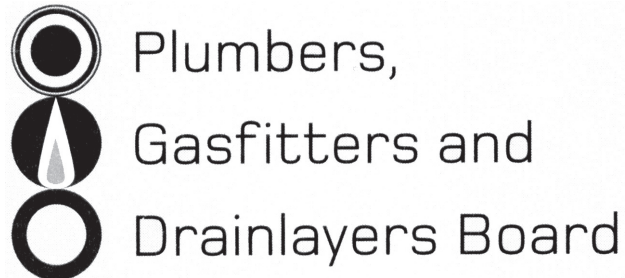


No. 9198



REGISTRATION EXAMINATION, JUNE 2022
CERTIFYING DRAINLAYER

ANSWER SCHEDULE

ANSWER 1

- (a) Any THREE (1 mark each)
- Near petrol station sites – existing or closed.
 - Close to roads.
 - Peaty soil.
 - Areas with geothermal activity.
 - Near leaking gas utility services.
 - Reclaimed land.
 - Near landfills. (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 2

- (a) Any EIGHT (½ mark each)
- Trench shoring.
 - Ladders.
 - Dewatering pumps.
 - Barriers/traffic access plates.
 - Gas detector.
 - Certified lifting equipment.
 - First aid box.
 - Signage.
 - Retrieval equipment.
 - Communication systems. (4 marks)
- (b)
- Before work starts each day.
 - After rain.
 - After any occurrence that could affect the stability of an excavated face. (3 marks)

- (c) (i) • Make the area safe to work in. (1 mark)
- (ii) • Call emergency services.
• Take whatever actions that can be carried out safely to assist the trapped worker. (2 marks)

- (d) Any TWO (1 mark each)
- Contact electricity/cable detection company.
 - Carefully hand dig sufficient to lay the new drain.
 - Get the property plans from the Territorial Authority.
 - If in an area of gas supply, contact gas supplier.
 - Look for signs of services.
- (2 marks)

Total 12 marks

ANSWER 3

Drawing to show:

Pipework connecting from all discharge pipes to outfall. (2 marks)

Inspections (4 marks)

ORG (1 mark)

Ventilation (2 marks)

Total 9 marks

ANSWER 4

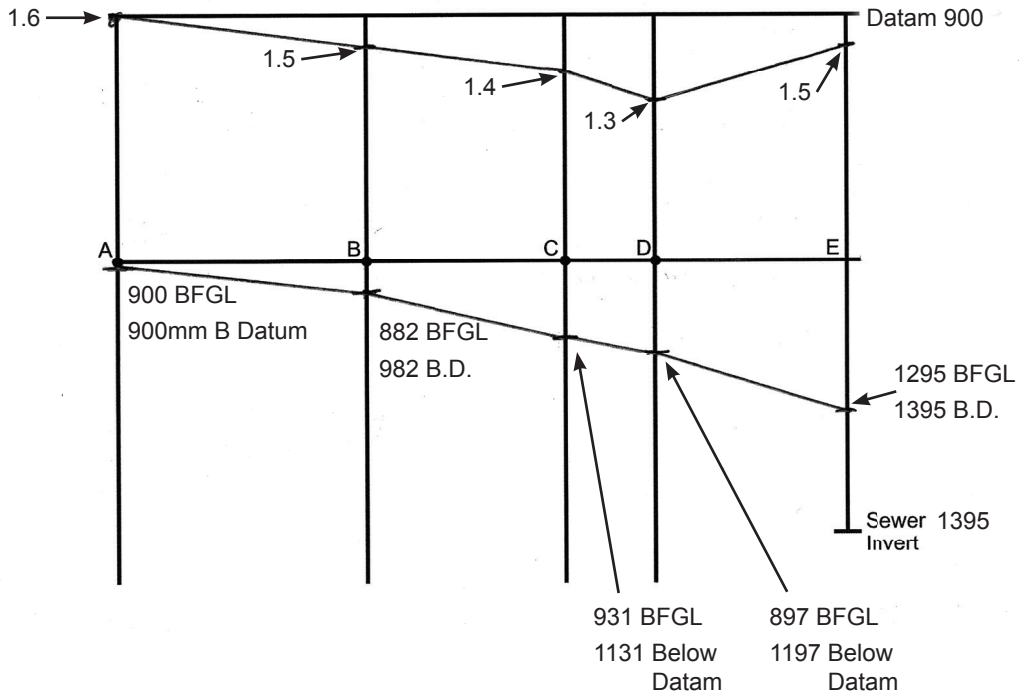
(a)

