No. 9197

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, NOVEMBER 2009

DRAINLAYING

ANSWER SCHEDULE

ANSWER 1

(a)
- The type of usage likely to occur.
- The nature of the liquids to be conveyed.
- The nature of the ground and environment and the possibility of chemical attack there from.
- The physical and chemical characteristics of materials and products.
- The possibility of abrasion by solids in the flow or of chemical attack.
- The range of temperatures likely to discharge to the system.

(1 mark each, total 4 marks)

(b) When applied it softens or melts the surfaces enabling them to fuse together when brought in contact with each other [For joining uPVC pipes and fittings]

(2 marks)

(c) Must be either with bedding material compacted to achieve a density as near to the original soil density as possible
Or
With concrete.

(1 mark each, total 2 marks)

Total 8 Marks

ANSWER 2

(a)

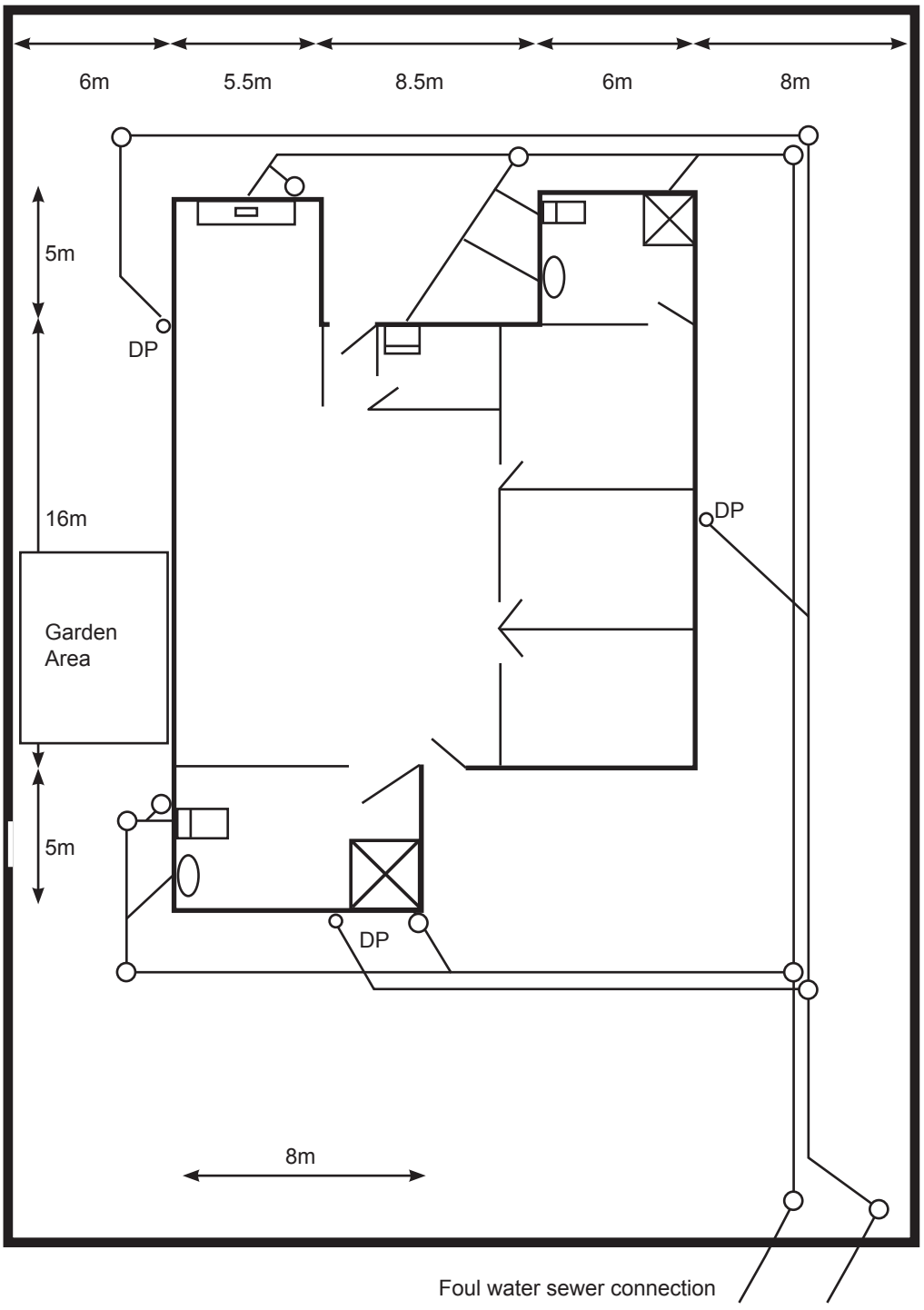
Materials	**Rate**	**Quantity**	**Cost**
Drainage pipe	$36.50/m	75m	2737.50
Inspection fittings	$48.00 each	3	144.00
Plain fittings	$21.50 each	3	64.50
Sub total			2946.00
Profit margin	17%		500.82
Sub total			3446.82
GST cost	12.5%		430.85
Total cost			3877.67

