education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

CIVIL TECHNOLOGY

FEBRUARY/MARCH 2010

MEMORANDUM

MARKS: 200

This memorandum consists of 16 pages.

QUESTION 1 **LO 3 AS 1,2,3,5,7,10**

1.1 1.1.1 False ✓ (1)

1.1.2 False ✓ (1)

1.1.3 True ✓ (1)

1.1.4 False ✓ (1)

1.1.5 False ✓ (1)

1.2 1.2.1 Angle grinder (1)

1.2.2 Steel
Aluminium
Copper
Concrete
Bricks (Masonry)
Plastics
Clay tiles (5)
ANY FIVE OF THE ABOVE OR OTHER ACCEPTABLE ANSWERS

1.2.3 Part 1 – Blade ✓
Part 2 – Safety guard ✓ (2)

1.2.4 The locking pin locks the axel to enable the operator to loosen the locking nut when replacing blades. ✓ (1)

1.2.5
- Always ensure that the safety guard is in place.
- Always ensure that the blade is properly secured.
- Use safety goggles when using the machine.
- Use ear protection when using the machine.
- Use protective clothing when operating the machine.
- Keep the electric cord away from revolving parts of the machine.
- Use a dust mask (depending on material being cut).
- Use the approved blade for the type of work.
- Never use a chipped or cracked blade on the machine.
- Avoid working in wet conditions

(3)

ANY THREE OF THE ABOVE OR OTHER ACCEPTABLE ANSWERS

1.3

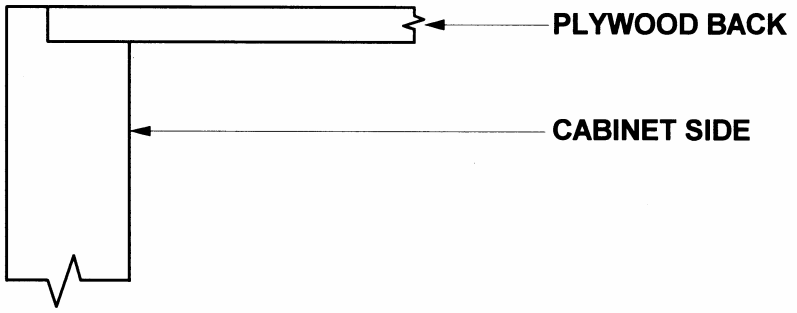
METAL	PROPERTIES	USES
Aluminium	Castable, malleable, ductile, soft, light, non-corrosive ✓	Doors, windows, screws, face plate ✓
Copper	Good conductor of heat and electricity, malleable, tough ✓	Electrical wire, face plates, screws, nails, pipes. ✓

(4)

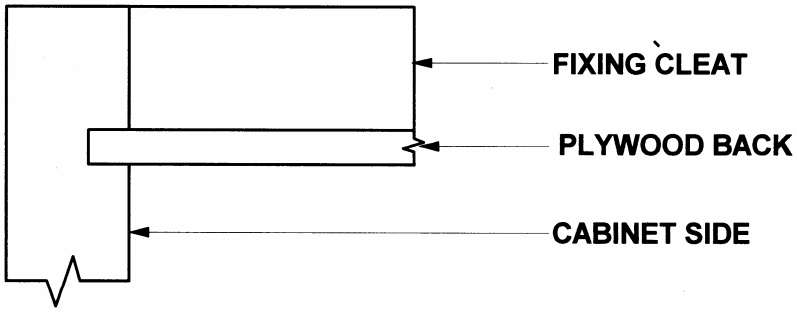
ANY ONE OF THE ANSWERS IN EACH GRID IN THE TABLE OR ANY OTHER ACCEPTABLE ANSWER

1.4 1.4.1 Masonite (hardboard), Chipboard, Plywood or Supawood. (1)
ANY ONE OF THE ABOVE OR OTHER ACCEPTABLE ANSWER

