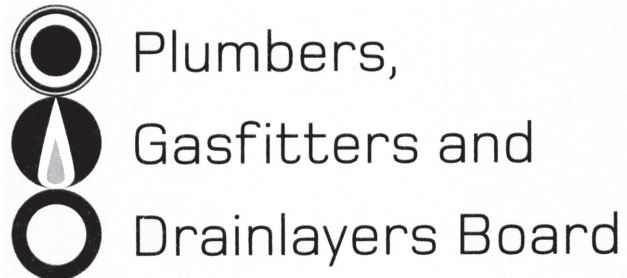


No. 9197



REGISTRATION EXAMINATION, JUNE 2014
LICENSED DRAINLAYER

ANSWER SCHEDULE

ANSWER 1

(a) A penetrometer is used to check the density of soil, hard or soft. (1 mark)

(b) An attached weight is slid up the shaft of the tool and dropped the weight falls down the shaft striking a stop point further down the length of the shaft. The force of the strike passes down to pointed end of the shaft which is resting on the ground. The firmness of the soil can be identified according to the depth that the impact drives the end of penetrometer into the soil.

(2 marks)

Total 3 Marks

ANSWER 2

E1 – Surface water.

G13 – Foul water.

G14 – Industrial liquid waste.

(½ mark clause number)

(½ mark title)

Total 3 Marks

ANSWER 3

(a) When solvent is applied it softens or melts the surfaces enabling them to fuse together when brought in contact with each other. (1 mark)

(b) Any FOUR (½ mark each)

- Pipe size.
- Pipe length.
- Roughness of pipe bore.
- Velocity of the liquid.
- Temperature of the liquid.
- Gradient of the pipe.
- Lack of ventilation

Total 2 Marks

ANSWER 4

	NZBC G13/AS2	AS/NZS3500
Minimum cover over a drain under a driveway	450 mm	450 mm
Maximum depth of a gully trap	600 mm	600 mm
Minimum gradient of a 100 mm drain	1:120	1:60 OR 1.65%
Minimum gradient of 150 mm drain	1:200	1:100 OR 1:00%
Maximum length of a branch drain without a drain vent	10.0 m	10.0 m
Maximum length of a branch drain to a gully without a vent	10.0 m	10:0 m
Minimum diameter for a drain	80 mm	65 mm

(½ mark each)

Total 7 Marks

ANSWER 5

- (a) To stabilise pipework against undue strain.
- (b) Either at a bend or at a T junction.

Total 2 Marks

ANSWER 6

- (a) Any ONE (1 mark)
- To cycle the pumps through hour clocks so that they wear out fairly evenly.
 - To operate when required.
 - To provide back up during maintenance. (1 mark)
- (b) (i) To warn of pump failure. (1 mark)
- (ii)
- When the inflow is greater than the pump discharge.
 - When the pump fails. (1 mark)
- (iii) Any TWO (½ mark each)
- Visual
 - Audio
 - Telemetry (1 mark)

- (c) Where it is not possible for the stormwater to be discharged by gravity through the available gravitational point of connection. (1 mark)
- (d) Drawing to show:
- support of jump-up.
 - inspection at top.
 - outside access chamber.
 - flexible joints. (4 marks)
- (e) • To give stability to the chamber at its base
- To provide a ledge on which back fill will be placed and compacted to prevent the chamber from “floating”. (2 marks)
- Total 11 Marks**

ANSWER 7

- (a) Intercepting any commercial or industrial waste which may contain matter that is not permitted to enter the NUO sewer. (2 marks)
- (b) Any THREE (1 mark each)
- Poisons.
 - Infectious waste.
 - Flammable substances.
 - High temperature (waste above 50 degrees).
 - Acid / alkaline.
 - Grease. (3 marks)
- Total 5 Marks**

ANSWER 8

- (a) Any THREE (1 mark each)
- Low pressure air test.
 - High pressure air test.
 - Water test.
 - Vacuum test. (3 marks)
- (b) • To stop ground water entering the drainage system.
- To stop foul water leeching into the surrounding ground. (1 mark)
- Total 4 Marks**