(½ mark per line, total 4 marks)

(b) 48.5m = 48500mm × 1.65% = 80025
80025 ÷ 100 = 800.25
Ans = 800.25mm (1 mark)

Total 5 Marks

QUESTION 3



Key

WC	
Sink	
Basin	
Tub	
Shower	
Downpipe	

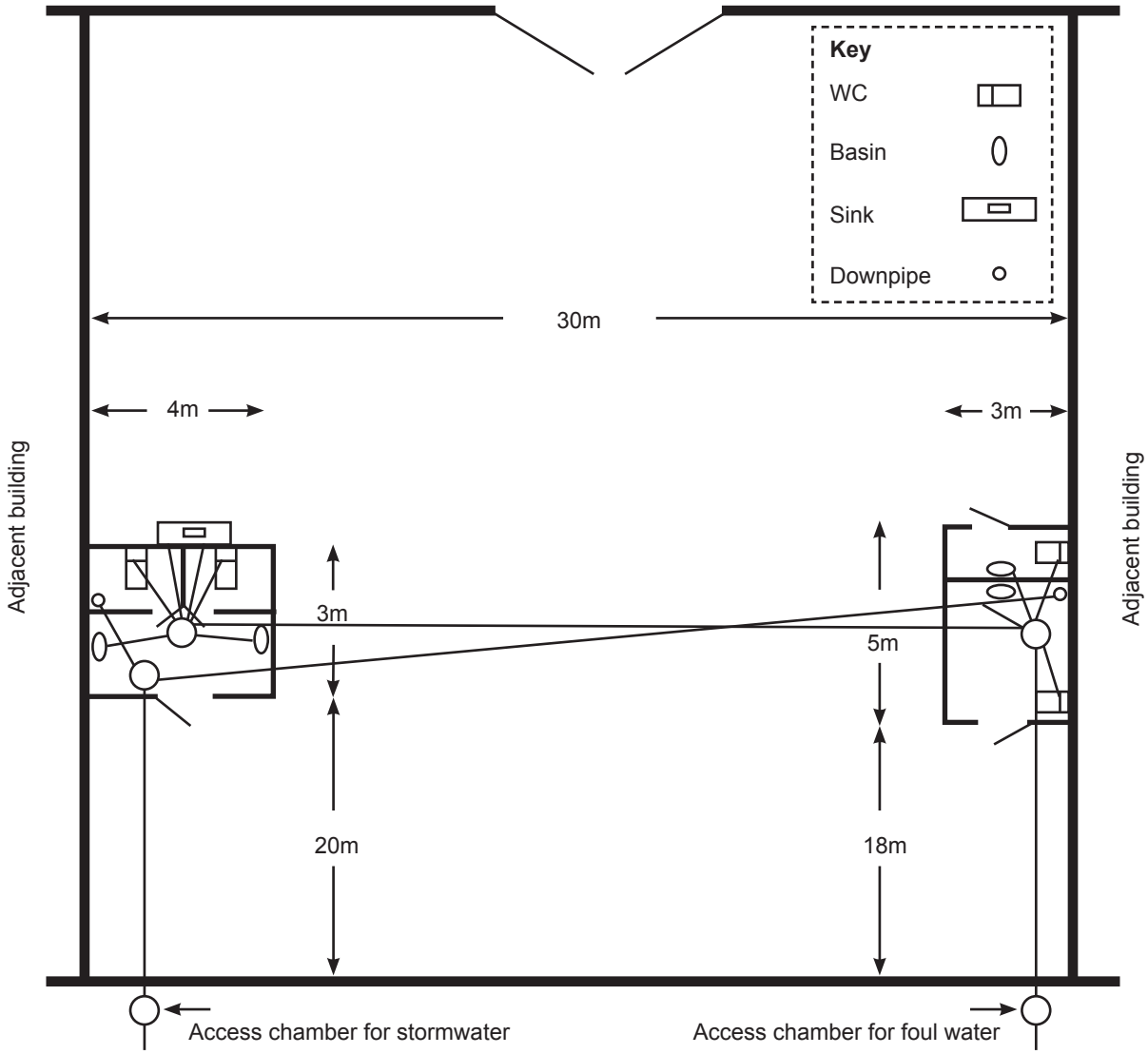
(½ mark each vent, total 1 mark)
(½ mark connection at boundary)
(1 mark ORG)
(1 mark minimum requirements)
(½ mark inspections, total 2 marks)