1.4.2



Sketch = 1
Construction = 2
Labels = 2
5



Sketch = 1
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Labels = 2
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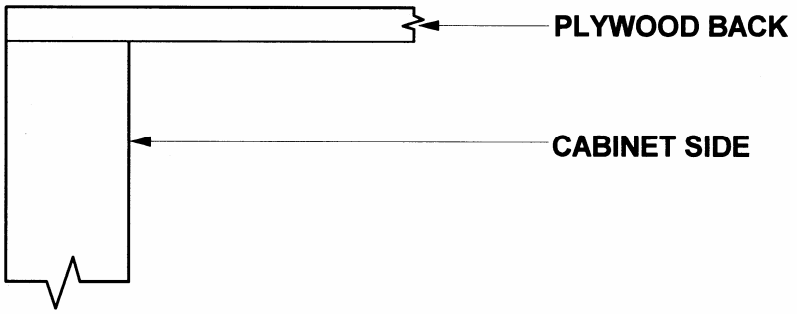


Sketch = 1
Construction = 2
Labels = 2
5

ANY ONE OF THE ABOVE (5)

1.5 1.5.1 English bond ✓ (1)

1.5.2 Cross junction ✓ (1)

1.5.3
- In a large floor area which has to be divided into smaller rooms.
- In libraries where study cubicles are required.
- In alterations in old buildings where English bond were commonly used (1)

ANY ONE OF THE ABOVE ANSWERS OR ANY OTHER ACCEPTABLE ANSWER

[30]

QUESTION 2 **LO 3 AS 1,3,5,7,10**

2.1 2.1.1

- Location of the stand
- Size of the stand
- Are the municipal services available
- Servitude through the property
- Air pollution
- The view
- Type of soil
- The moisture content of the soil
- Main road
- Access road
- Noise
- Sunlight (5)

ANY FIVE OF THE ABOVE OR OTHER ACCEPTABLE ANSWERS

2.1.2

- The area must be fenced in.
- The area must be kept clean.
- The building area must be well lit at night.
- Covered walkways must be erected under cranes.
- Hard hats and protective clothing must be worn.
- Sufficient and unambiguous notices must be put up on the building site.
- No unauthorised persons are allowed on site.
- Where dangerous excavation is in progress, it must be effectively enclosed.
- Scaffolding in use must stand firm and kept clean.
- Materials which are not immediately in use, must be neatly stored away.
- Control of delivery and other vehicles. (5)

ANY FIVE OF THE ABOVE OR OTHER ACCEPTABLE ANSWERS

2.2

CAVITY WALLS	SOLID WALLS
• It provides good sound insulation. • It provides good thermal (heat and cold) insulation. • It prevents moisture from entering the inner walls of the building.	• It is cheaper to construct than a cavity wall. • It is quicker to erect. • Does not require specialised craftsmanship to erect. • It uses less space (percentage of floor area taken up by walls) and gives more floor area between partition walls.

(4)

ANY TWO OF THE ABOVE FROM EACH COLUMN OR OTHER ACCEPTABLE ANSWERS

2.3 Learners' responses must be evaluated against recommendations based on advantages, disadvantages and climatic conditions of the area that the building is to be erected in. (1)
THIS IS AN OPEN-ENDED QUESTION.ANY ACCEPTABLE ANSWER

2.4
1. Stringer ✓
2. Cleats/Riser board ✓
3. Support/Post/Prop/Strut ✓
4. Soffit boards ✓
5. Bearer ✓
6. Brace ✓
7. Folding wedges ✓
8. Floor ✓ (8)

2.5
1 – Common brick ✓
2 – Screed ✓
3 – Concrete ✓
4 – Hard core ✓
5 – Glass ✓ (5)

2.6 Distance = (top stage line reading – bottom stage line reading) x 100
✓ ✓ ✓
= (1,525 – 1,475) x 100
✓
= 0,05 x 100
✓
= 5 metres ✓ (6)

2.7 2.7.1 Piling forms the deepest part of the foundation and helps to
✓ ✓
distribute the weight of a building onto deeper firmer ground. (2)

✓
2.7.2 Underpinning is a temporary support that is used to support a part
✓
of a structure when maintenance or alteration needs to be done to a building. (2)

