No. 9197

Plumbers,
Gasfitters and
Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2011

LICENSED DRAINLAYER

ANSWER SCHEDULE

ANSWER 1

(a) To keep the tank at a constant temperature.
To provide fall for gravity fed systems. (1 mark)

(b) Any FOUR (½ mark each)
1. The number of people using the tank.
2. The ambient temperature.
3. Whether or not a waste disposal has been installed.
4. The size of the tank.
5. The lifestyle of the building users. (2 marks)

(c) Any SIX (½ mark each)
1. Antibiotics.
2. Paint.
3. Bleach/Disinfectants.
4. Herbcides/Pesticides.
5. Oil.
6. Automobile fluids.
7. Water softeners.
8. Stormwater. (3 marks)

(d) 1. The effluent is stirred up disrupting the settling process.
2. The effluent is pushed through the system too quickly not allowing enough time for bacteria to treat the waste.
3. The disposal field is forced to absorb too much liquid.

(3 marks)

Total 9 Marks

ANSWER 2

Drawing to include
1. Air tight inspection cap.
2. There must be >1 metre clear space above the inspection cap.
3. There must be >100 mm clear space each side and to rear of inspection cap.
4. Removable cover on recess.

Total 4 Marks

ANSWER 3

(a) To prevent surcharge entering the drainage system. (1 mark)

(b) Answer is to describe a situation where surcharging from a sewer occurs and an ORG trap cannot be installed. For example: sewage ejecting system or pumping system. (2 marks)

(c) Immediately downstream from and adjacent to the outlet of the boundary trap.

(1 mark)

Total 4 Marks

ANSWER 4

(a) The total number of discharge units to be conveyed.
The gradient the drain is to be laid at.

(2 marks)

(b) Any SIX (½ mark each)
At maximum of 30 metre spacing on a drain.
At least one on each main drain.
At the connection to the network utility operator's sewer.
On the downstream end of the drain where any drain passes under a building except where waste fixtures only are concerned.
Where any new section of drain is connected to an existing drain.
Immediately at or upstream of the upper bend of a jump-up.
At every change in horizontal direction of greater than 45°.
At every change in gradient greater than 45°. (3 marks)

(c)

Diameter of drain	Diameter of inspection opening
80 mm	80 mm
100 mm	100 mm
150 mm	150 mm
300 mm	150 mm

(2 marks)

Total 6 Marks

ANSWER 5

(a) Have waste pipes sealed when they enter through the side or back of the gully dish.
Have the top of the gully dish 25 mm above paved surfaces.
Have the top of the gully dish 100 mm above unpaved surfaces.

(3 marks)

(b) (1 mark for 2 out of 3 steps)
Chamfer spigot end.
Lightly roughen end of pipe.
Measure and mark depth of socket on pipe.

(1 mark for both steps)
Clean both surfaces with appropriate cleaning fluid.
Apply even coating of solvent to socket and spigot.

(1 mark for 2 out of 3 steps)
Push spigot into full depth of socket.
Remove excess solvent from pipe.
Do not allow joint to move for at least 5 minutes.

(3 marks)

