



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2011

**CIVIL TECHNOLOGY
MEMORANDUM**

MARKS: 200

This memorandum of 8 pages.

QUESTION 1 CONSTRUCTION PROCESS

- 1.1 Weight of roof (1)
- 1.2 A King post
 B Rafter
 C Strut
 D Hanger
 E Tie beam (5)
- 1.3 Bolts and nuts
 Gang nail plate (2)
- 1.4 To join roof truss parts together, truss spacing stays the same distance apart (2)
- 1.5 114 mm x 38 mm (2)
- 1.6 Machines must be fitted with safety guards
 Protective clothing and equipment must be supplied to workers
 Workers must be trained to work on machines
 Workplace must be clean
 No smoke/gasses that can cause diseases (Any 3) (3)
- 1.7 1.7.1 Corrugated iron (1)
 1.7.2 Rafter (1)
 1.7.3 Truss (1)
 1.7.4 Brandering (1)
 1.7.5 Ceiling board (1)
 1.7.6 Cornice (1)
- 1.8 Overalls
 Gloves
 Apron
 Boots
 Safety glasses
 Gas masks
 Helmets (Any 4) (4)
- 1.9 CO₂/Dry chemical fire extinguisher (Any 1) (1)
- 1.10 Keep tools with sharp points always from body when carrying it.
 Tools must be kept sharp.
 When working with tool keep hands behind cutting surface.
 Report defects and rectify immediately. (4)

[30]

QUESTION 3 CIVIL SERVICES

- 3.1 • Water flow into a warm water cylinder which is controlled by a ball valve.
 • Electricity is used to heat the element which heats the water.
 • A built-in thermostat regulates the temperature as required.
 • Copper pipes convey the warm water to taps where needed (4)
- 3.2 • The extent of exposure to the sun
 • Time of year
 • Amount of cloud coverage
 • Amount of daylight
 • The time of the day (Any 4) (4)
- 3.3 Bib taps are used at draw-off points such as sinks and baths.
 Stop taps are used on the water supply line where it can be turned off when necessary such as storage tanks and geysers. (2)
- 3.4 Pitch Fibre drain pipes
 Cement fibre drain pipes
 Cast iron drain pipes
 PVC drain pipes (4)
- 3.5 • A French drain is a trench which is dug out more or less 1,6 m – 2,5 m and 0,8 m wide.
 • It is filled with stones and covered with corrugated iron sheets and a layer of soil.
 • Soiled water flows into the French drain where it is absorbed into the ground. (4)
- 3.6 Easy to do inspections at manhole
 Easy to clean blockages (2)
- 3.7 Green and yellow Earth (marked E)
 Brown Live (marked L)
 Blue Neutral (marked N) (6)
- 3.8 Clean energy/no gasses or waste material
 Wind turbines require less maintenance (2)
- 3.9 Prevents bad smells in house (1)
- 3.10 P-trap
 S-trap (Any 1) (1)

[30]

QUESTION 4 MATERIALS

- 4.1 Volume for concrete driveway
 $= 3 \text{ m} \times 8 \text{ m} \times 0,1 \text{ m}$
 $= 2,4 \text{ m}^3$ (5)
- 4.2 Concrete handles easily
 Concrete is clean and hygienic
 Concrete has a low maintenance cost
 Concrete has a long life (durable)
 Concrete is not affected by water
 A smooth finish can be obtained
 Concrete can be made watertight (Any 5) (5)
- 4.3 4.3.1 Copper pipes (1)
 4.3.2 Slump test (1)
 4.3.3 Good (1)
 4.3.4 Pine wood (1)
 4.3.5 PVA-glue (1)
 4.3.6 Brick ties (1)
- 4.4 Linseed oil putty
 Wood moulding & panel pins (2)
- 4.5
 5 x Pillars $0,22 \text{ m} \times 2 \text{ m}$ $2,2 \text{ m}^2$ 1xpillar- $0,22 \text{ m} \times 2 \text{ m} = 0,44 \text{ m}^2$
 $= 0,44 \text{ m} \times 5 \text{ m}$ 5 pillars- $0,44 \text{ m} \times 5 = 2,2 \text{ m}^2 - 100 \text{ bricks}$
 for double wall $= 2,2 \text{ m}^2 \times 100 = \underline{220 \text{ bricks}}$
- 4 x Halfbrick wall $3 \text{ m} \times 1,5 \text{ m}$ 18 m^2 1 x halfbrick wall $= 3 \text{ m} \times 1,5 \text{ m} = 4,5 \text{ m}^2$
 $\times 5$ $4,5 \text{ m}^2 \times 4 = 18 \text{ m}^2 \times 50 \text{ bricks} = \underline{900 \text{ bricks}}$
- Total 900 bricks + 220 bricks = 1 120 bricks needed
 (12)
[30]

