No. 9198

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2015

# CERTIFYING DRAINLAYER

ANSWER SCHEDULE

## ANSWER 1

To relief waste in the event of a sewage surcharge/blockage.
To provide a disconnection point between waste discharges and the remainder of the sewage installation.
Or
To provide a disconnection point between waste pipes the drainage installation.

**Total 2 marks**

## ANSWER 2

| Calculation | Answer |
|---|---|
| Run-off coefficient for roof | 0.90 |
| Run-off coefficient for driveway | 0.85 |
| Expected water run-off from roof in $m^3/h$<br>(= area of catchment in $m^2$ × run-off coefficient × rainfall intensity in m/h) | 240 × 0.9 × 0.0263 = 5.6808 $m^3/h$ |
| Expected water run-off from drive way in $m^3/h$<br>(= area of catchment in $m^2$ × run-off coefficient × rainfall intensity in m/h) | 8.58 × 0.85 × 0.0263 = 0.1918 $m^3/h$ |
| Total volume of water conveyed from catchment areas to soak pit | 5.6808 + 0.1918 = 5.873 $m^3$ |
| Area of the base of the soak pit | 3.1416 $m^2$ |
| Absorption ability of soak pit in $m^3/h$<br>(= area of base of Soak Pit in $m^2$ × average level drop from percolation test in m) | 3.1416 × 0.42 = 1.319 $m^3/h$ |
| Required volume of soak pit | 4.554 $m^3$ |
| Required depth of soak pit | 4.554 ÷ 3.1416 = 1.45 m |

(9 marks)

(b) NIWA/HIRDS
Local Territorial Authority.
AS/NZS 3500.3 (2 marks)

**Total 11 marks**

## ANSWER 3

1 mark each correct vent location
minus 1 mark each incorrect vent location (3 marks)

Sizing of vents
50 mm main vent (1 mark)
40 mm branch vents (1 mark)

| Location | Minimum diameter (1 mark each) | Minimum Gradient (½ mark each) |
|---|---|---|
| A | 65 | 2.5% |
| B | 80 | 2.5% |
| C | 65 | 2.5% |
| D | 80 | 2.5% |
| E | 100 | 1.65% |
| F | 100 | 1.00% |

**Total 14 marks**

## ANSWER 4

volume = 4.75 m × 0.9 m × 1.4 m
= 5.985 $m^3$ (1 mark)

water = $\frac{6\ m^3 \times 2}{3}$ or 6 $m^3$ × 0.6
= 3.99 $m^3$ (1 mark)

Litres = 3.99 × 1000 = 3999 L (1 mark)

Minutes = 3999 ÷ 40
= 99.75 minutes (1 mark)

**Total 4 marks**

## ANSWER 5

(a) Any THREE (1 mark each)
- Toxic gas in trench.
- Low oxygen levels in trench.
- Personal health issues of co-worker (heart attack, stroke etc).
- Accident e.g. fall.
- Electric shock. (3 marks)

(b) (i)
- Risks to personal safety assessed –Trench stability, Toxic gas levels, Oxygen levels.

(ii) Any THREE (1 mark each)
- Backup/spotter person at the trench site.
- Contact emergency services.
- Safety equipment, recovery system made available and used before approaching co-worker.
- Provide first aid. (4 marks)

(c)
- Incident form.
- Accident investigation form.
- Notification of Accident or Serious Harm form. (1 mark each, 3 marks)

**Total 10 marks**

## ANSWER 6

(a) Correct location of the following
TV
ORG
IO to WC
No IO on GT
SW
Economical (8 marks)

(b) Length of drain from scale = 29 – 30 metres
Depth = 0.6 m + 30 m × 20 mm/m = 1.2 m (accept 1180 – 1220) to be updated after printing

Fall = 29 × 16.5 = 478.5 mm min
Fall = 30 × 17 mm = 510 mm
+500 mm
978.0 to 1010 mm (3 marks)

**Total 11 marks**

## ANSWER 7

Any FIVE (1 mark each)

- Top of dish 25 mm above paved level.
- Concrete surrounding dish.
- Compacted bedding material.
- Pipework separated from building foundation if gully trap likely to become damaged.
- 600 mm maximum depth from top of gully dish to invert of gully trap.
- 100 mm diameter outlet.
- At least one discharge pipe discharging into gully.
- Grating that allows surcharge.
- 600 mm space above gully dish for access.