ANSWER 9

- (a) Unintended entry of water into a drainage system. (1 mark)
- (b) Any TWO (1 mark each)
- Illegal stormwater connections to the foul water drain.
 - Defective fittings or joints in a foul water drain.
 - Gully dish too low. (2 marks)
- (c) (i) To show the ground level at various points on the site in relation to the datum. (1 mark)
- (ii) The site is steep. (1 mark)
- (d)
- Benching.
 - Safe slope.
 - Shoring / shields. (3 marks)
- (e)
- Asphyxiation / suffocation.
 - Explosion.
 - Fire.
 - Toxic poisoning. (4 marks)
- (f) Any FOUR (1 mark each)
- Soil type.
 - Moisture content.
 - Depth of trench.
 - Soil loads/ discharge loads.
 - Vibration from machinery.
 - Water table. (2 marks)
- (g) Any THREE (1 mark each)
- Cracks in the ground adjacent to the trench.
 - Bulges in the trench wall.
 - Crumbling soil in trench.
 - Surface or ground water entering the trench. (3 marks)

Total 17 Marks

ANSWER 10

- Correct scale. (1 mark)
- Gully dishes located correctly. (2 marks)
- WCs located correctly. (2 marks)
- Septic tank located. (1 mark)
- Septic tank size. (1 mark)
- Drain junctions located. (1 mark)
- Drain distance from building. (1 mark)
- Vent located correctly. (1 mark)

Total 10 Marks

ANSWER 11

Hot water cools down allowing fats to solidify.
Fats and grease float to top.
Liquid, free of fats and grease, passes through to drain.

Total 3 Marks

ANSWER 12

(a) Any THREE (1 mark each)

- Drip lines.
- Composting toilet / incinerating toilet.
- Grey water recycling.
- Grey water soak pit/pre-treated/sand filter.
- Holding tank which is pumped and trucked away as required.
- Raised bed.

(3 marks)

- (b)
- The position of the sewer connection from any side boundary peg.
 - The depth of the sewer connection (invert level).

(2 marks)

Total 5 Marks

ANSWER 13

(a) (i) 6.5 m (½ mark)

(ii) 6.836 m (½ mark)

(b) (i) 1:108 OR 0.93% (½ mark)

(ii) 1:52 OR 1.92% (½ mark)

(c)

Section	Fall	
B – C	0.025 m	(½ mark)
C – D	0.067 m	(½ mark)
D – E	2 m	(½ mark)
E – F	0.033 m	(½ mark)

Point	Depth	
A	Ground Level	
C	0.825 m	(1 mark)
D	0.892 m	(1 mark)
E	2.892 m	(1 mark)
F	2.925 m	(1 mark)

Total 8 Marks

ANSWER 14

- (a) A grate. (1 mark)
- (b) Sloping back towards the culvert opening. (1 mark)
- (c) Floating debris will rise up the grate and be supported by the grate allowing water to flow below trapped debris, giving a larger inlet area.

(1 mark)

Total 3 Marks

ANSWER 15

$$\text{Vol of washpit} = 3 \times 8 \times 0.5 + \frac{1}{2} \times 3 \times 8 \times 0.6 = 12 + 7.2 = 19.2 \text{ m}^3$$

OR

$$\text{Vol of washpit} = 3 \times 8 \times 0.8 = 19.2 \text{ m}^3 \quad (2 \text{ marks})$$

$$\text{Vol of trap} = 1 \times 1 \times 2 = 2 \text{ m}^3 \quad (\frac{1}{2} \text{ mark})$$

$$\text{Vol of valve pit} = 1 \times 0.6 \times 0.6 = 0.36 \text{ m}^3 \quad (\frac{1}{2} \text{ mark})$$

$$\text{Total vol} = 21.56 \text{ m}^3 \quad (\frac{1}{2} \text{ mark})$$

$$\text{Bulking} = 20\% \text{ of } 21.56 = \frac{20}{100} \times \frac{21.56}{1} = 4.31 \text{ m}^3 \quad (1 \text{ mark})$$

$$\text{Vol of spoil} = 25.87 \text{ m}^3 \quad (\frac{1}{2} \text{ mark})$$

Total 5 Marks

SECTION B

1. B 75 mm.
2. A Between 20% and vertical.
3. C The top of the inside of a pipe.
4. B 150 litres.
5. D 60°
6. E A toilet.
7. D 10.0 metres.
8. E 611
9. D Liquid being absorbed liquid through a plants root system and released as moisture through its leaves.
10. A 20 mm.

Total 10 Marks