2.8
- A scaffold must never be left in an unsafe state.
- It must never be moved whilst work is being done on it.
- The frame must be made from the same material throughout.
- Remove or cover all sharp edges or corners.
- Always attach free standing scaffolds to buildings.
- Safety harnesses must be worn whilst working on suspended scaffolding.
- Ensure that working surfaces are safe.
- Never over-load a scaffold.
- Remove refuse and unneeded tools from scaffolds. (2)

ANY TWO OF THE ABOVE OR OTHER ACCEPTABLE ANSWERS

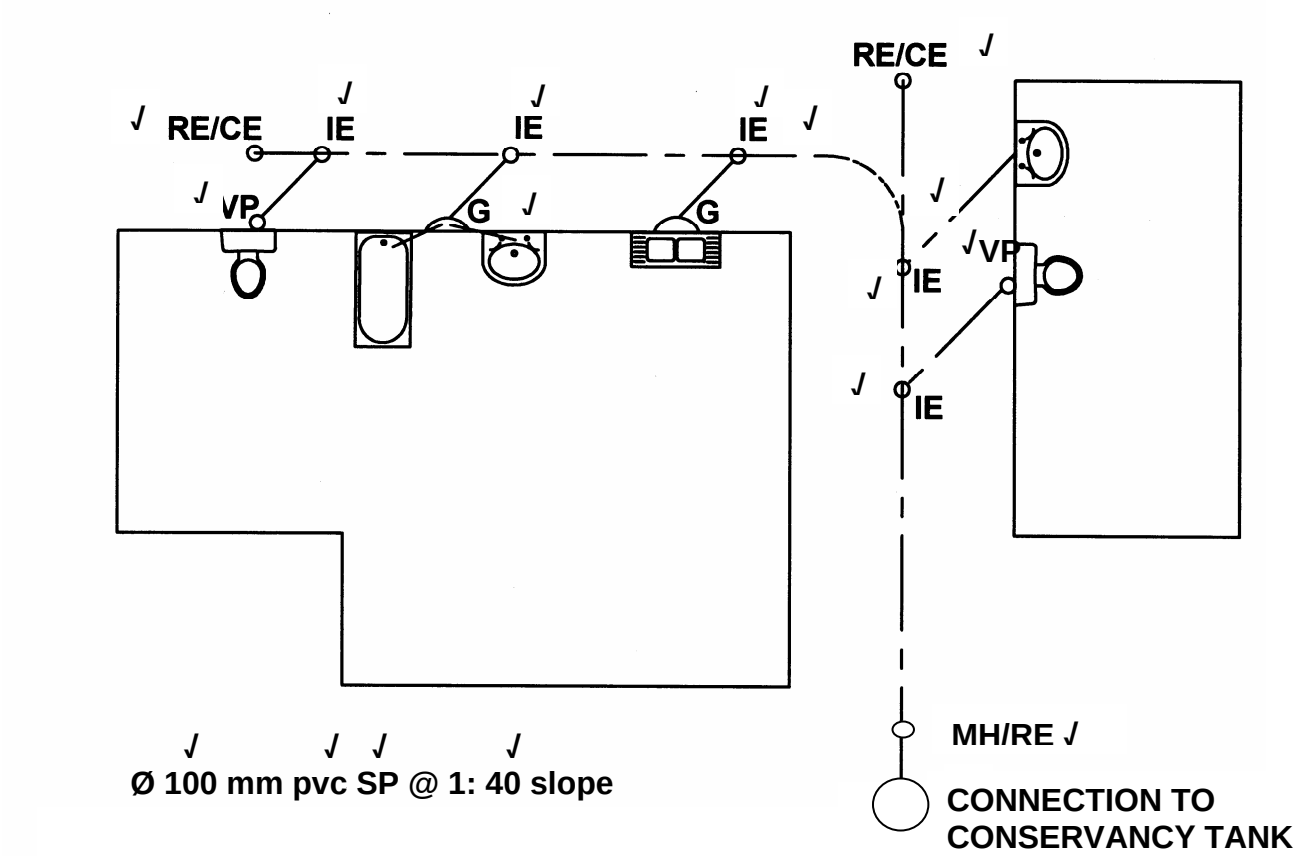
[40]

