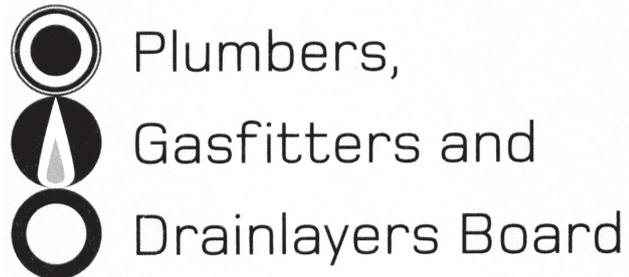


No. 9197



REGISTRATION EXAMINATION, NOVEMBER 2008  
**DRAINLAYING**

ANSWER SCHEDULE



## ANSWER 1

- (a)
- Any form of tunnel or drive where workers work underground irrespective of timbering or support.
  - Any construction where explosives are to be used or stored.
  - When workmen are required to be working in compressed air.
  - Those excavations where the excavated face is more than 5m deep and the batter of the face is steeper than 1 horizontal to 2 vertical.
  - Any trench, pit, shaft or other excavation that is more than 1.5 metres deep.
  - Ground containing asbestos or other toxic pollutants.
- (Any 3, 1 mark each) (3 marks)
- (b) (i) A build-up of non toxic gases displaces air (oxygen) for breathing causing Suffocation. (2 marks)
- (ii) Feeling faint or weak  
Unconsciousness  
Skin colour becomes blue/grey. (Any 2, 2 marks)
- (iii) Can cause tissue and brain damage.  
Death. (2 marks)

**Total 9 marks**

## ANSWER 2

(a)-(b)

Item	Number	Cost per item	Cost
Drain length 80m	80	\$35.00 m	\$2800.00
Inspection fittings	6	\$40.00 each	\$ 240.00
Plain fittings	8	\$16.00 each	\$ 128
Overflow relief gully	1	\$125.00 each	\$ 125.00
Sub total material			\$3293.00
Profit margin 15%			\$ 493.95
Sub total			\$3786.95
GST (12.5%)			\$ 473.37
Total			\$4260.32

(½ mark each line and extra ½ mark for correct final answer) (5 marks)