(½ mark inspection at boundary)
(1 mark all DP connected)
Total 7 marks

ANSWER 4

Left ablution block
½ mark inspection chamber foul water
½ mark for 2 basins to foul water chamber
½ mark 2 WC to chamber
½ mark vent from chamber
½ mark sink bench
Right ablution block
½ mark inspection chamber foul water
½ mark for 2 basins to foul water chamber
½ mark 2 WC to chamber
Storm water
½ mark each for chamber or rodding eye (Total1 mark)

Total 5 Marks



ANSWER 5

(a) (i) It must be installed on both the inlet and the outlet of the grease trap

(½ mark each, total 1 mark)

(ii) 3.000 m (1 mark)

(iii) To allow silt to be trapped in the bottom [where it can be removed later] and not enter the stormwater drain.

(2 marks)

(iv)
- Increase the stability of the ground and footings of buildings by inducing a more stable moisture regime
- Reduce foundation movement due to variations in the soil moisture content.
- Mitigate surface water ponding
- Reduce water logging of soils by lowering water tables
- Increase soil strength by reducing moisture content
- Prevent damage, where applicable, due to frost heave of subsoil.

(Any 3, 1 mark each, 3 marks)

(b) Cut end of pipe square.
Chamfer end of pipe.
Mark depth of socket on pipe (witness mark)

(2 out of 3 – 1 mark)

Clean inside of socket and end of pipe.
Clean ring.
Insert ring into groove with flap pointing inward

(2 out of 3 – 1 mark)

Apply lubricant to ring flap and to the pipe spigot.
Line up pipe(just into socket)
Push into socket so witness mark is just showing (allows for expansion)

(2 out of 3 – 1 mark)

(3 marks)

(c) (i) 25mm all around the pipe.

(1 mark)

(ii) Correctly bedding of pipe.
Prevents slumping and gives lateral support to prevent drain moving sideways.

(2 marks)

(iii)
- The gully riser must extend to floor level
- The gully riser must be sealed with a removable air tight cover.
- A DN 50 vent pipe branching from gully riser pipe or fitting to terminate with a grating at an external wall of building.
- Fixtures or appliances must not be connected to vent pipe.

