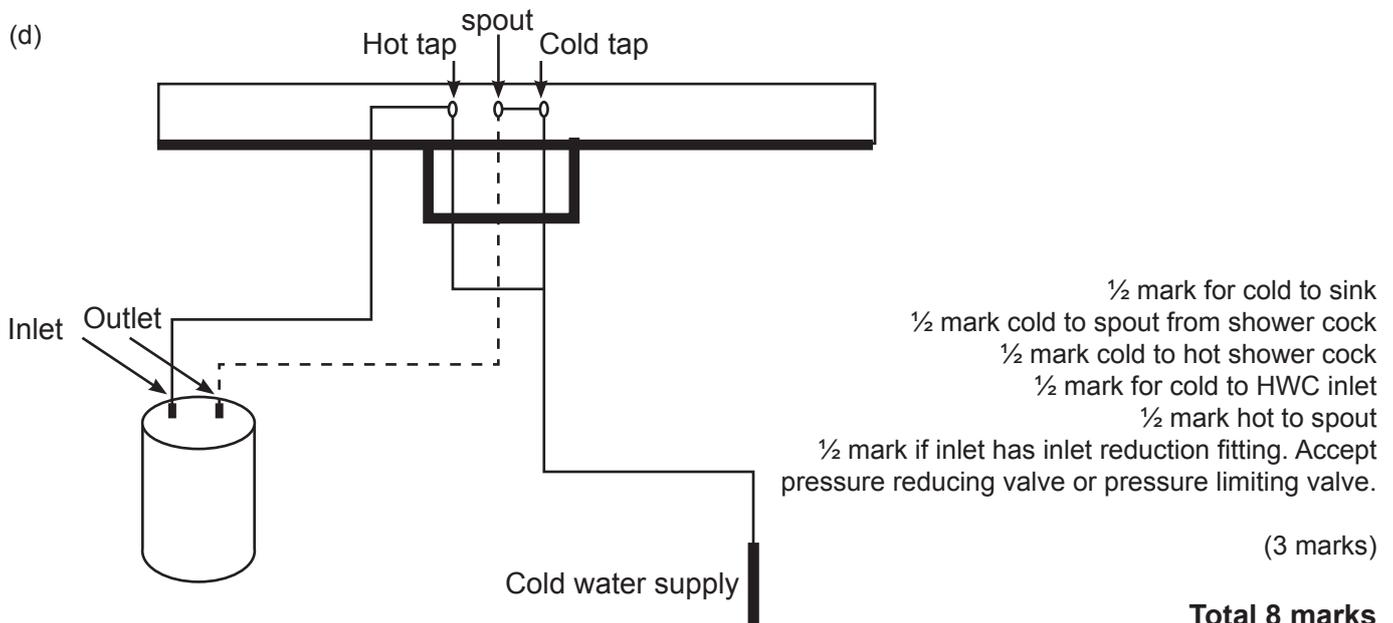
ANSWER 1

- (a) As close as possible to the source of the electrical supply. (1 mark)
- (b) – Batter or angle the sides of the trench to a point where the trench will not collapse.
 – Provide adequate shoring to the sides of the trench.
 – The use of a steel cage or box.
 – Make sure there is provision to prevent the build up of water in the trench.
 – Provide ladders for safe entry and exit from the trench.
 – Have a safety plan.
 – Machinery and/or spoil no closer than 600mm from safe slope. (from trench ½ mark)
 – Daily check by supervisor.
 – Check for toxic gases/use gas detectors. (6 marks)
- (c) (i) 45°C
 (ii) 55°C (1 mark)

Total 8 marks

ANSWER 2

- (a) (i) Shut the heat source (power) off.
 (ii) Thermostatic control failure (2 marks)
- (b) indirect system (calorifier) (1 mark)
- (c) (i) The primary flow is the water or steam that is flowing from the heat source to the heat exchanger.
 (ii) The secondary flow is the heated water that is flowing from the heat exchanger to the hot water outlets. (1 mark each), (2 marks)



