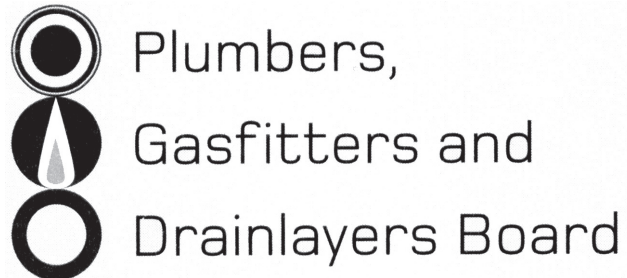


No. 9197



REGISTRATION EXAMINATION, JUNE 2016  
**LICENSED DRAINLAYER**

**ANSWER SCHEDULE**

## ANSWER 1

- (a) Any THREE (1 mark each)
- Every main drain.
  - Every branch drain over 10 m long.
  - When a boundary trap is installed.
  - Septic tanks.
  - Grease traps.
  - Three or more WCs on 100 mm drain.
  - Two or more WCs on 80 mm drain. (3 marks)
- (b) Any THREE (1 mark each)
- To allow gases to escape.
  - To protect trap seal.
  - To allow smells to be taken away from people.
  - To dry out organic matter that accumulates in the pipe. (3 marks)
- (c) • To ensure that the vent connection is regularly flushed out. (1 mark)
- Total 7 marks**

## ANSWER 2

- (a) (i) • The blockage is on the branch drain between C and D. (1 mark)
- (ii) • Flush the downstream toilet and observe. If the water drains away normally the blockage is upstream of the toilet junction. If it drains away slowly or overflows anywhere the blockage is likely to be downstream of the toilet junction. Also observe gully traps for overflow. (2 marks)
- (b) • Tree roots.
- Ground slump.
  - Broken pipe.
  - Inappropriate material entering the drain. (4 marks)
- (c) Any THREE (1 mark each)
- Have a simple layout with minimal changes of direction.
  - Use bends with the maximum radius possible.
  - Be laid only in straight lines between bends or junctions (both horizontally and vertically).
  - Approved pipe material.
  - Correct gradient.
  - Correct pipe diameter. (4 marks)

(d) Any THREE (1 mark each)

- Plunging.
- Corkscrew/auger.
- Jetting unit.
- Cutting unit.
- Drainage rods.

(3 marks)

(e) Any FOUR (1 mark each)

- Rinse in clean water to dilute waste.
- Leave to soak in a solution containing disinfectant.
- Lay out in the sun to dry – UV and drying will kill a large amount of bacteria.
- Store in a container with drainage holes so that any fluid that escapes the rods will dry.
- Store away from other tools and equipment to prevent contamination.
- Clean the tools in a safe location.

(4 marks)

(f) Any ONE (1 mark)

- To ensure that the blockage does not move to another point.
- To ensure that the drain is unblocked.

(1 mark)

**Total 19 marks**

### **ANSWER 3**

Any THREE (1 mark each)

- Under gully traps.
- Under boundary traps.
- Under inspection junctions when riser brought to surface.
- Under all junctions and bends greater than DN 65 forming risers from the drain.
- At the top of an inclined drain (20% grade to vertical).
- At the bottom of an inclined drain (20% grade to vertical).
- At intervals not exceeding 3 metres on an inclined drain.
- Anchor/thrust blocks/anti-scour

(3 marks)

**Total 8 marks**

#### ANSWER 4

- (a) Any THREE (1 mark each)
- Near a petrol station site – existing or closed.
  - Close to a road.
  - Peaty soil.
  - Area with geothermal activity.
  - Near a gas service line that is leaking.
  - Reclaimed land.
  - Near a landfill.
  - Industrial sites (e.g. paint, chemical) (3 marks)
- (b) Any TWO (1 mark each)
- Methane.
  - Sulphur dioxide.
  - Hydrogen sulphide.
  - Carbon dioxide. (2 marks)
- (c) • Those gases are heavier than air and get trapped in the lower areas of the excavation. (1 mark)
- (d) • Fire.
- Explosion.
  - Suffocation.
  - Poisoning. (2 marks)