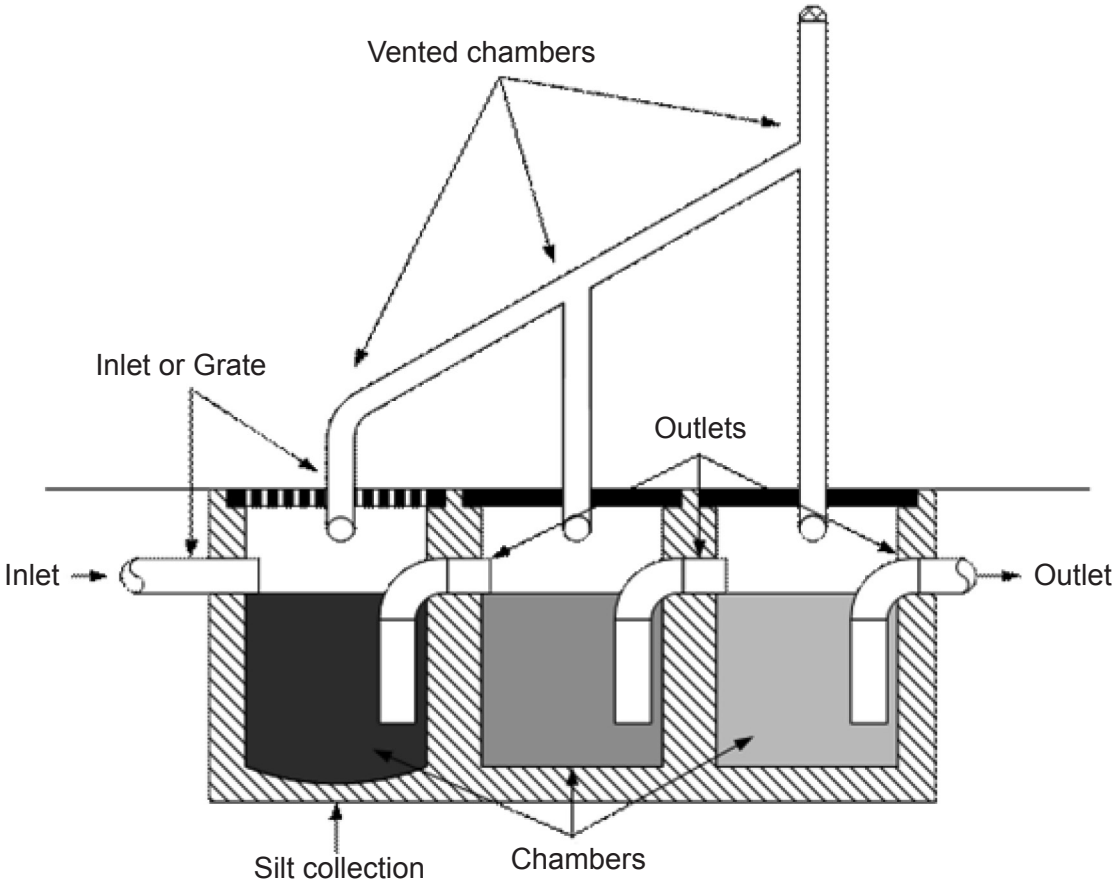
(c) Any TWO (1 mark each)
The trap at the head of the disused section will evaporate allowing foul gases to escape or vermin to enter the drain.
The unused section could fail and allow the ingress of ground water.
To prevent tree roots entering the drain.

(2 marks)

Total 9 Marks

ANSWER 6

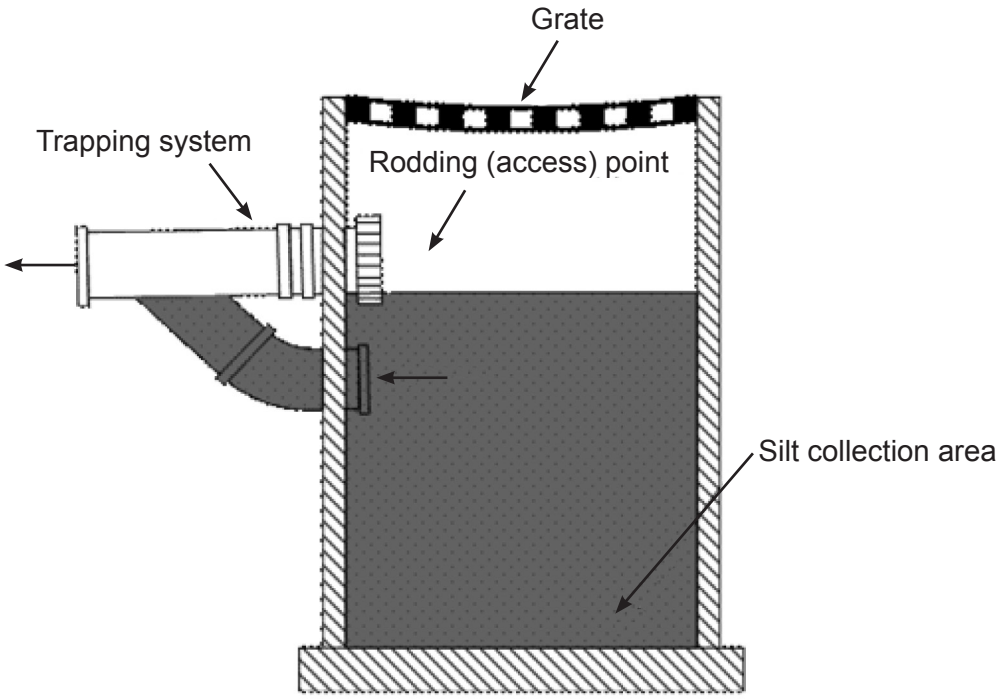
(a)



Silt collection	(1 mark)
Chambers (at least two)	(1 mark)
Vents	(1 mark)
Outlets	(1 mark)
Inlet or grate	(1 mark)

(5 marks)

(b)



Silt collection area	(1 mark)
Rodding (access point)	(1 mark)
Trapping system	(1 mark)
Grate	(1 mark)

(4 marks)

Total 9 Marks

ANSWER 7

(a)