(c)  $F = \frac{L}{G} + \text{cover} + \text{pipe dia}$

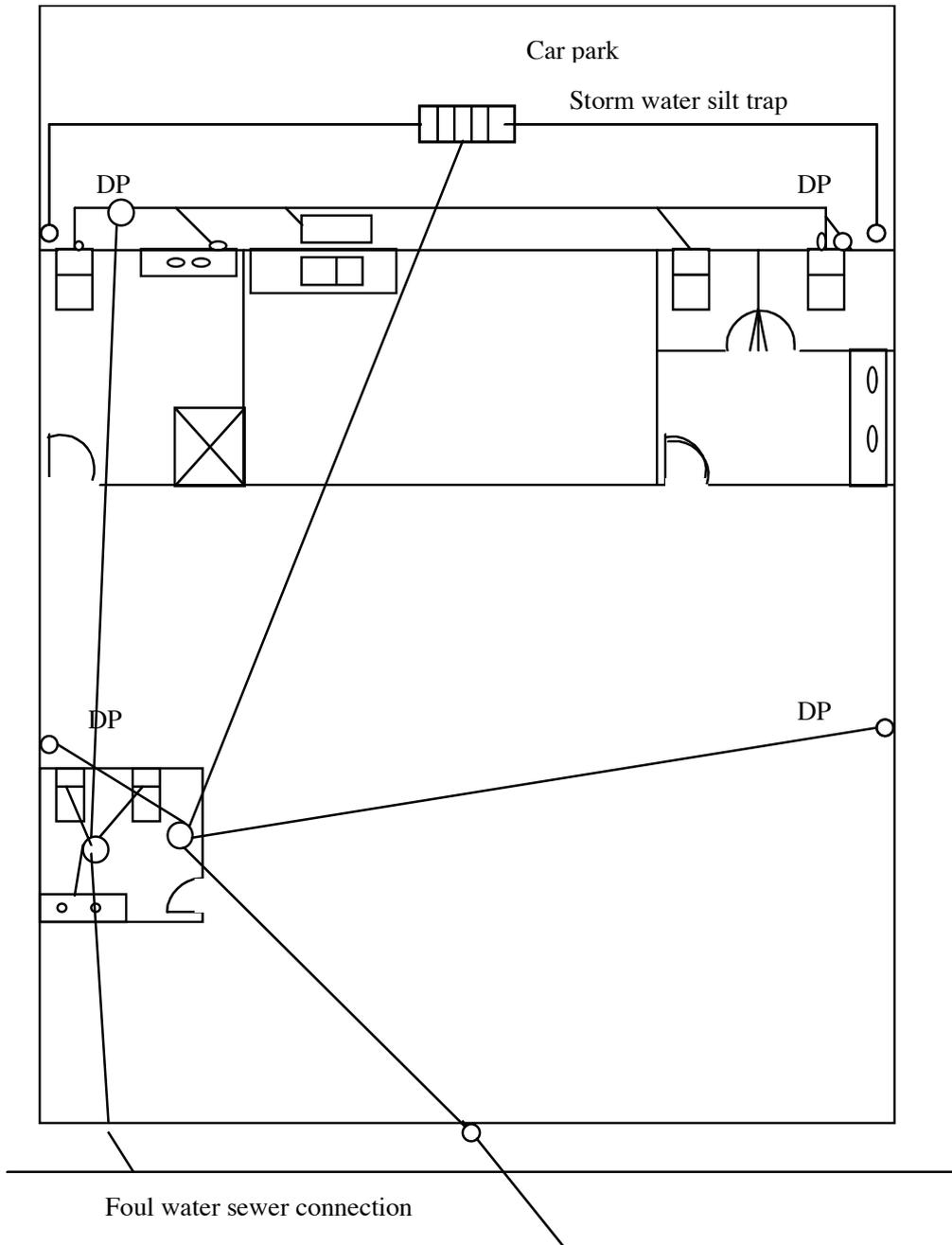
$$F = \frac{65000}{60} \quad (½ \text{ mark})$$

$$F = 1083.333 + 500\text{mm} + 110\text{mm} \quad (½ \text{ mark})$$

$$\text{Depth at connection} = 1693.333\text{mm} \text{ or } 1.693\text{m} \quad (1 \text{ mark})$$

**Total 7 marks**

**ANSWER 3**



**Storm water**

- 1 mark for all down pipe connected
- 1 mark for access chamber in floor
- 1 mark for access at sewer connection
- ½ mark for silt trap connection

**Foul water**

- 1 mark for grease trap
- 1 mark for access chamber in car park
- 1 mark for access point at foul water sewer
- 1 mark for access chamber in ablution block
- ½ mark for each gully
- ½ mark for drain vent
- 1 mark for inspections at foul water drain

(Total 1 mark)

**Total 10 marks**

## ANSWER 4

- (a) When a drain passes under a building

If there is a danger of physical damage.

The drain has less than the minimum cover required.

Whenever an engineer or the designer of the system says that it is necessary, for example, unstable conditions. (other examples will be shown)

If there is a danger of environmental damage to the drain

(Any 4, 1 mark each) (4 marks)

- (b) (i) Dewatering (1 mark)
- (ii) Well point. (1 mark)
- (iii) Cascade level. (1 mark)
- (iv) A holding chamber that is large enough to hold the expected discharge until the sewer flows normally again. (1 mark)
- (v) Lack of ventilation. (1 mark)

**Total 9 marks**

## ANSWER 5

- (a) (i) Naturally occurring water that results from rainfall run-off (water flowing onto the site). (2 marks)

Purpose: To prevent overloading of the system and causing surface flooding by storing storm water until the system can handle it.

(2 marks)

- (b) (i) Intercepting any commercial or industrial waste which may contain matter that is not permitted to enter the T/A sewer. (2 marks)

- (ii) Petrol station as a "petrol, oil & grit interceptor".

Fast food outlets as a grease trap to prevent grease entering sewer.

Truck wash down areas as a grit & oil/grease trap.

(Any 2, 1 mark each) (2 marks)

- (c) Evapo-transpiration bed at ground level.

Pumped trickle feed to plants or better soakage areas.