ANSWER 3

- (a) Any ONE of
- Obtain National Certificate in Plumbing (completed apprenticeship) OR serve five years while holding a limited certificate and pass a practical test of workmanship OR overseas persons undertake independent Board assessment.
 - Pass the theory examinations.
 - Apply to the Plumbers Gasfitters and Drainlayers Board and pay the prescribed fee. (3 marks)
- (b) Before the date on which it is intended to commence work.
- Before the covering up or closing in of any plumbing or drainage work.
- Pre floor inspection.
- Pre line inspection.
- Final inspection.
- Cutting into Territorial Authority water main. (Any 2, 1 mark each), (2 marks)
- (c) A building consent is required from the Territorial Local Authority.
- The heater and flue is to be installed according to the manufacturer's instructions.
- The heater and flue is to comply with requirements for seismic restraint.
- Suitable hearth. (Non-combustible base ½ mark).
- The Territorial Local Authority is to be notified on completion for the Code Compliance Certificate. (Any 4, 1 mark each), (4 marks)
- (d) All internal roof gutters shall be fitted with overflow outlets. (1 mark)
- (e) Carry foul water to appropriate outfalls. (1 mark)

Total 11 marks

ANSWER 4

- (a) Any FOUR
- The amount of water required/Quantity
 - Outlet delivery pressure required
 - The vertical height between the lowest water level and the pump inlet/Suction head and lift
 - The length of the suction pipe
 - The vertical height between the centre of the pump and the highest outlet/Delivery head
 - The length of the delivery pipe (4 marks)

- (b) (i) May continue to stop and start whether or not water is being used OR loss of flow rate.
(ii) Drain water (½ mark) and recharge with air (½ mark).
OR
Replacement of vessel components. (1 mark each), (2 marks)
- (c) – The water main must be pressure tested (Be leak-free)
– Flushed
– Disinfected with extra chlorinated water.
– Suitably restrained. (Any 2, 1 mark each), (2 marks)
- (d) Positively identify the pipe
Identify and notify effected users
Shut down supply
Drain water from pipe line
Fit earth bonding strap
Reverse flow from HWC (Any 4, ½ mark each), (2 marks)
- (e) Possibility of air locks in the pipe work.
Reduced flow of water to an outlet.
Interrupted flow to an outlet. (Not pressure) (Any 2, 1 mark each), (2 marks)
- (f) (i) One that passes through one or more than one impervious layer.
(ii) One that is above the first impervious layer.
- NB: Accept answers referring to consequences of the features (ie. Pollution, potability, subject to climatic conditions, etc) for ½ mark. See Doyle pages 12-13 volume 2. (2 marks)

Total 14 Marks

ANSWER 5

- (a) (i) Two unlike metals are immersed in an electrolyte (eg water). (2 marks)
(ii) Corrosion. (1 mark)
- (b) (127-129 Doyle's Volume 1)
(i) Ductility: The ability to be drawn into small section
(ii) Conductivity: The ability to conduct heat or electricity.
(iii) Malleability: The ability to deform permanently without rupture.
(iv) Tenacity: The ability to resist breaking by being pulled apart
(v) Fusibility: The ease which it may be melted. (1 mark each), (5 marks)
- (c) The ambient temperature is the average temperature of the atmosphere (1 mark)

Total 9 Marks

ANSWER 6

(a) Working Diameter = 500 - 50 = 450mm (½ mark) Use diam. = 475 or other value (1½ marks max)

Volume = 0.180m³ (½ mark)

$$\text{Height} = \frac{\text{Volume}}{0.7854 \times D^2}$$
$$= \frac{0.180\text{m}^3}{0.7854 \times 0.450\text{m} \times 0.450\text{m}} \quad (½ \text{ mark})$$

$$= \frac{0.180\text{m}^3}{0.1590435\text{m}^2} \quad (½ \text{ mark})$$

Height = 1.132m (1 mark)

(3 marks)

(b) Circumference = 3.142 × 0.4 = 1.2568 (½ mark)

Circumference + Lap = 1.2568 + 0.020 = 1.2768 (½ mark)