**Total 8 marks**

#### ANSWER 5

- (a) (i) Any relevant location such as river, creek, culvert, surface water inlet. (1 mark)
- (ii) When a water course such as a stream is going to be piped a wing wall must be installed on the inlet or outlet of the pipe to channel the flow into and out of the pipe to prevent the scouring and erosion of the earth surrounding the inlet or outlet of the pipe. (2 marks)
- (b) Drawing to include:
- the side walls angled to the pipe
  - key into the ground.
  - a diffuser outlet (wing wall) or a grate (inlet wing wall). (4 marks)

**Total 7 marks**

## ANSWER 6

- (a) Any FIVE (1 mark each)
- Depth greater than the width and depth more than 1.5 m.
  - Imposed loads.
  - Explosives being used or stored.
  - Fall(s) over 5 m.
  - Breathing compressed air.
  - Manual lift(s) over 500 kg.
  - Working underground (tunnelling)
  - Where asbestos may be present.

**Total 5 marks**

## ANSWER 7

- (a) (i) • Oxygen is present for the chemical reaction. (1 mark)
- (ii) • Oxygen is not present for the chemical reaction. (1 mark)
- (b) ONE of (1 mark)
- Greater choice of disposal system.
  - Better quality effluent. (1 mark)
- (c) ONE of (1 mark)
- Requires power for pumps etc.
  - Requires frequent maintenance. (1 mark)
- (d) • Flooding the disposal field to utilise all of its disposal capacity and allowing it to rest. (1 mark)
- (e) Drawing to include:
- Primary/digestion chamber. (1 mark)
  - Aeration chamber. (2 marks)
  - Pump chamber and pump. (1 mark)
  - Baffles.
  - Biofilter.
  - Distribution box. (½ mark)
  - Ratio valves. (½ mark)
  - Disposal field. (½ mark)

(5 marks)

**Total 10 marks**

## ANSWER 8

- Name: Grease trap. (1 mark)
- Situation: Restaurant or effluent disposal system. (1 mark)
- Function: Remove grease before it enters the system. (1 mark)

**Total 3 marks**

## ANSWER 9

- (a) Any FOUR (1 mark each)
- Oxygen level.
  - Presence of any toxic fumes.
  - Flammable contaminants.
  - Temperature within the chamber.
  - Recent rainfall in catchment area/water level, flow rate in drain.
  - Tidal movements if the drain is discharging to the sea. (4 marks)
- (b) Any TWO (1 mark each)
- A co-worker on lookout above.
  - Communication method.
  - Harness with retrieval rope, with co-workers to operate.
  - Adequate oxygen supply/gas detector. (2 marks)

**Total 6 marks**

## ANSWER 10

Drawn to scale

**Total 6 marks**

## ANSWER 11

- (a) (i) 2.79 m (1 mark)
- (ii) 1.06 m (1 mark)
- (b) (i) 1.9% (approx 1:51) (1 mark)
- (ii) 2.3% (approx 1:44) (1 mark)

**Total 4 marks**

## ANSWER 12

- (a) Drawing to show:  
Non-return flap  
Cascade (4 marks)
- (b) Any ONE (1 mark)  
Use a sump and pump  
Limit the flood area/use a detention structure. (1 mark)

**Total 5 marks**

### ANSWER 13

- (a) ANY FOUR (1 mark each)
- The type of usage likely to occur.
  - The nature of the liquids to be conveyed.
  - The nature of the ground and environment and the possibility of chemical attack there from.
  - The physical and chemical characteristics of materials and products.
  - The possibility of abrasion by solids in the flow or of chemical attack.
  - The range of temperatures of materials likely to discharge to the system. (4 marks)
- (b) • When applied it softens or melts the surfaces enabling them to fuse together when brought in contact with each other. (2 marks)
- (c) • Must be either with bedding material compacted (to achieve a density as near to the original soil density as possible).  
• With concrete. (2 marks)

**Total 8 marks**

### SECTION B

1. B DN 40
2. D 600 mm.
3. D Greater than 20.0%.
4. D 60°
5. D 100 mm.
6. C 350 mm.
7. B B2
8. B E1 Surface Water.
9. E To remove ground water before excavation.
10. C Dumpy/builder's level.

**Total 10 marks**