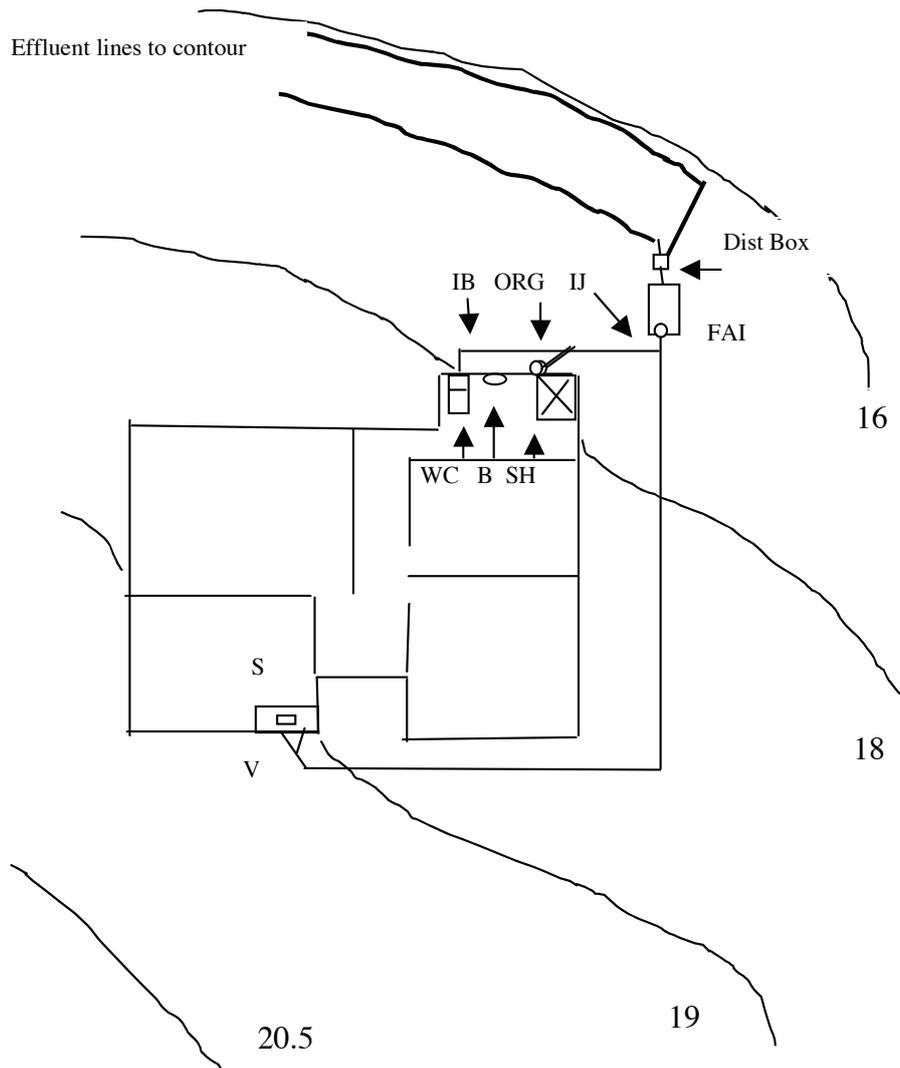
Pump to elevated area and gravity trickle fed to plants.

Aerated spray.

(Any 2, 2 marks each) (4 marks)