Area = (Circumference + Lap) × H
= 1.2768 × 1.2 (½ mark)
= 1.53216

Therefore area = 1.532m² ANS (½ mark)
= 1,532,000mm² OK

(2 marks)

(c) $q = \frac{Q \times h \times e}{H \times 100}$ Use e = 0.55 and get 1.026 (½ mark max)

$$= \frac{320 \times 3.5 \times 55}{600}$$

= 102.667 litres per hour (2 marks)

Total 7 marks

ANSWER 7

Any THREE:

- Plan view
- Elevation
- Sectional
- Isometric
- Schematic
- Oblique

(1 mark each), (3 marks)

Total 3 marks

ANSWER 8

(a) The number of occupants

The activity of the occupants/what the building is used for

Whether dust or fumes must be removed

Legislative requirements

(1 mark each), (4 marks)

(b) When the ventilating air is likely to carry grit and dust with it, you can install filters in the inlet, so that dust particles are removed.

(2 mark)

(c) Any two, 1 mark each:

(i) As the air is controlled at its entry point, filtering, heating and humidifying equipment can be included.

(ii) Both winter heating and summer cooling can be provided.

(iii) Adjustable dampers can provide a controlled mixture of fresh and return air.

(iv) Create a positive air pressure inside the building.

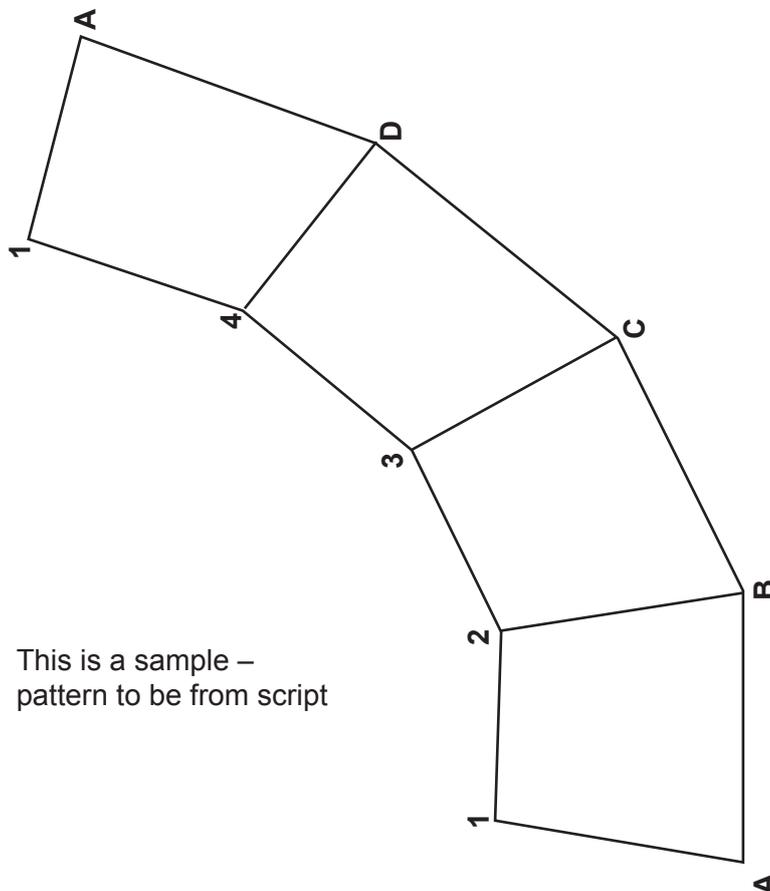
(2 marks)

(d) A clogged air filter reduces the air flow to the conditioned spaces.

(1 mark)

Total 9 marks

ANSWER 9



1 mark per section
1 mark for measurements
(5 marks)

Total 5 marks

ANSWER 10

- (a) A cold water expansion valve must have a pressure rating exceeding the inlet pressure to the cylinder (OR the pressure limit). (Must have comparison)

It should have a pressure rating less than the hot water relief valve rating. (Must have comparison)
(2 marks)

- (b) To prevent the pressure exceeding the maximum rated pressure in the system. (1 mark)

- (c) An overall energy saving on hot water production is achieved. A cold water expansion valve guards against catastrophic failure which results in excessive energy loss. When hot water valve vented systems fail they vent copious quantities of heated water down the drain. With a cold water relief valve, cold water is relieved rather than hot water.

