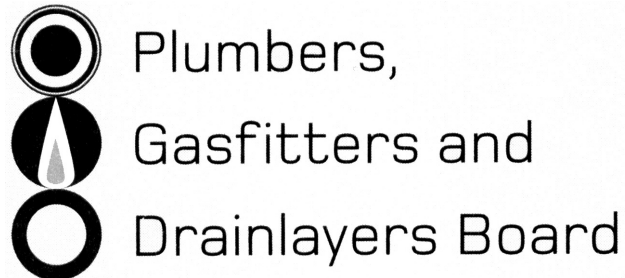


No. 9197



REGISTRATION EXAMINATION, NOVEMBER 2012  
**LICENSED DRAINLAYER**

**ANSWER SCHEDULE**



## ANSWER 1

- (a) • Bends/elbows.  
• Junctions.  
• Inspection chambers. (3 marks)
- (b) • Every main drain.  
• Every branch drain over 10 m.  
• When a boundary trap is installed. (3 marks)
- (c) Any TWO: (1 mark each)  
• Use a reduced grade and install a minimum number of fixtures (discharge units).  
• Install a flushing tank.  
• Install a pump station.  
• Install an ejector pump. (2 marks)

**Total 8 Marks**

## ANSWER 2

- (a) • They interfere with the digestion/breaking down of the solids. (1 mark)
- (b) Any FOUR: (½ mark each)  
• Traffic.  
• Plants.  
• Clogging.  
• Stock.  
• Change of design usage.  
• Lack of maintenance. (2 marks)
- (c) Any TWO: (1 mark each)  
• Filters/Bio-filters.  
• Diverter box.  
• Flushing points.  
• Control valves.  
• Indexing valves.  
• Syphon/dosing system.  
• Tip bucket. (2 marks)

**Total 5 Marks**

**ANSWER 3**

Vented Drain Diameter	Ratio (gradient)	Gradient in %	mm per m
DN 150	1 in 60	1.65%	16.5 mm
DN 65	1 in 80	1.25%	12.5 mm
DN 100	1 in 30	3.35%	33.5 mm
DN 300	1 in 120	0.85%	8.5 mm

(½ mark per entry)

**Total 4 Marks**

**ANSWER 4**

- (a) •  $w = 3v \times d$  (1 mark)  
 •  $W = 3 \times 450$   
 • 1350 mm (1 mark)

(2 marks)

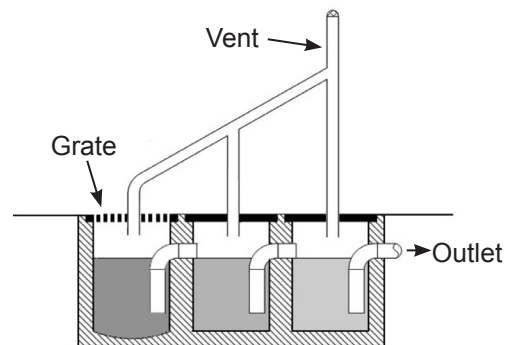
- (b) • The ground is rock.

(1 mark)

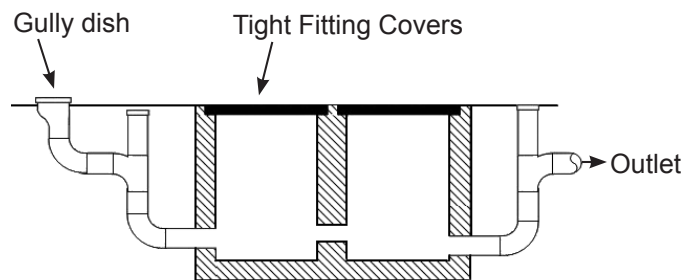
**Total 3 Marks**

**ANSWER 5**

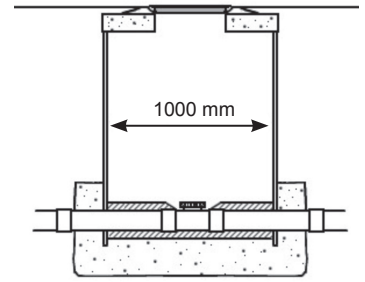
- (a) Name:  
 Petrol trap. (1 mark)  
 Situation:  
 On a forecourt to remove surface liquid. (1 mark)  
 Function:  
 Remove grit and flammable gases before they enter the system etc. (1 mark)



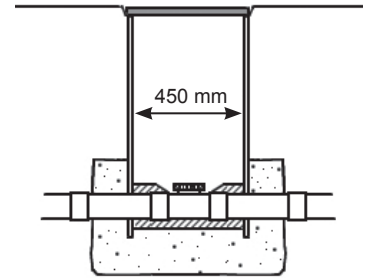
- (b) Name:  
 Grease trap. (1 mark)  
 Situation:  
 Restaurant. (1 mark)  
 Function:  
 Remove grease before it enters the system. (1 mark)



- (c) Name:  
 Access chamber (1 mark) / Dry chamber. (½ mark)  
 Situation:  
 Where an inspection is more than 1 m below cover. (1 mark)  
 Function:  
 Ability to climb down to level of drain. (1 mark)



- (d) Name:  
 Inspection Chamber. (1 mark)  
 Situation:  
 Where inspection cap is less than 1 m below ground level. (1 mark)  
 Function:  
 To allow access from ground level. (1 mark)