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

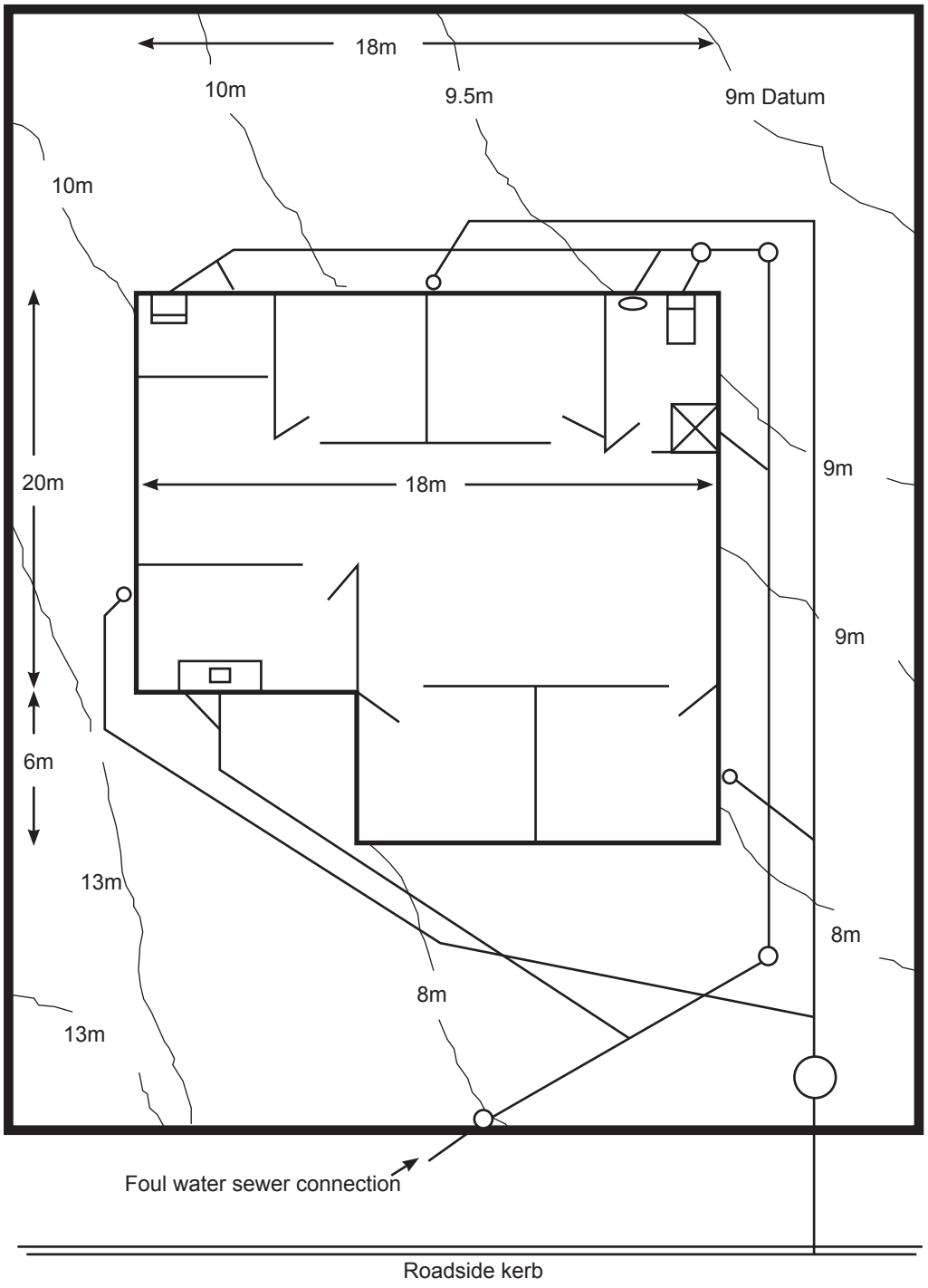
(d) (i) Reinforced concrete
(ii) 100mm
(iii) 75mm
(iv) 50mm

(½ mark each, 2 marks)

Total 18 marks

ANSWER 6

1 mark for retention tank in correct position
½ mark for all DP connected
½ mark for both vents Total 1 mark
½ mark for inspections Total 1 mark
1 mark for inspection at boundary
1 mark foul water run correctly
1 mark ORG **Total 6 marks**