**Total 12 marks**

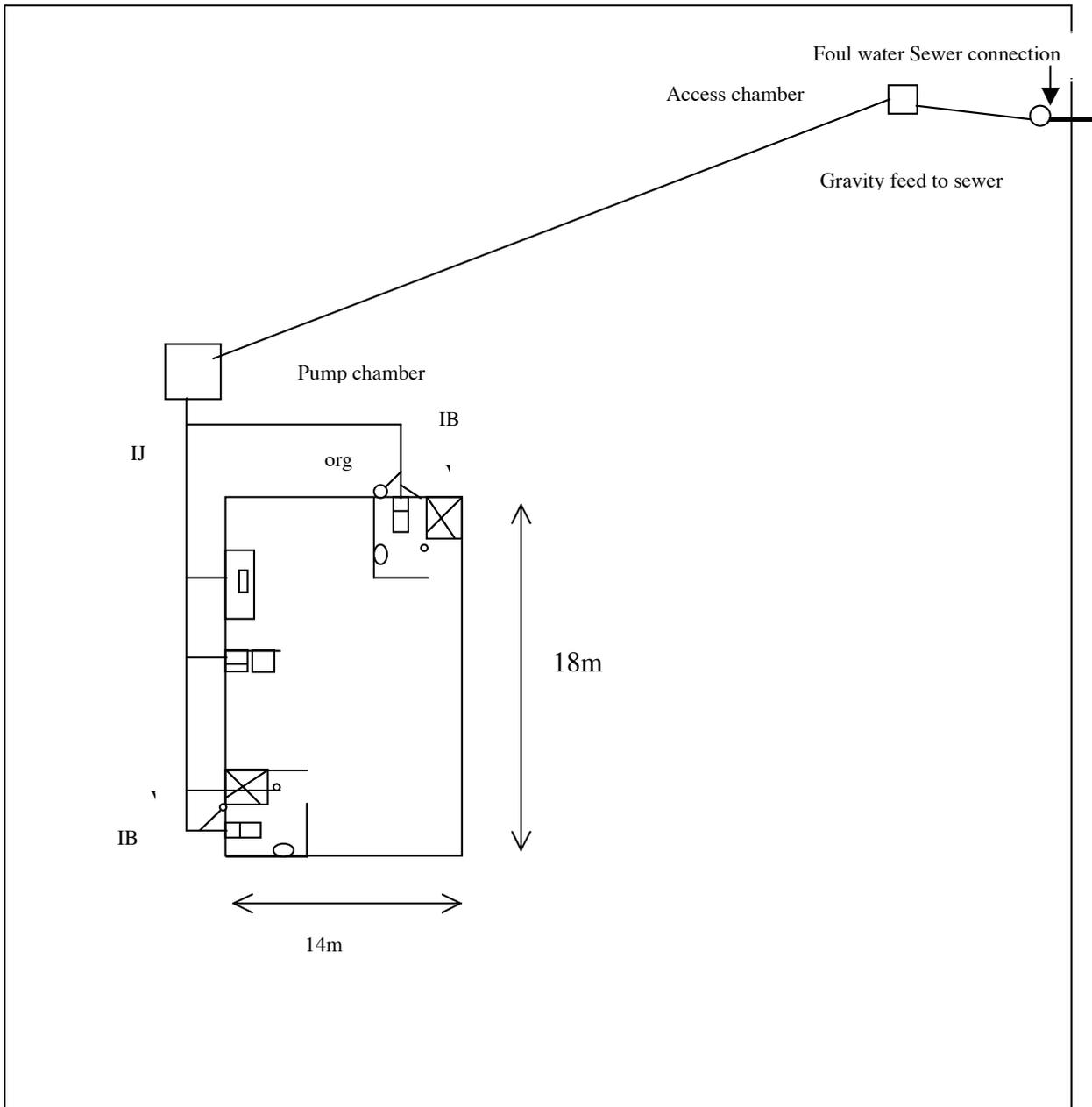
**ANSWER 6**



- 2 marks for effluent lines following contours (1 mark each)
- 1 mark for distribution box.
- 1 mark for septic tank at right level.
- 1 mark for FAI.
- 1 mark for inspection at septic tank.
- 1 mark for vent at head of drain.
- ½ mark each for inspection bends and junctions (2 marks)
- 1 mark for ORG.

**Total 10 marks**

**ANSWER 7**



- 1 mark for ORG
- 1 mark for vent
- 1 mark for inspection bends [half mark each inspection bend total 1 mark]
- 1 mark for inspection junctions [Half mark each total 1 mark].
- 3 marks for pumping station.
- 1 marks for access at boundary to gravity feed to sewer connection.
- 1 mark all connections comply with minimum standard.
- 1 mark all labelled.