QUESTION 3 **LO 3 AS 5,8,10**

3.1
- Use SABS-approved materials
- The heating panel must face north
- Insulate all hot water pipes
- There should be no shade or shadows over the panels
- Circulation pipes must be as short as possible
- Cold water should be supplied from a storage cylinder or storage tank (1)

ANY ONE OF THE ABOVE OR OTHER ACCEPTABLE ANSWER

3.2 3.2.1



RE (Rodding eye)	2
IE (Inspection eye)	5
G (Gulley)	1
VP (Vent pipe)	2
Description of pipe	4
Manhole/ RE near connection to conservancy tank	1
Correct line type for drain	1
Total	16

(16)

3.2.2

- Rodding eye / cleaning eye
- Inspection eye
- Gulley
- Manhole

(1)

ANY ONE OF THE ABOVE OR OTHER ACCEPTABLE ANSWER

3.3

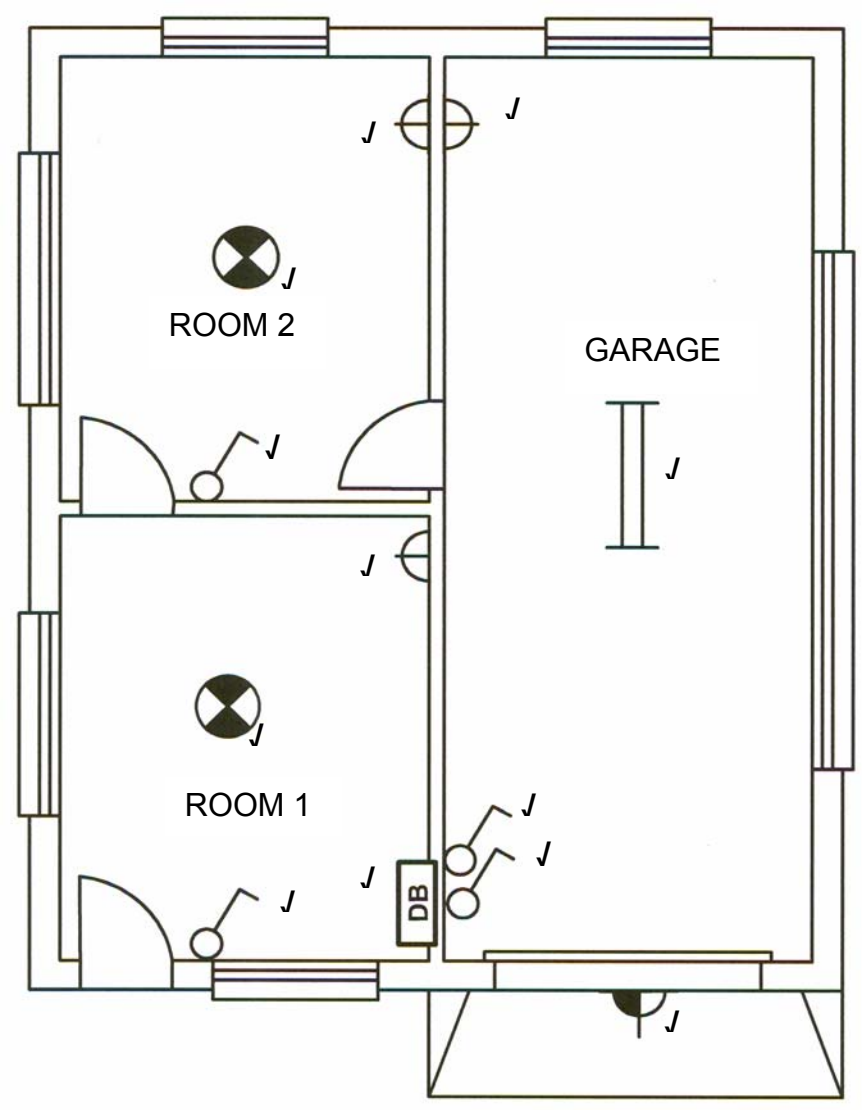


FIGURE 3.3

The following symbols will also be correct:
Light : X or O
Power socket/socket outlet : ⏚