**Total 12 Marks**

**ANSWER 6**

- (a) Drawing to show:
- Wing-wall angled sides.
  - Base of wing-wall evident.
  - Baffle system will slow the flow.
  - Culvert pipe.
  - The situation as required. (5 marks)
- (b) • Install a baffle. (1 mark)

**Total 6 Marks**

**ANSWER 7**

Point	Fall	Depth
A	0 mm	400 mm
B	25 mm	425 mm
C	62.5 mm	487.5 mm
D	31.3 mm	518.8 mm
E	50 mm	568.8 mm

**Total 8 Marks**

## ANSWER 8

Any EIGHT: (½ 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.
- Bubble up chamber.
- Sump.
- Inspection chamber.
- Access chamber.
- Unstable ground.
- Gully dish.

**Total 4 Marks**

## ANSWER 9

- (a) • Oxygen is present for the chemical reaction. (1 mark)
- (b) Any ONE:
- Greater choice of effluent field type.
  - Better quality effluent. (1 mark)
- (c) Any ONE:
- Requires power for pumps etc.
  - Requires more frequent maintenance. (1 mark)

**Total 3 Marks**

## ANSWER 10

- Scale (1 mark)
- Building shape and size (1 mark)
- Length of main run 190 mm (1 mark)
- 90 mm for bottom pipe (1 mark)
- Building for network pipe (1 mark)
- The angle of short branch (1 mark)
- The angle of long branch (1 mark)

**Total 7 Marks**

## ANSWER 11

(a) Any ONE (2 marks)

- It is geotextile cloth which is designed to allow water to seep through but not fine particles of soil.
- Required in subsoil drainage and soak pits. (2 marks)

(b) • 600 mm (1 mark)

(c) • To permit the gully trap to be cleaned by hand. (1 mark)

**Total 4 Marks**

## ANSWER 12

(a) Any TWO tests: (3 marks each)

Type of test	hydrostatic
Minimum test pressure	More than 1 metre above soffit (1 kPa) but less than 3 m (3 kPa)
Minimum test time	15 minutes

Type of test	Air pressure
Minimum test pressure	10 kPa
Minimum test time	2 minutes

Type of test	Vacuum test
Minimum test pressure	10 kPa
Minimum test time	2 minutes

(b) Any TWO: (1 mark each)

- Atmospheric pressure.
- Temperature.
- Pipe material. (2 marks)

**Total 8 Marks**

**ANSWER 13**

- (a) Any TWO: (½ mark each)
- Methane.
  - Sulphur dioxide.
  - Hydrogen sulphide.
  - Carbon dioxide. (1 mark)
- (b) • Those gases are heavier than air and get trapped in the lower areas of the excavation. (1 mark)
- (c) • Ventilation equipment to blow clean air in sufficient quantities to dissipate the harmful gases. (1 mark)
- (d) • Before work begins  
• Continuing throughout the work period (1 mark)

**Total 4 Marks****ANSWER 14**

- (a) Any FOUR: (½ mark each)
- Laser level.
  - Inclined level.
  - Manual level with bubble or smart level.
  - Dumpy level.
  - Boning rods. (2 marks)
- (b) Any TWO: (1 mark each line)

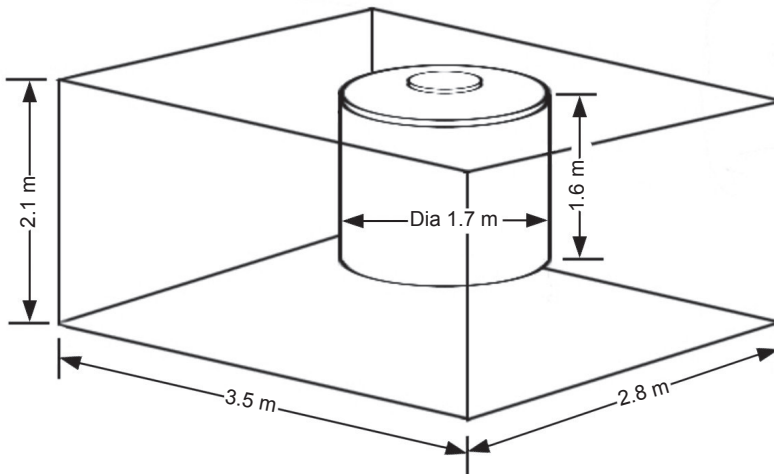
Way	Cause
Slumping	Rain
Crumbling	Drying wind
Collapse	Vibration from traffic

(2 marks)

**Total 4 Marks**



### ANSWER 15



- Volume of the tank (2 marks)
- Volume of the excavation (1 mark)
- Excavation minus tank volume (1 mark)
- Excavation volume plus 20% (1 mark)

**Total 5 Marks**

### ANSWER 16

- Depth greater than width.
- Imposed loads.
- Explosives.
- Compressed air /caissons/tunnelling.
- Falls over 5 m.

**Total 5 Marks**

### SECTION B

- 1 B 1.25%
- 2 A 20%
- 3 E 3 m
- 4 A 2 m
- 5 C 2 m
- 6 B 200 mm
- 7 C 1 in 80 or less
- 8 B 100 litres
- 9 C Fine particles of soil can be pumped out with the water
- 10 D Head lamp

**Total 10 Marks**