Protects cylinder.

Acts as an additional safety device. (Any 2, 1 mark each), (2 marks)

- (d) – Easy access to facilitate maintenance/replacement. (Maintenance includes use of the easing gear).

– A relief discharge pipe with gravity fall to an approved point.

– Protect the drain from freezing

– CWE should be rated lower than the TPR. (Any 2), (2 marks)

- (e) – pressure limiting valve.

– Pressure reducing valve (½ mark each, 1 mark)

- (f) The cold water supply to the inlet manifold must enter from the opposite end to that at which the hot water line leaves the outlet manifold.

Pipe sizing must be equal. (2 marks)

Total 10 marks

ANSWER 11

- (a) The loss of water seal in a water trap caused by momentum results from the trap being fitted some distance from the sanitary fixture it serves, particularly if there is a long vertical drop between the outlet of the fixture and the water seal. The falling discharge gains momentum which will force the water seal over the trap weir resulting in a reduction or total loss of seal. (Others answers to be checked)
(2 marks)

- (b) If the termination of a vent pipe is such that wind gusts can cause variations in air pressure within the pipe then the result is a rising and falling or oscillating action of the water seal in the trap, which leads to water seal losses as the water spills over the weir.
(2 marks)

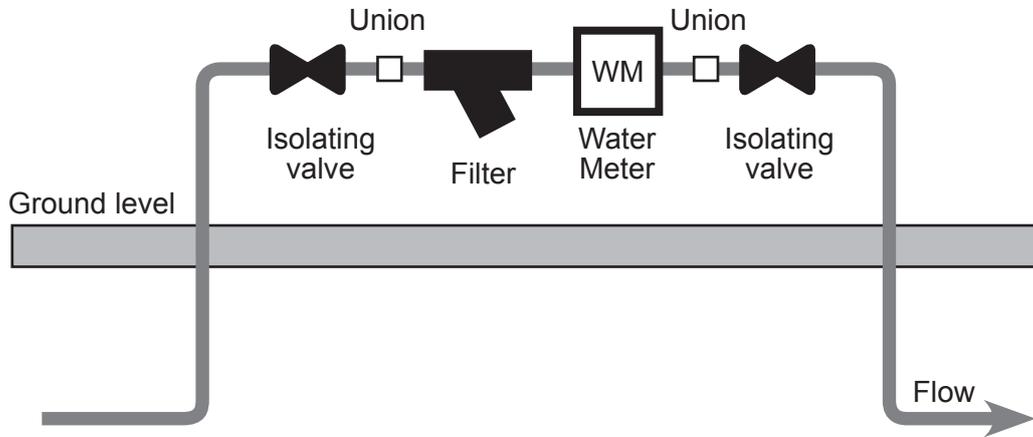
- (c) Urinal flushing apparatus shall be capable of cleaning the whole urinal surface OR give a minimum of 2.5 litres per flush. (Either answer) (1 mark)