**Total 5 marks**

## ANSWER 8

(a) The level at which any below-ground water is located in any particular area. (1 mark)

(b)
- Rainfall – seasons – summer/winter.
- Tidal movement in coastal areas.
- Well or bore in the area. (2 marks)

(c) Any THREE (1 mark each)
Sand/Wisconsin mounds.
Drip lines – subsurface drip, surface drip, spray system.
Evapo-transpiration system.
Slow sand filter.
Advanced treatment systems cholrine or UV).
Pumped systems. (3 marks)

(d) Any FIVE (1 mark each)
Size and occupancy of dwelling/building.
Size of property available for field.
Water courses/ trees/ gardens and other structures on property.
Soakage rate of soil.
Contours of the property.
Set-back.
Reserve areas. (5 marks)

**Total 11 marks**

## ANSWER 9

Diagram to show

(a)
- Drain to septic tank with fresh air inlet.
- Inspection opening above inlet pipe.
- Septic tank with two chambers or biofilter.
- Baffle.

(b)
- Dosing system (pump/tip bucket etc) at tank outlet.
- Outlet of septic tank providing cascade through tank.
- Distribution box.
- Trench effluent disposal field.

**Total 7 marks**

## ANSWER 10

(a) (ii) Features A series of valves and chambers, positive displacement increasing pressure. (1 mark)
Benefit Able to pump sludges and slurry/viscous liquids. Working parts separated from liquid being pumped. (1 mark)

(2 marks)

(ii) Features Impellor applying force to the water. (1 mark)

Benefit High efficiency, low friction losses. Steady flow rate. (1 mark)

(2 marks)

(iii) Features Grinding plate on pump inlet. (1 mark)

Benefit Able to pulverise waste to reduce chances of pump and pipework blocking. (1 mark)

(2 marks)

(b) Head with allowance = 8.8 (1 mark)
Pressure = 8.8 × 9.81 = 86.33 kPa (1 mark)

(2 marks)

**Total 6 marks**

## ANSWER 11

(a) Pellets that emit a special type of smoke are lit and the smoke from the pellet is directed into the downstream end of the drain.
The smoke will travel up the gentle gradient of the drain and escape through any faults in the drain.
Pressurise.

(2 marks)

(b) Any THREE (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. (3 marks)

**Total 5 marks**

## ANSWER 12

(a) Work that does not require a building consent. (1 mark)

(b) Any TWO (1 mark each):

- Opening an existing access point to clear a blockage and resealing that access point.
- A kitchen benchtop is replaced and the kitchen sink is moved to an adjacent wall (see exemption (ad)).The existing gully trap servicing the kitchen needs to be shifted a short distance to receive the discharge from the repositioned sink wastepipe.
- A toilet pan has been repositioned in an existing bathroom (see exemption (ad)) and it is reconnected into the existing drain at a different point.
- Installing a new access or rodding point for unblocking drains.
- A short extension to a stormwater drain to collect water from a new downpipe.
- Connecting a new gully trap on an existing drain to receive discharge from a redirected waste pipe.
- Sealing off a branch drain following the removal of sanitary fixtures from an outbuilding associated with a dwelling.
- Extending, for a short distance, the drain from a dwelling to connect to a new council sewer lateral installed at the boundary by the NUO due to the original lateral being damaged by tree roots (provided no new connections to a NUO system are made).

(2 marks)

(c) Any THREE (1 mark each):

Certifying drainlayer.

Licensed drainlayer.

Trainee drainlayer.

Exempted person under supervision.

Provisional licence holder (3 marks)

**Total 6 marks**

## SECTION B

1. C Cover the pipe with 50 mm of overlay followed by 75 mm of concrete paving.
2. E A hazard that cannot be eliminated or isolated or minimised.
3. E Bruising to a large area of the body.
4. E Replacing a noisy piece of machinery with a quieter model.
5. C Providing and wearing personal protective equipment to prevent injury.
6. A Constructing a barricade around a piece of machinery to prevent workers coming into contact with a hazard.

**Total 6 marks**