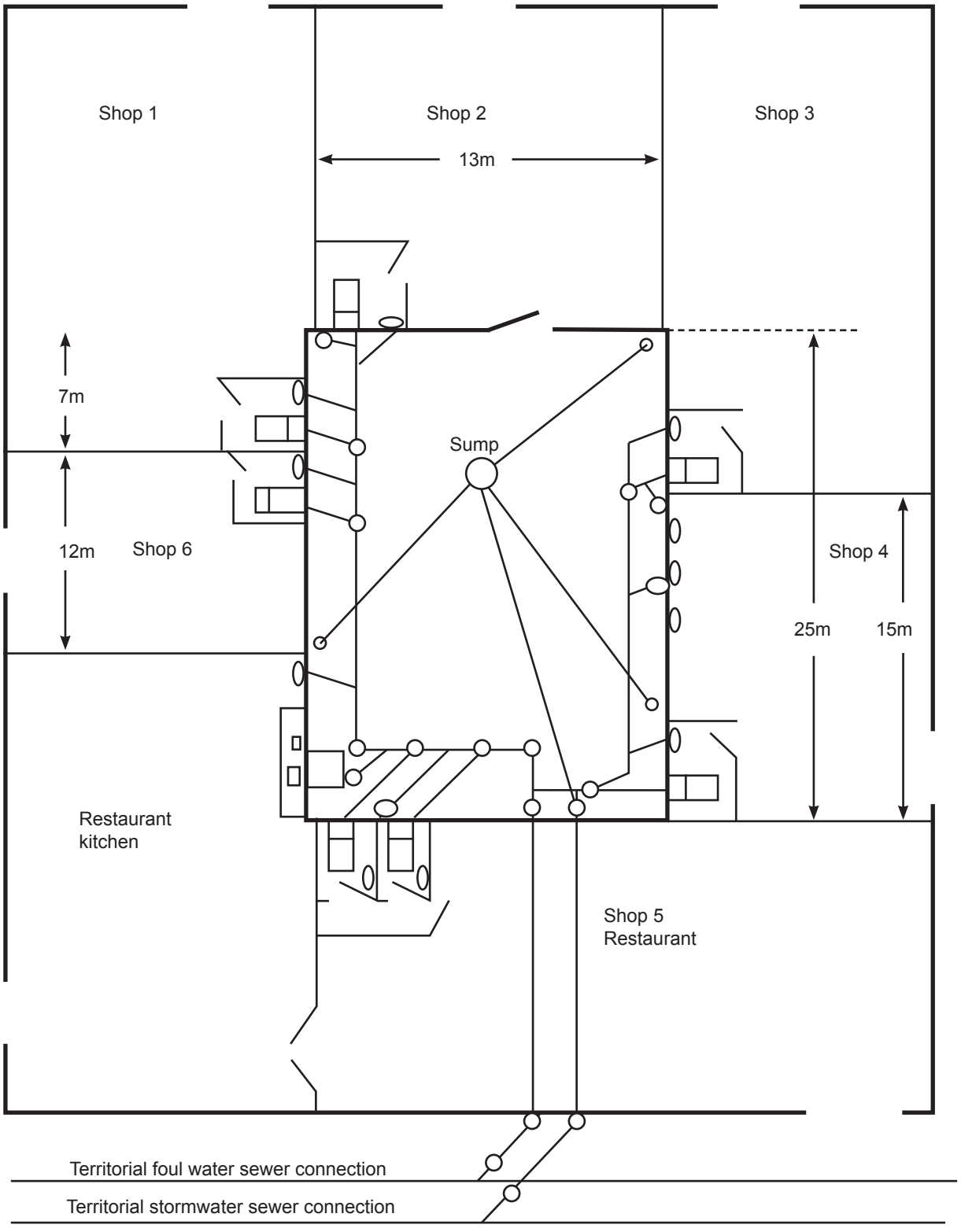


ANSWER 7

½ mark for all down pipes to sump
½ mark sump to territorial connection
½ mark for storm water inspections either side of building
½ mark inspection at territorial connection.

½ mark vent
½ mark for ORG
½ mark inspections on foul water line (max 2 marks)
½ mark for inspections as foul drain passes through building
1 mark for grease trap complete with inspections
½ mark inspection where foul drain joins sewer

Total 7 marks


Shop 1
Shop 2
Shop 3
13m
7m
12m
Shop 6
Sump
Shop 4
25m
15m
Restaurant
kitchen
Shop 5
Restaurant
Territorial foul water sewer connection
Territorial stormwater sewer connection

