No. 9197

Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2012

LICENSED DRAINLAYER

ANSWER SCHEDULE

ANSWER 1

(a) Point indicated between GT marked A and the junction to GTD and toilet E.

(1 mark)

(b) Flush the downstream toilet and observe. 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.
Incorrectly installed drain – wrong gradient.

(3 marks)

(d) Have a simple layout with minimal changes in direction.
Use bends with the maximum radius possible.
Be laid only in straight lines between bends or junctions (both horizontally and vertically).

(3 marks)

(e) Any THREE (1 mark each)
Plunging.
Cork screw/auger.
Jetting unit.
Cutting unit.

(3 marks)

(f) Any FOUR (½ mark each)
Rinsed with clean water to dilute waste.
Left to soak in a solution containing disinfectant.
Laid out in the sun to dry – UV and drying will kill a large amount of bacteria.
Stored in a container with drainage holes so that any fluid that escapes the rods will dry out.
Stored away from other tools and equipment to prevent contamination.

(2 marks)

Total 14 Marks

ANSWER 2

(a) (i) Conveys a set amount of effluent to the disposal field at specific time intervals.

(ii) To prevent sludge or scum from travelling further through the system.

(iii) To prevent solids entering the disposal field.

(iv) To break down raw sewage inside the septic tank.

(v) A diverter that can be adjusted so different areas of the effluent field can be used or rested as required.

(5 marks)

(b) Any FOUR (1 mark each)

Type of plants existing on site.

Amount of space required – distance from boundaries and buildings.

Water table level.

Location of any bore water supply.

Location, or future location of other land improvements – buildings, swimming pools etc.

Slope of ground.

Site exposed/sheltered – prevailing wind direction.

Distance to open bodies of water (creeks, streams etc).

Overland flood plain.

Vehicles and stock.

Digger access to site.

(4 marks)

(c) (i) The effluent will drain away too quickly and could enter underground water sources or streams before it is sufficiently treated.

(ii) The effluent will not be able to drain away and the field will become boggy with untreated effluent.
OR
Slow draining therefore large disposal area required.

(2 marks)

(d) To prevent the tank floating up by ground or rainwater entering the area around the tank.

(1 mark)

(e) Drawing at correct scale with all components correctly spaced.

(10 marks)

Total 22 Marks

ANSWER 3

(a) Protection of water trap seals.
Drying out of organic matter – drain becomes self-cleaning – reduces likelihood of blockage.
No build-up of dangerous gases in the system.
(3 marks)

(b) The overflowing of a drain through an overflow relief point. (1 mark)

(c) Top of the gully grate must be at least 150 mm below overflow of lowest sanitary fixture.
Have a grating that will allow surcharge.
Be in a visible location.
Installed so surcharge cannot enter or go under buildings. (2 marks)

Total 8 Marks

ANSWER 4

40 ÷ 60 = 0.667 (1 mark)
500 mm + 667 = 1167 (½ mark)
1167 + 110 = 1277 (½ mark)

Total 2 Marks

ANSWER 5

(a) Soak pipe work for 24 hours.
Fill pipe with water ensuring all air is expelled.
Top up water to test head level – 1.5 m above head of drain no more than 6.0 m above base of drain.
Leave for 30 minutes.
Check amount of water loss is within acceptable limits.
OR
1 m – 3 m head
Time = 15 minutes (5 marks)

(b) A bubble up chamber is used to lift the level of a stormwater drain when the minimum fall cannot be obtained continuously between the collection area and the drain connection point. The drain can then be laid at the correct gradient between chambers.
It also provides a trap for the collection of silt and debris that may enter the system.
(2 marks)

(c) Drawing to show:
An access cover.
An inlet (above the base level of the chamber).
An outlet (at higher level than the inlet).
Flow direction arrow from inlet to outlet. (4 marks)

(d) Chamber with holes.
Rocks at base of chamber.
Filter cloth.
Lid. (4 marks)

(e) When a water course such as a stream is going to be piped a wing wall must be installed on the inlet and the outlet of the pipe to channel the flow into and out of the pipe prevent the scouring and erosion of the earth surrounding the inlet and outlet of the pipe.

(3 marks)

Total 18 Marks

ANSWER 6

(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 (½ mark each)
Fire.
Explosion.
Suffocation.
Poisoning. (1 mark)

Total 4 Marks

ANSWER 7

(a) Submersible macerating pump. (1 mark)

(b) Clean the drain.
The drain plug is fitted to the internal diameter at the base of the drain to be tested.
The handle is turned on a thread (or the pneumatic bellows is inflated or a lever is worked) which brings the two solid discs closer together compressing the rubber seal (or expands the bellows), forcing the seal against the internal wall of the drain pipe.
Restrain the plug.

(2 marks)

(c) Any THREE (1 mark each)
Drainage spear.
Tracer wire and cable locator.
Camera and locator.
Ultra sound – radar – geophysics equipment. (3 marks)

(d) Any TWO (1 mark each)
They are fragile and can go out of calibration if knocked – ground stability.
The laser can cause eye damage and should not be set up at a level that may shine into the eyes of people near the site.
The maximum reach of the laser beam.
Any obstructions to the laser beam (line of sight).
Atmospheric conditions – weather patterns. (2 marks)

(e) Where drains travel through external walls below ground.
Where differential settlement may occur and a drain passes through the wall of an inspection chamber.
(2 marks)

(f) Accept any acceptable flexible joint. (2 marks)

(g) Any FOUR (½ mark each)
uPVC.
Ceramic.
Cast Iron.
Copper.
Polyethylene HD.
Polyethylene LD.
Steel.
Concrete. (2 marks)

Total 14 Marks

ANSWER 8

(a) Check valve / non-return valve / reflux valve / surcharge valve. (1 mark)

EITHER

Low lying areas where rainwater is channelled downstream to the main sewer, making it susceptible to flash floods after heavy rain.

OR

Private discharge systems channelled to public sewers equipped with pumping stations. (1 mark)

(2 marks)

(b) 45° Inspection bend. (1 mark)

At changes of direction where access to the drain must be provided. (1 mark)

(2 marks)

(c) 45° side access junction/inspection junction. (1 mark)

Where a branch drain meets the main. (1 mark)

(2 marks)

(d) 90°/88° plain junction. (1 mark)

Any ONE of (1 mark)

At the top of a jump-up at the point of connection.

At the connection of an inspection shaft to a graded drain.

At the connection of a drain to a boundary trap riser.

Where a vent is connected to a boundary trap riser.

As the inlet riser of a gully or floor waste gully.

As an inspection opening – including inlet and outlet inspections on grease trap.

At the top of a jump-up in a drain, in lieu of a bend and inspection opening.

At vent pipe connections. (2 marks)

(e) Fresh air inlet. (1 mark)

EITHER

On the inlet of a septic tank system.

OR

On the vent of boundary trap. (1 mark)

(2 marks)

Total 10 Mark

SECTION B

1	E	600 mm.
2	E	1:100
3	C	165.
4	C	450 mm.
5	B	150 mm.
6	C	8%
7	A	The near face of the main drain and the weir of the trap.
8	E	1:150
9	B	2.
10	C	100 mm.

Total 10 Marks