(12)
[30]

QUESTION 4 **LO 3 AS 2,5,9**

4.1 4.1.1
- Base-plate ✓
- Frustum (form/cone) ✓
- Tamping rod ✓ (3)

4.1.2 The slump (1)

4.2
- Clean the surface to remove any concrete that may be stuck to it.
- Plug all holes that will not be used for the next operation.
- Coat with a layer of shutter or form oil.
- Store in a manner that will not allow it to twist and preferably under shelter. (1)

ANY ONE OF THE ABOVE OR OTHER ACCEPTABLE ANSWER

4.3 Learner's responses must be evaluated against recommendations based on advantages, disadvantages, sizes, availability, finishes, workability and cost of melamine boards.

EXAMPLE :
- Melamine boards are available in a wide range of colours and textures.
- Melamine boards are readily available at a reasonable cost.
- It is easy to work with melamine boards, etc. (2)

THIS IS AN OPEN-ENDED QUESTION. ANY TWO ACCEPTABLE ANSWERS

4.4 4.4.1

A	B	C	D
			Inside lengths of walls: 6 000 mm – 2/220 mm = 5 560 mm ✓ **OR** 6 000 mm – 440 mm = 5 560 mm 3 000 mm – 2/220 mm = 2 560 mm ✓ **OR** 3 000 mm – 440 mm = 2 560 mm
1/	✓ 5,56 2,56	✓ 14,23 m²	Area of floor
1/	0,250 0,250✓	✓ 0,0625 m²	Area of tiles
1 ✓ 0,0625 /	14,23	✓ 227,68	Number of tiles 14,23 ÷ 0,0625
1/	227,68 0,05✓	✓ 11,38	5% waste = 11,38 tiles
			Total number of tiles 227,68 + 11,38 = 239,06 = 240 ✓

(11)

4.4.2

A	B	C	D
			Inside lengths of walls: ✓ 6 000 mm – 2 / 220 mm = 5 560 mm 3 000 mm – 2 / 220 mm = 2 560 mm ✓ There are 2 inside walls with a length of 5 560 mm and 2 walls with a length of 2 560 mm
2/ 2/	5,560 2,560	11,120 m✓ 5,120 m✓ 16,24 m	The total length of the inside walls is 11,120 + 5,120 = 16, 240 m ✓
1/	16,24 2,7	43,848 m²✓	Area to be painted: The wall is 2 700 mm high.
1/	2,0 0,91✓	1,82 m² ✓	Minus door opening: The door is 2 000 mm high and 910 mm wide.
	0,9 0,6✓	✓ 0,54 m²	Minus window opening: Size of window: 900 mm x 600 mm Total deduction 1,82 + 0,54 = 2,36 m² ✓ Total area of wall to be painted is 43,848 – 2,36 m² 41,49 m² ✓

(12)
[30]

QUESTION 5 **LO 3 AS 5,6**

5.1 5.1.1 m ✓
5.1.2 Pascal ✓
5.1.3 kg ✓
5.1.4 Newton ✓
5.1.5 N.m ✓ OR Nm (5)

5.2 Area of triangle = ½ base x height
= ½ 30 mm x 60 mm ✓
= 900 mm² ✓

Area square = l x b
= 40 mm x 40 mm ✓
= 1 600 mm² ✓

Total area = 900 mm² + 1 600 mm² ✓
= 2 500 mm² ✓

Take moments around AA

2 500 mm² x AA = (900 mm² x 60) + (1 600 mm² x 20)
✓ ✓ ✓ ✓
= 54 000 mm² + 32 000 mm²
= 86 000 mm² ✓
AA = $\frac{86\,000\ mm^2}{2\,500\ mm^2}$ ✓ ✓
= 34,4 mm ✓