ANSWER 8

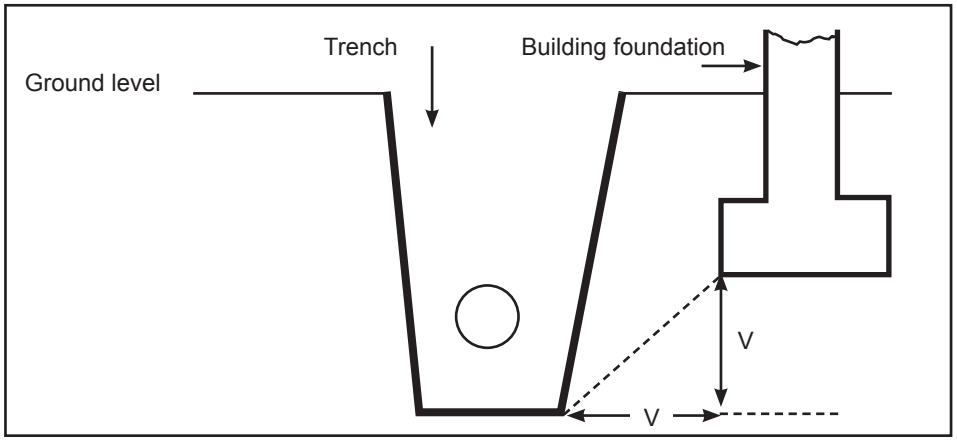
(a) (i) Distance from base of trench to base of foundation is same as from side of base of trench to side of foundation.

May be expressed as v = v or 3v = 3v. (2 marks)

(ii) Distance away must increase 3 times (or shown as 3v) (1 mark)

(iii) Professional engineering advice must be obtained prior to works start. (1 mark)

(iv)



V is equal to the vertical distance between the base of foundation and bottom of trench

(2 marks)

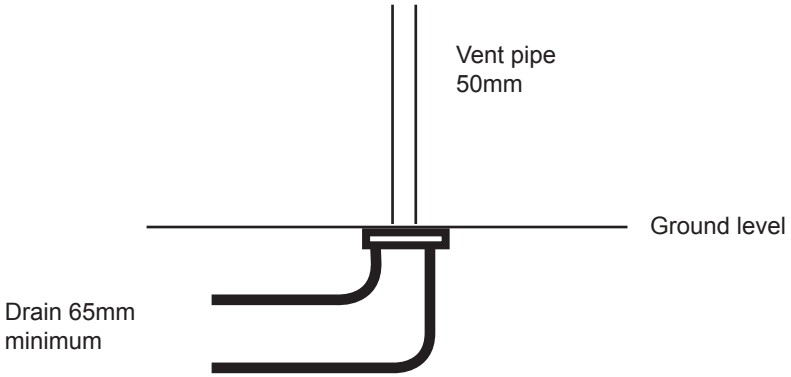
(b) (i) Gases heavier than air

(1 mark)

(ii) Oxygen levels
Toxic gas levels
Explosive gas

(3 marks)

(c) ½ mark each measurement and 1 mark for drawing



(2 marks)

(d) (i) 10m (1 mark)

(ii) At the upstream end. (1 mark)

Total 14 marks

ANSWER 9

(a) (i)
- Unjustifiably dismissed
- You have been disadvantaged in your employment because of some unjustifiable action of your employer.
- You have been subjected to racial harassment because of colour, ethnicity or nationality, marital status, age or religion.
- Sexually harassed at work
- Subjected to duress because of membership of an employees organisation.

(Any 5, 1 mark each, 5 marks)

(ii) 90 days (1 mark)

(iii) It may be referred to the Employment Relations Authority for mediation and or adjudication.