QUESTION 5 APPLIED MECHANICS

<p>5.1 around A</p> <p>L.O.M = R.O.M</p> <p>$(B \times 8m) = (20N \times 2m) + (40N \times 4m)$</p> <p>$B \times 8m = 40N/m + 160N/m$</p> <p>$B = \frac{200 \text{ N/m}}{8 \text{ m}}$</p> <p>$B = 25 \text{ N}$</p>	<p>around B</p> <p>R.O.M = L.O.M</p> <p>$(A \times 8m) = (40N \times 4m) + (20N \times 6m)$</p> <p>$A \times 8m = 160N/m + 120N/m$</p> <p>$A = \frac{280 \text{ N/m}}{8 \text{ m}}$</p> <p>$A = 35 \text{ N}$</p>	(8)
---	---	-----

5.2 5.2.1 ON ANSWER SHEET (9)

5.2.2 ON ANSWER SHEET (9)

5.3 Stress = $\frac{\text{force}}{\text{Cross-section area}}$

= $\frac{10 \text{ kN}}{25 \times 25}$

= $\frac{10 \times 10^3 \text{ N/mm}^3}{252}$

= 16 N/mm^2

(4)

[30]

QUESTION 6 GRAPHICS AND COMMUNICATION

6.1 See ANSWER SHEET (25)

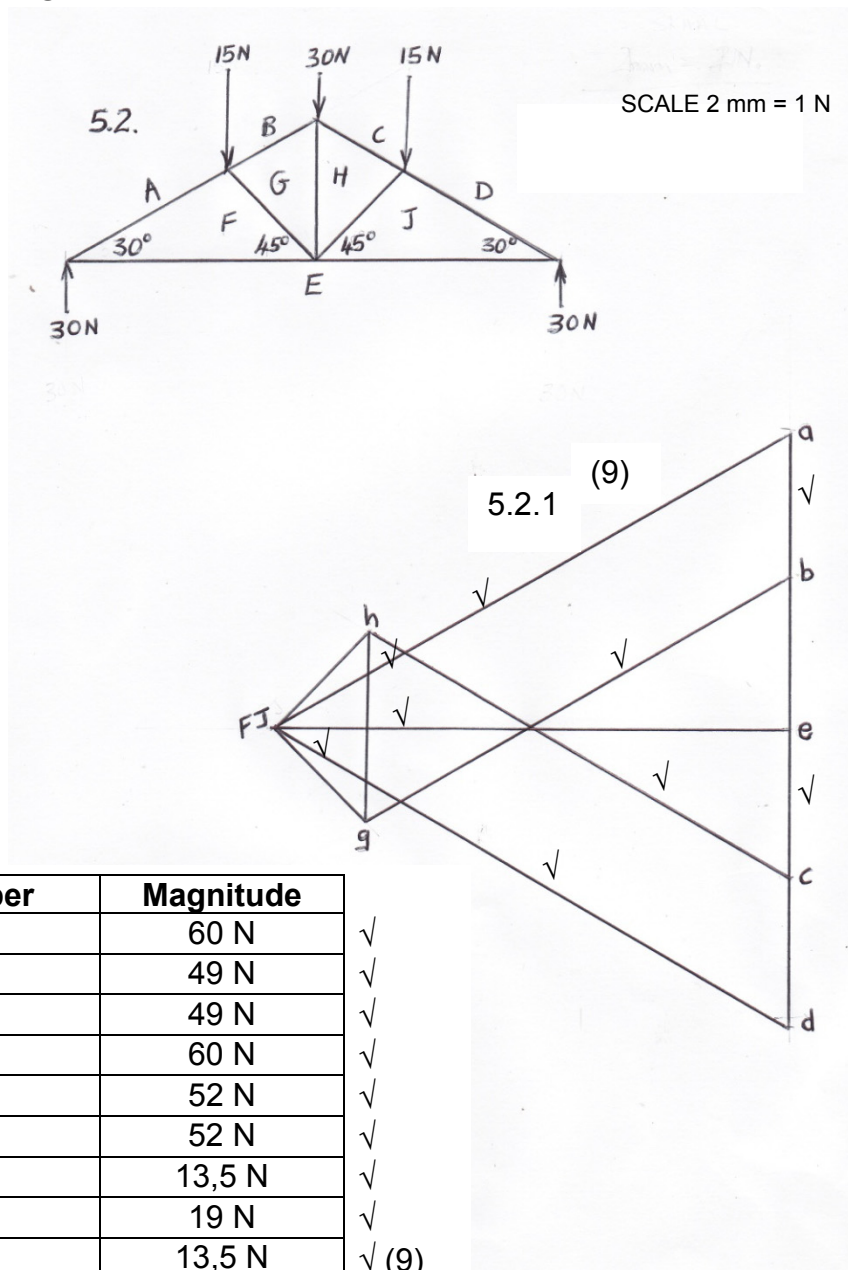
6.2 See ANSWER SHEET (15)