OR

PART	AREA (A)	Y	AREA Y (Ay)
1	½ x b x h = ½ x 30 x 60 = 900	20 + 40 = 60 ✓	54 000 ✓
2	L x b = 40 x 40 = 1600	20 ✓	32 000 ✓
Total	2 500		86 000 ✓

$X = \frac{\sum A\,y}{\sum A}$
$= \frac{86\,000}{2\,500}$ ✓ ✓
= 34,4 mm ✓

OR

Position of centroid = $\frac{(A1 \times d) + (A2 \times d)}{\text{Total area}}$
✓ ✓
$= \frac{(1\,600 \times 20) + (900 \times 60)}{2\,500}$ ✓
✓ ✓
$= \frac{32\,000 + 54\,000}{2\,500}$

$= \frac{86\,000}{2\,500}$ ✓✓

= 34, 4 mm ✓

(14)

5.3 5.3.1 Strut ✓
5.3.2 Strut ✓
5.3.3 Strut ✓
5.3.4 Tie ✓
5.3.5 Tie ✓
5.3.6 Strut ✓ (6)

5.4

5.4.1

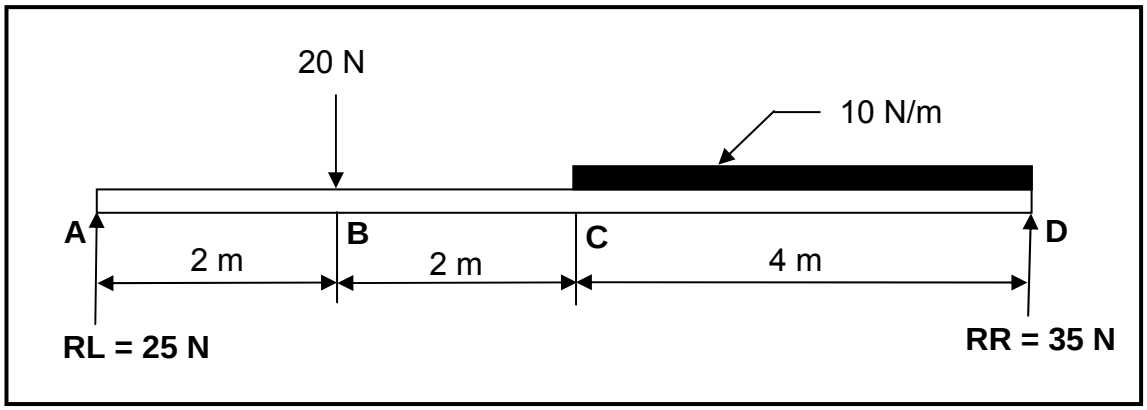
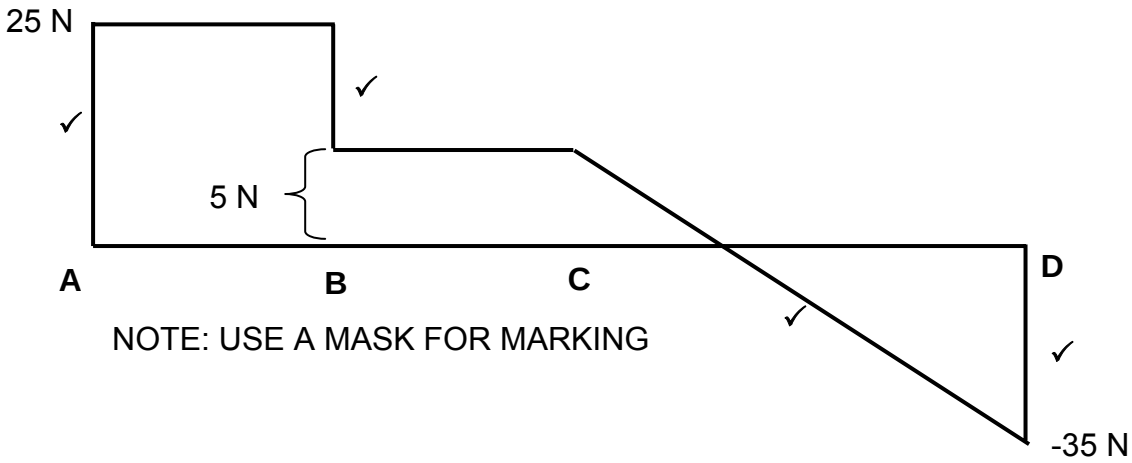