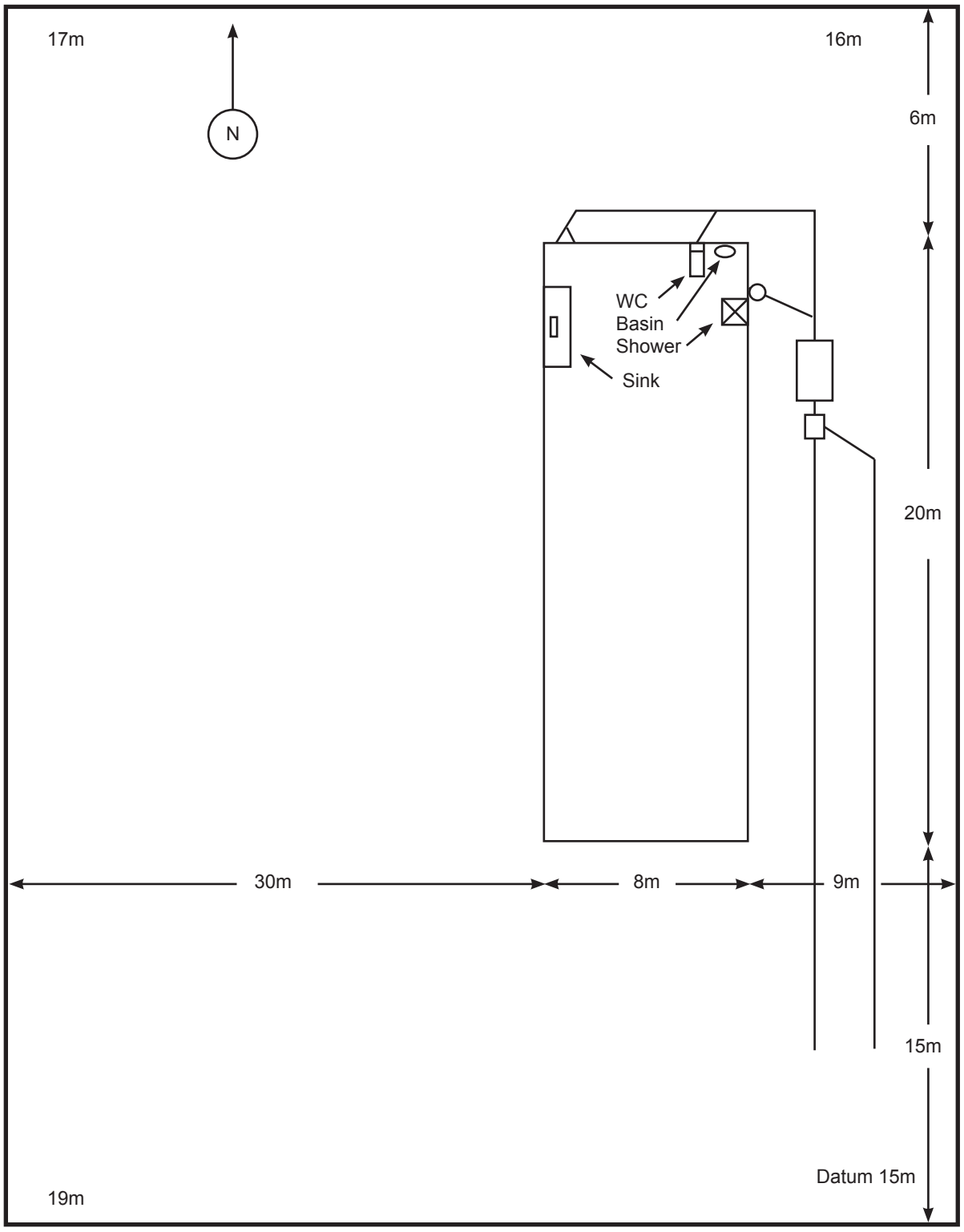
(1 mark)

(b) Acceptable solutions – Give examples of materials, components and construction methods which if used will result in compliance with the NZ Building code. In most cases quote documents such as AS/NZS 3500.2 Sanitary plumbing and drainage.

Verification methods - Provides methods by which an alternative solution may be evaluated.

(4 marks)

