No. 9197

Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2013

# LICENSED DRAINLAYER

ANSWER SCHEDULE

**ANSWER 1**

(a) (i) Lengthens the set time of cement in concrete.

(ii) Hot weather.

(2 marks)

(b) (i) Shortens the set time of cement in concrete(check out curing time as well).

(ii) Cold temperatures (or rapid cure/hardening is required).

(2 marks)

**Total 4 Marks**

**ANSWER 2**

(a) Any ONE
- Visual inspection.
- drainage spear/prodder.
- Penetrometer. (1 mark)

(b) Any ONE
- Over excavation and compacted backfill.
- Concrete bed and haunching and reinforcing rods. (2 marks)

(c) (i) To check the line and gradient/level. (1 mark)

(ii) Points a and b are marked with the water level and any point in between them can be obtained by using the third boning rod and sighting along the rods.

(2 marks)

**Total 6 Marks**

**ANSWER 3**

(a) Ensure the material adjacent to the cloth is of a course grade. (1 mark)

(b) Any TWO (½ mark each)
- Soak Pits.
- Effluent fields.
- drain coils subsoil drainage. (1 mark)

**Total 2 Marks**

**ANSWER 4**

(a) (i) Scouring

- Running water washing soil away. (1 mark)

Causes

- Water table is too high.
- Rain water flowing through the trench. (1 mark)

(ii) Slippage

- Soil slipping back into the trench. (1 mark)

Causes

- Rain or high water table creating water logged soil, vibration.
- Add wind/drying. (1 mark)

(b) Any THREE (1 mark each)

- Dewatering.
- Well pointing.
- Trench support.
- Cut off trenches.
- Sumps and pumps. (3 marks)

**Total 7 Marks**

**ANSWER 5**

(a)

| Section | Fall |
|---|---|
| A – B | 50 mm |
| B – C | 100 mm |
| C – D | 37.5 mm |
| D – E | 100 mm |
| D – F | 66.6 – 68 mm |
| F – G | 115.5 – 117 mm |

(6 marks)

(b)

| Point | Depth |
|---|---|
| B | 750 mm |
| C | 650 mm |
| D | 612.5 mm |
| E | 512.5 mm |
| F | 545 – 547 mm |
| G | 429 – 431 mm |

(6 marks)

**Total 12 Marks**

**ANSWER 6**

(a)
- Breathing.
- Cuts or punctures in the skin.
- Consuming food without washing hands.
- Eyes. (2 marks)

(b) (i) Any FOUR
- Oxygen level is safe for breathing.
- Temperature level in atmosphere is not extreme.
- Flammable contaminants in atmosphere are at a safe level.
- Toxic contaminants in atmosphere are at a safe level.
- Presence of fumes.
- Presence of dust. (4 marks)

(ii) A safety harness and life line winch system (½ mark each). (1 mark)

(iii) Some gases are heavier than air. (1 mark)

**Total 8 Marks**

**ANSWER 7**

(a) The main conduit of a drainage system to which branches are connected. It is that portion of sewage service on private property normally located in ground and which conveys or is intended to convey the discharge from fixtures to the outfall.

(2 marks)

(b) Domestic wastes from baths, basins, showers, laundries, and kitchens including floor wastes from these sources.

OR

Gray water.

(1 mark)

(c) The unintended ingress of water from one place to another. (1 mark)

(d) An outfall is the discharge point of a waste stream. (1 mark)

(e) Overflow from a sewer or combined sewer caused by overloading, blockage, or infiltration of surface water.

(1 mark)

**Total 6 Marks**

**ANSWER 8**

| Section | Length of the section (m) | Fall of the section (mm) |
|---|---|---|
| A – B | 7.2– 7.6 | 118 – 129 |
| B – C | 3.8 – 4 | 62.5 – 66 |
| C – D | 4.2 – 4.5 | 69 – 75 |
| C – E | 11.0 – 11.2 | 181.5 – 187 |
| E – F | 13.2 – 13.4 | 217.5 – 228 |
| F – G | 2.9 | 48 – 51 |

**Total 6 Marks**

**ANSWER 9**

Drawing to include:

- Vent. (1 mark)
- Silt trap. (1 mark)
- Oils trap. (1 mark)
- Correctly positioned outlet. (1 mark)
- Grate. (1 mark)

**Total 5 Marks**

**ANSWER 10**

Average depth = ½ (0.820 + 1.440) = 1.13

Volume of trench = 60 × 0.600 × 1.13 or (60 × 0.600 × 0.820) + (½ × 60 × 0.62)

= 40.68 $m^3$

Compaction = 10.17 $m^3$

Total backfill = 50.85 $m^3$

**Total 5 Marks**

**ANSWER 11**

Any FOUR (½ mark each)

- Accumulation of explosive gases.
- Seals on traps may not be maintained.
- Foul odours may accumulate.
- Bacteria could multiply under these conditions.
- The flow could be restricted/blockages may occur.
- Lack of drying air.
- No scaling.

**Total 2 Marks**

**ANSWER 12**

(a) Any ONE
- Septic.
- Sullage.
- Soakage. (1 mark)

(b) A test to determine the suitability of soils for absorption (percolation). (1 mark)

**Total 2 Marks**

**ANSWER 13**

(a)
- Chamfer spigot end.
- Lightly roughen end of pipe to give solvent something to bite into.
- Measure and mark depth of socket on pipe. (1 mark for 2 out of 3 steps)

- Clean both surfaces with appropriate cleaning fluid.
- Apply even coating of appropriate solvent to socket and then spigot. (1 mark for both steps)

- Push spigot into full depth of socket.
- Remove excess solvent from pipe.
- Do not move for at least five minutes. (1 mark for 2 out of 3 steps)

(3 marks)

(b)
- Cut end of pipe square.
- Chamfer end of pipe.
- Mark depth of socket on pipe (witness mark). (2 out of 3 – 1 mark)

- Clean inside of socket and end of pipe.
- Clean ring.
- Insert ring into groove with flap pointing inward. (2 out of 3 – 1 mark)

- Apply lubricant to ring flap and to the pipe spigot.
- Line up pipe (just into socket).
- Push into socket so witness mark is just showing (allows for expansion). (2 out of 3 – 1 mark)

(3 marks)

**Total 6 Marks**

**ANSWER 14**

(a) 1. Rubber ring.
2. Band clamped. (2 marks)

(b) 1. Silver braced / threaded / screwed.
2. Silver braced / elastomeric ring / screwed.
3. Rubber ring. (3 marks)

(c) 1. Rubber ring.
2. Cement mortar (epoxy). (3 marks)

**Total 7 Marks**

**ANSWER 15**

(a) Any THREE (1 mark each)
- Any waste water fixture. (3 marks)

(b)
- To prevent the overloading of the system and surface flooding by storing surface water.
- Releasing the stored water at a rate which the system can handle. (2 marks)

**Total 5 Marks**

**ANSWER 16**

(a)
- Less accumulation of sewer gases.
- No fouling of the chamber if a blockage has occurred. (1 mark)

(b)
- A blockage is immediately apparent.
- Easier to clear the drainage system. (1 mark)

**Total 2 Marks**

**SECTION B**

1. E 3.35%
2. B PE-X
3. C 10 mm higher the soffit of the drain to which it connects.
4. D 1200 mm
5. B 500 mm
6. E 3.0 m
7. C Every five years, or sooner is necessary.
8. D When the trench is 1.0 m wide.
9. D 60º
10. C 350 mm
11. E 50 m
12. C 1.5 m
13. A 150 mm
14. D 65 mm
15. D 2.0 m

**Total 15 Marks**