FIGURE 5.4



NOTE: USE A MASK FOR MARKING (4)

5.4.2 SFb = 5 N ✓ (1)
[30]

QUESTION 6 **LO 3 AS 4,5**

6.1

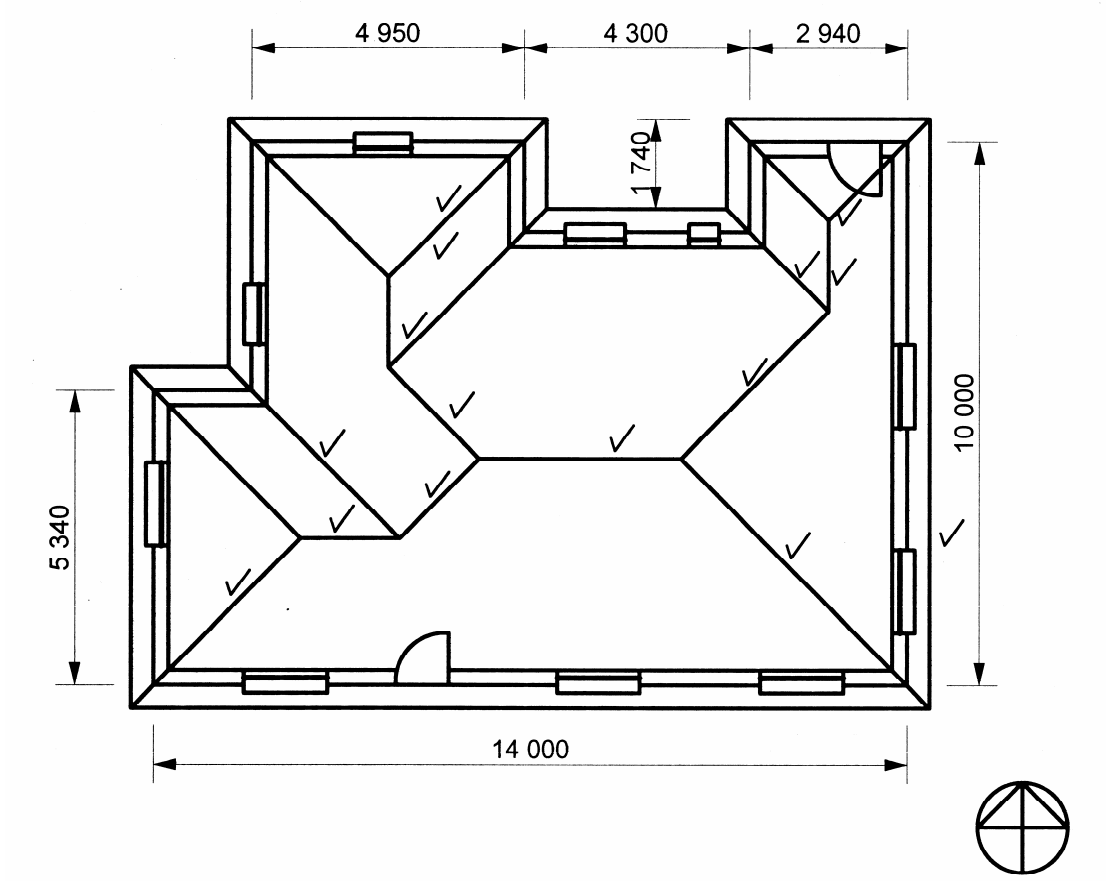


FIGURE 6.1

Ridges	11	
Valleys	3	
Overhang	1	
Total	**15**	

(15)