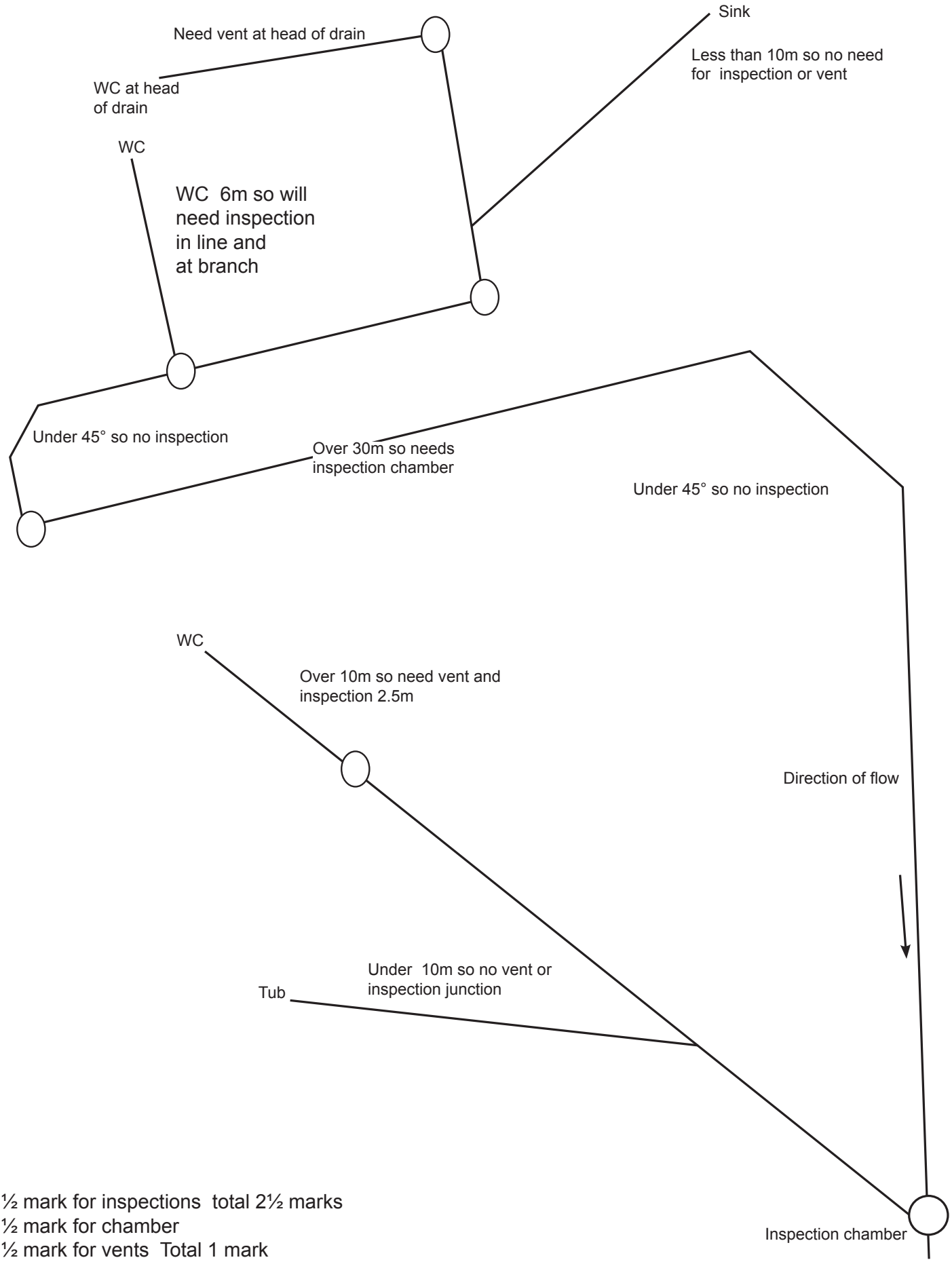
ANSWER 10



Marks 1 mark septic tank in correct position
1 mark effluent lines correct
1 mark ORG
1 mark inspections on drain
1 mark distribution box
½ mark -- Fai – inspection at septic tank

Total 6 marks

ANSWER 11



½ mark for inspections total 2½ marks
½ mark for chamber
½ mark for vents Total 1 mark

Total 4 marks

ANSWER 12

(a)
- Effluent pipes installed in a timber frame at ground level and mounded over with sand. Plants are planted into the sand (shrubs, flax) the plants "transpire" (suck up) the effluent, the mounding of sand allows evaporation to take place and any available soakage is used. Hence evapo-transpiration bed.
- Pumped effluent trickle feeds through outlets giving controlled plant feeding (or soakage).
- Pump to an elevated area and gravity trickle fed to plants
- Aerated spray in an isolated unpopulated area with limited public access.

(Any three, 2 marks each, total 6 marks)

(b) Cast iron drains that have lead joints. (1 mark)

(c)
- Flexible – allows for ground movement or expansion/contraction.
- Water-tight – does not leak. (½ mark each, 1 mark)

Total 8 marks