Gradient	Percentage	Fall over 6 metres
1:20	5.00 %	300 mm
1:40	2.50 %	150 mm
1:60	1.65 %	100 mm
1:90	1.10 %	66.66 mm

(½ mark for two percentages, 1 mark for four percentages, 1 mark for each fall), (5 marks)

(b) Calculate the fall on the pipe
1000 ÷ 40 = 25 mm/per metre
25 × 30 = 750 mm (1 mark)

Maximum head pressure (m) for testing = 3 metres (1 mark)

3000 - 750 = 2250 mm / 2.25 m (1 mark) (3 marks)

Total 7 Marks

ANSWER 8

(a) In buildings other than housing (restaurants/cafes etc), grease traps shall be provided where waste water is likely to convey grease.
Grease traps shall be provided for any discharge pipe serving a sink(s) where the foul water discharges to a soak pit.

(2 marks)

(b) Finding/knowing that grease trap must be at least double the capacity of fixture discharging to it.
(1 mark)

55 × 2 = 110 litres or 0.11 m^3

(½ mark for # ½ mark for unit)
(2 marks)

Total 4 Mark

ANSWER 9

(a) Any FOUR (4 marks)
Trench side steeper than angle of repose.
Heavy loads stacked too close to trench side.
Vehicles travelling or parked too close to side of trench.
Surface water flowing into trench.
Ground water flowing into trench/water table level.
Soil type.

(b) (i) Any FOUR (4 marks)
Oxygen level.
Toxic fumes.
Flammable contaminants.
Temperature within the chamber.
Recent rainfall in catchment area.
Tidal movements if the drain is discharging to the sea.
(4 marks)

(ii) Any TWO (4 marks)
A co-worker on lookout above.
Communication method.
Harness with retrieval rope, with co-workers to operate.
Adequate oxygen supply.
(2 marks)
Total 10 Marks

ANSWER 10

(a) Pump will turn off – remain off. (1 mark)

(b) Pump will turn on and discharge until low level sensor deactivates. (1 mark)

(c) Owner is notified/Maintenance to be carried out. (1 mark)
OR
Second pump will come on. (½ mark)
Total 3 Marks

ANSWER 11

Dry inspection chamber. (1 mark)
Wet inspection chamber. (1 mark)
Haunching on wet inspection chamber. (1 mark)
Total 3 Marks

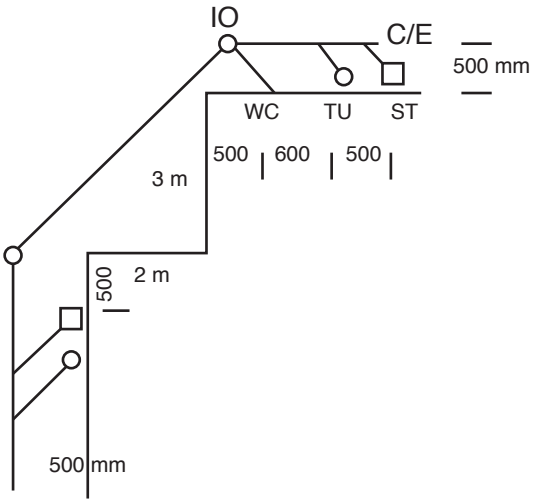
ANSWER 12

Picture to show
A minimum of 50 mm of overlay.
Paved with at least 75 mm of brick or concrete paving for the full width of the trench.

Total 3 Marks

ANSWER 13

The sketch shown below represents the alterations made to the foul water drain. The alterations required extending the drain to a new bathroom at the rear of the house.



Draw an as built plan of the sketch using a scale of 1:50

Each measurement (7 marks)
Correct scale (1 mark)
Total 8 Marks

SECTION B

1	E	60°.
2	D	1:200.
3	E	300 mm.
4	D	255.
5	B	150 mm.
6	D	4 hours.
7	C	To provide a point of overflow should the drain become blocked.
8	E	An inspection or access point.
9	A	A toilet.
10	C	The moisture from the effluent field vaporising into the atmosphere.
11	A	A plant absorbing liquid via the root system and releasing the moisture to the air through its leaves.
12	E	The sludge, scum and effluent separating while in the septic tank.
13	C	To supply oxygen to the bacteria within the tank.
14	C	Benching.
15	B	At any change of direction that may be under strain due to hydraulic load.
16	D	To prevent erosion of soil where a stream enters a culvert.
17	A	The percentage a material can be compressed.
18	C	To convey the effluent evenly over the disposal field.
19	B	To check a pipe is completely vertical.
20	D	When the trench is 1.0 metres wide.

Total 20 Marks