6.2

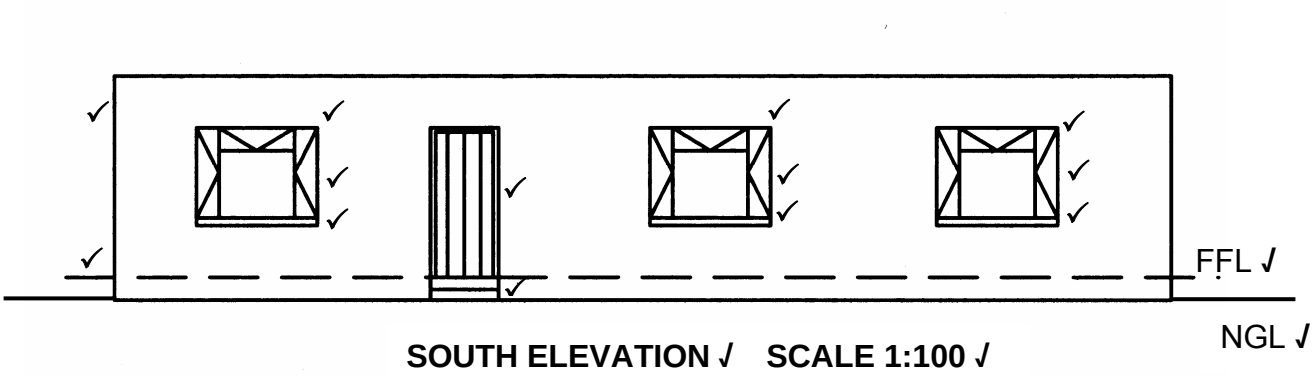


FIGURE 6.2

Correctness of:	Mark Alocation
Height of walls	1
Height of FFL	1
Position of windows	3
Opening parts of window	3
Window sills	3
Position of door	1
Step at door	1
Labels correctly indicated:	
NGL	1
FFL	1
Scale: 1:100	1
South Elevation	1
Total	**17**

(17)

6.3

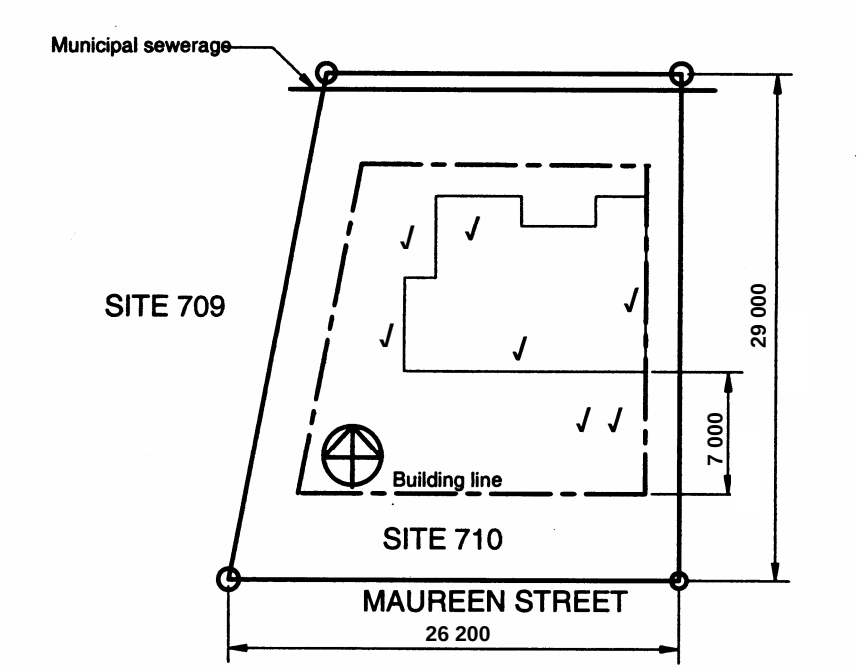


FIGURE 6.3 SCALE 1:250 (8)

NOT DRAWN TO SCALE

NOTE:

Provincial moderators and chief markers may accept alternative answers provided they can verify that such answers are indicated in reference material relevant to Civil Technology used in the province. **[40]**

TOTAL: 200