Section	Fall (mm)
A – B	83.3 (1 mark)
B – C	149.9 (1 mark)
C – D	66.6 (1 mark)
D – E	199.9 (1 mark)

Point	Depth below datum (mm)
A	900
C	982 (1 mark)
D	1131 (1 mark)
E	1197 (1 mark)
F	1395 (1 mark)

(8 marks)

(b)



(4 marks)

Total 12 marks

ANSWER 5

(a) (i) Volume = $0.6 \times 0.9 \times 0.2 = 0.108 \text{ m}^3$ (2 marks)

(ii) Volume = $3.142 \times 0.5 \times 0.5 \times 1.1 = 0.86405 \text{ m}^3$ (3 marks)
= 864 litres (1 mark) (4 marks)

(b) Volume = $12.25 \text{ m} \times 0.75 \text{ m} \times 1.3 \text{ m} = 11.943 \text{ m}^3$ (1 mark)
= 11943 litres (1 mark)

Time = $11943 \div 50 = 238.86 \text{ mins}$ (1 mark)

(3 marks)

Total 9 marks

ANSWER 6

- (a) Any SIX (1 mark each)
- Land area.
 - Proximity of water ways.
 - Location of bores/wells.
 - Water table level.
 - Short circuit paths.
 - House and boundary location.
 - Plantings, domestic, landscaping, woodlots/natives/gorse etc.
 - Location of retaining walls/embankments.
 - Topography of the land.
 - Slope.
 - Exposure, sun, wind. (6 marks)
- (b) • To utilise all of its disposal capacity and allowing it to rest. (1 mark)
- (c) Drawing to include:
- Primary/digestion/anaerobic chamber. (1 mark)
 - Secondary aeration/aerobic chamber. (1 mark)
 - Filter. (1 mark)
 - Pump. (1 mark) (4 marks)
- (d) (i) 4500 litres (1 mark)
- (ii) $\text{Length} = \frac{170 \times 6}{30 \times 0.9} = 37.77 \text{ m}$ (3 marks)

Total 15 marks

ANSWER 7

- (a) A soil that has the ability to pass rapidly into suspension in water. (1 mark)
- (b) The distance that an on-site system shall be situated from any facility, boundary or body of water. (1 mark)
- (c) The rate at which liquid infiltrates a particular soil. (1 mark)
- (d) An area set aside for future use for land application to replace original land application area when required. (1 mark)
- (e) Expected waste water volumes allowing for peak occupancy and usage for the system to be designed to manage. (1 mark)

Total 5 marks

ANSWER 8

- (a) Point should be indicated between GTs C and D. (1 mark)
- (b) Flush the other toilet. 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. (2 marks)
- (c) Any THREE (1 mark each)
- Tree roots.
 - Ground slump.
 - Broken pipe.
 - Inappropriate material entering drain. (3 marks)
- (d)
- Have a simple layout with minimal changes in direction.
 - Use bends with the maximum radius possible.
 - Support pipework to avoid slumping. (3 marks)
- (e)
- Plunging.
 - Corkscrew/auger.
 - Jetting unit. (3 marks)

Total 12 marks

ANSWER 9

- (a) Office: $0.01 \times 360 \times 63 = 227 \text{ m}^2$
Factory: $0.01 \times 1380 \times 63 = 870 \text{ m}^2$
Carpark: $0.01 \times 570 \times 63 = 359 \text{ m}^2$ (3 marks)
- (b) A: 85 mm.
B: 150 mm.
C: 100 mm. (3 marks)
- (c) Total modified area = 1456 m^2
Main drain diameter = 225 mm (at 1:130) (1 mark)
- (d) Type 2 sump. (1 mark)

Total 8 marks

SECTION B

1. B Junctions of drains serving a single downpipe that are less than 2.0 m long.
2. D 300
3. A The company.
4. E 4.5 m
5. E 611
6. C Extra weight from soil or vehicles near the edge of the trench.
7. B 12 months.
8. A To stop the waste cooling and fats solidifying on the internal wall of the pipe.
9. C 10 m²
10. A To prevent trap seal loss due to compression.

Total 10 marks