Total 5 marks

ANSWER 12

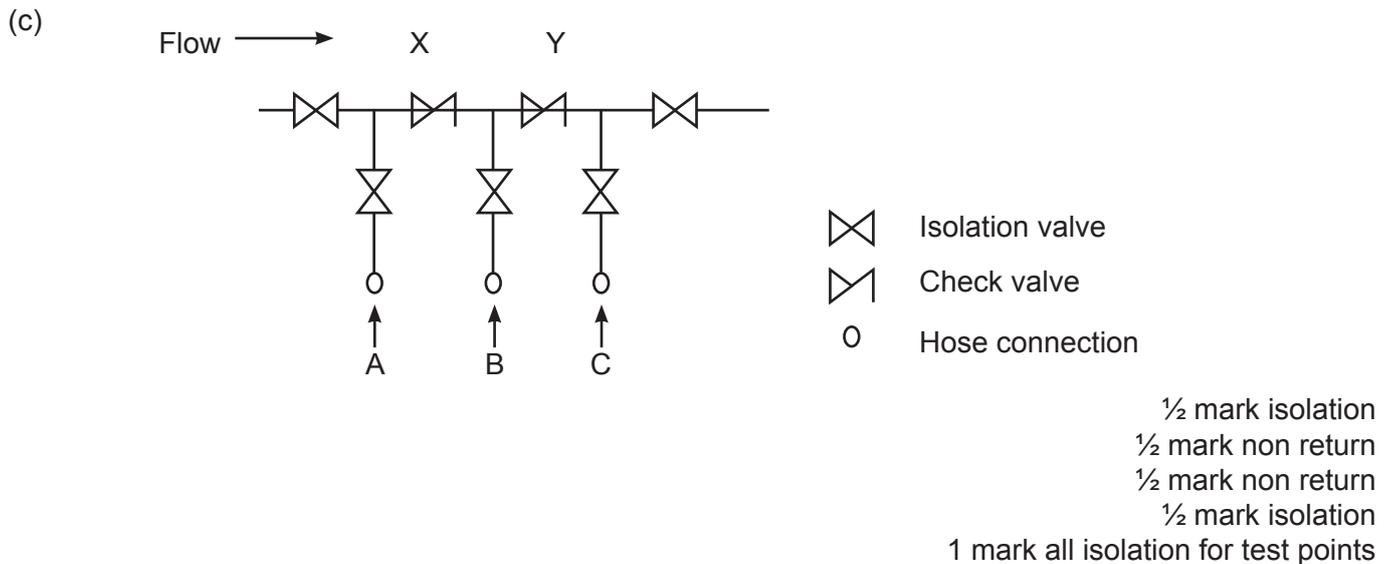
- (a) Break tank is a storage tank which incorporates an air gap on the incoming water supply.
 OR
 A tank in a multi-storey building to avoid excess pressure. (1 mark)

- (b)

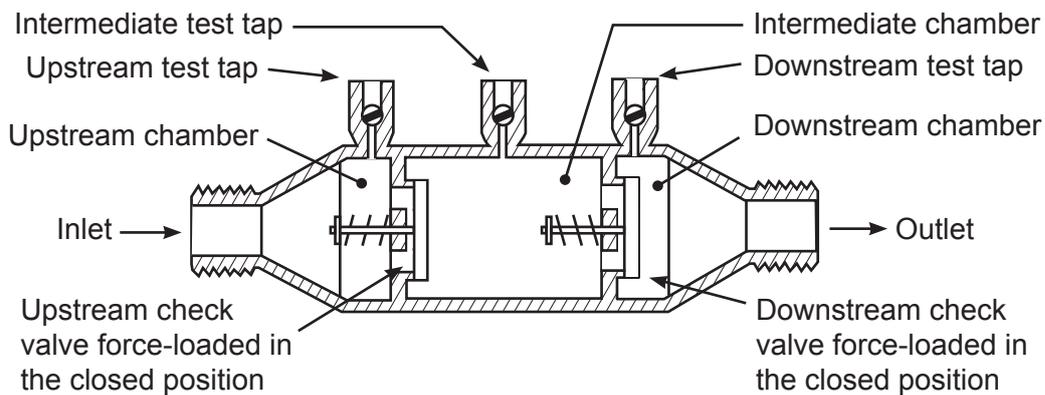


(4 marks)

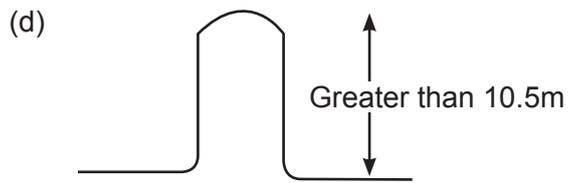
- Direction of flow – ½ mark
- Ground level – ½ mark
- Each component ½ mark



OR



(3 marks)



(½ mark drawing, ½ mark measurement), (1 mark)

- (e) air gap separation
backflow prevention devices

(2 marks)

Total 11 marks

