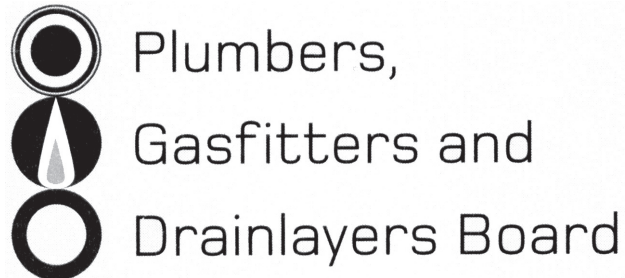


No. 9198



REGISTRATION EXAMINATION, JUNE 2023
CERTIFYING DRAINLAYER

ANSWER SCHEDULE

ANSWER 1

Any SIX:

- Drain meets the plan specifications.
- Bedding is stable.
- Pipes are laid in straight lines.
- Gradient is correct.
- Haunching is completed.
- Inspections located correctly.
- Gully trap height is correct.
- Vents are located correctly.
- Thrust, anchor, anti-scour blocks installed.
- Drain is on test.
- Drain is set to correct outfall.

Total 6 marks

ANSWER 2

- (a) Anchor the tank. (1 mark)

Ensure that the tank always holds sufficient liquid to prevent uplift. (1 mark)

- (b) If width of tank is W , volume of tank = $1.5 \times 2 \times W > 3$
 $W = 1$ (1 mark)

Volume of tank to outlet = $1.2 \times 2 \times 1 = 2.4$
so tank can hold 2.4 m^3 (1 mark)

OR

Tank can hold $\frac{1.2}{1.5} \times 3 \text{ (mark)} = 2.4 \text{ m}^3$ (1 mark)

Total 2 marks

ANSWER 3

- (a)
- Keep spoil and machinery away from the edge of the trench.
 - Use shoring/trench shield etc.
 - Use a ladder to access and exit the trench.
 - Put up barricades around the perimeter of the trench to prevent objects and people falling into the trench.
 - Monitor the air quality in the trench.
 - Check the soil moisture levels regularly.
 - Dewatering the excavation.
 - Ensure excavation has a safe slope. (4 marks)

- (b) Any FOUR (1 mark each)
- How to adjust guards.
 - PPE to be worn.
 - Method of isolation – turning on and off.
 - Pre-use inspections.
 - Procedure to be followed in emergency.
 - Operating procedure instructions.

(4 marks)

Total 8 marks

ANSWER 4

Answer to show

- Sink gully trap outside the deck (1 mark)
- Inspections at bends. (2 marks)
- Inspections at WC junctions. (2 marks)
- No inspections at gully traps. (2 marks)
- Venting correct. (2 marks)
- Inspection at boundary. (1 mark)

Total 10 marks

ANSWER 5

(a)

| Method of entry | Method of reducing risk |
|------------------|-------------------------|
| Eyes | Wear safety glasses |
| Mouth (eating) | Wear a mask |
| Mouth (breating) | Wear a mask |
| Cuts | Wear gloves |

(3 marks)

(b) Any THREE (1 mark each)

- Tetanus.
- Hepatitis B.
- Hepatitis A.
- Giardia.
- Salmonella.
- Gastro-enteritis.
- Leptospirosis
- E-coli diarrhoea.

(3 marks)

- (c) Any THREE (1 mark each)
- Wash hands (in cold water).
 - Use disinfectant to clean the area.
 - Clean tools after work is completed.
 - Remove soiled clothing.

(3 marks)

Total 9 marks

ANSWER 6

- Catchment area
- $(28 \times 12) + (18 \times 5) = 426 \text{ m}^2$ (2 marks)
- Nelson rainfall intensity from Appendix A = 77 (1 mark)
- Modified catchment area = $0.01 \times 426 \text{ m}^2 \times 77 = 328 \text{ m}^2$ (1 mark)
- Diameter pipe required = 150 mm (1 mark)

Total 5 marks

ANSWER 7

- (a) Any FOUR (1 mark each)
- The house drain between the gully and the septic tank is blocked.
 - The septic tank requires emptying.
 - The filter on the outlet of the septic tank is blocked.
 - The pumping system has failed (no power, worn impellor etc).
 - The effluent disposal field has failed. (4 marks)
- (b) Diagram to show (1 mark each)
- Distribution pipe.
 - Granular fill.
 - Planting. (3 marks)
- (c) Any THREE (1 mark each)
- Make sure any plants in the area are suitable.
 - Do not allow stock or heavy machinery/vehicles to have access to the mounds.
 - Have the septic tank pumped out regularly.
 - Do not flush unsuitable products into the system.
 - Ensure surface water is diverted from the mound.
 - Clean filters regularly. (4 marks)

Total 10 marks

ANSWER 8

- (a) Work must be conducted:
- competently
 - compliantly
 - safely. (3 marks)
- (b) • Direct presence requires the supervisor and the supervisee to be within eyesight or earshot of each other. (2 marks)
- (c) (i) • 3 months (1 mark)
- (ii) • \$500 fine (1 mark)

Total 7 marks

ANSWER 9

| Point | Depth |
|-------|------------------|
| B | 850 mm (1 mark) |
| C | 950 mm (1 mark) |
| D | 1075 mm (1 mark) |
| E | 3075 mm (1 mark) |
| F | 3250 mm (1 mark) |
| G | 1042 mm (1 mark) |
| H | 992 mm (1 mark) |

| Section | Fall |
|---------|-----------------|
| A – B | 50 mm (½ mark) |
| B – C | 100 mm (½ mark) |
| C – D | 125 mm (½ mark) |
| D – E | 2000 mm |
| E – F | 175 mm (½ mark) |
| G – H | 50 mm (½ mark) |
| H – C | 42 mm (½ mark) |

Total 10 marks

ANSWER 10

Drawing to show inspection or rodding points at B (1 mark) and F (1 mark), and every 50 m or 100 m from A or F (accordingly to use of either the 50 m rule or the 100 m rule). (2 marks)

Total 4 marks

ANSWER 11

- (a)
- Smoke is generated and is directed into the downstream end of the drain. (1 mark)
 - The system is pressurised with air. (1 mark)
 - The smoke will travel up the gentle gradient of the drain and escape through any leaks in the drain. (1 mark)
- (b) Any TWO (1 mark each)
- Cross connection with the storm water system.
 - Insufficient water to provide seal at trap.
 - Broken pipe or joint (leak).
 - Disconnected or blocked vents. (2 marks)
- (c) (i) 8 kPa (½ mark)
- (ii) 3 minutes. (½ mark)
- Total 6 marks**

ANSWER 12

Drawing to show

- Correct location of vent (1 mark)
 - ORG included (1 mark)
 - Correct locations of inspection points (drain) (2 marks)
 - Inspection point at septic tank (1 mark)
 - Septic tank location (1 mark)
 - Fresh air inlet (1 mark)
 - Distribution box (1 mark)
 - Effluent dosing system (1 mark)
 - Effluent lines following contours of ground (2 marks)
- Total 11 marks**

SECTION B

1. C Hydrogen sulphide.
2. E 24 hours.
3. E 1:350
4. B 200.
5. A Between 20% and vertical.
6. A 1.34 m.
7. B Drainlayer B.
8. D The sludge, scum and effluent separating while in the septic tank.
9. C 15 years.
10. A To allow a drain to be laid within a neighbouring property.

Total 10 marks