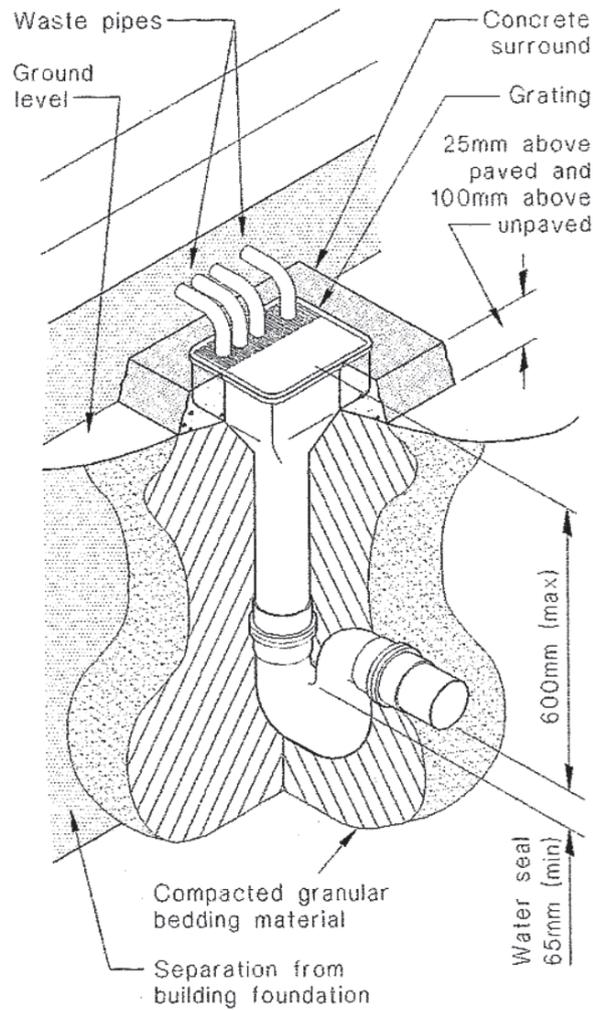
**Total 10 Marks**

## ANSWER 8

- (a) (i) Two flexible joints (1 mark)  
Not less than 600mm apart. (1 mark)
- (ii) The penetration to wall is to be made watertight. (1 mark)
- (b) Extraneous water (1 mark)  
Soil, sand, rock 1 mark (only one accepted)  
Contents of a septic tank (1 mark)  
Any other substance, the discharge of which would impede the operation of the sewer. (1 mark)
- (Any three 1 mark each) (3 marks)
- (c) (i) Under gully traps  
Under boundary traps  
Under all inspection junctions where a riser is brought to surface.  
Under all junctions and bends greater than DN 65 forming risers from the drain  
(Any three, 1 mark each) (3 marks)
- (ii) Flexible joint. (1 mark)

**Total 10 marks**

**ANSWER 9**



Concrete surround  
 Depth 600mm  
 Gully trap  
 100mm above ground  
 Separation from wall  
 Bedding material

(½ mark each) (3 marks)

(b) (i) 25 mm

(1 mark)

(ii) 100 mm

(1 mark)

(c) 80 mm

(1 mark)

**Total 6 marks**

## ANSWER 10

- (a) (i) Grease traps shall be provided for any waste pipe serving a sink or sinks where the foul water discharges to a soak pit.
- (ii) In buildings other than housing, grease traps shall be provided where waste water is likely to convey grease.

(1 mark each, 2 marks)

- (b) A chamber, with working space at ground level, through which the drain passes, either as an open channel or as a pipe incorporating an inspection point.

(2 marks )

- (c) Covering exposed or disturbed surfaces with vegetation or meshes.

Surface grading of sites and the direction of storm water flow paths through construction sites so that erosion is minimized.

Provision of sediment barriers along flow paths and water courses, such as silt fences, hay bales and porous stone filters.

Construction of temporary sediment traps or basins [usually near site boundaries]

(Any 3, 1 mark each) (3 marks)

**Total 7 marks**

## ANSWER 11

- (a) The Department of Labour or their representative (1 mark)

- (b) (a) G13 Foul Water (1 mark)

- (b) G14 Industrial Liquid Waste (1 mark)

- (c) It does not apply to foul water drainage systems where it is necessary to dispose of industrial wastes, chemical or toxic waste which cannot be discharged to a sewer without pre treatment.

(3 marks)

- (d) Age if under 20 years

The work they are to do (description)

Date commenced work

Hours of employment

Wages paid

Tax code

IRD number

(Any 4, 1 mark each) (4 marks)

**Total 10 marks**