[40]

TOTAL: 200

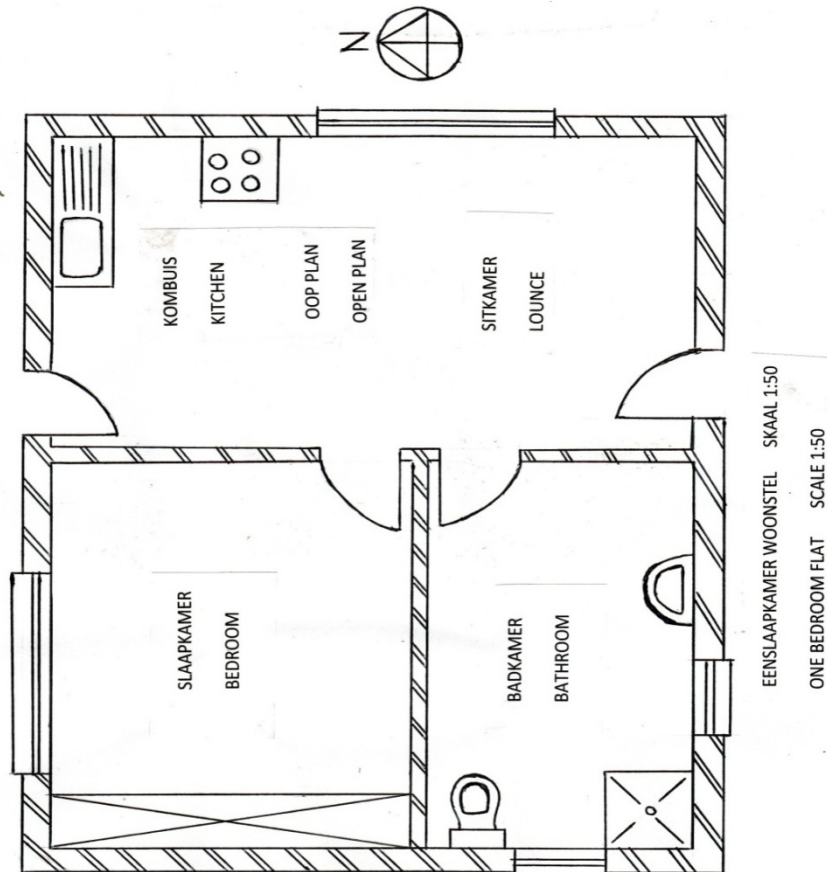
ANSWER SHEET 5.2 **NAME OF CANDIDATE:** _____

FORCE DIAGRAM



ANSWER SHEET 6.1

NAME OF CANDIDATE: _____

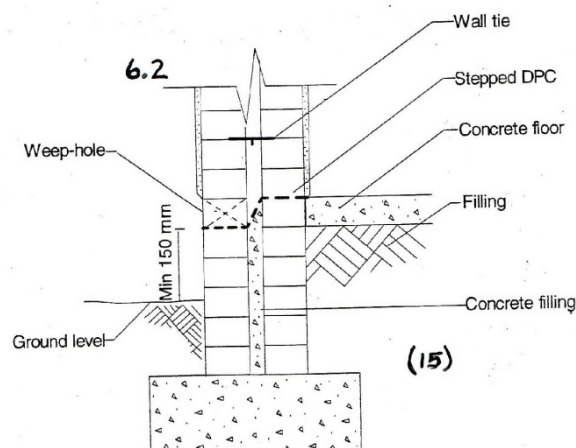


Marking Memo					
Windows	4	Water closet	1	North arrow	1
Doors	4	Basin	1	Title and scale	2
Outer walls	4	Stove	1	Inner walls	4
Cabinet		Shower	1	Sink	1

(25)

ANSWER SHEET 6.2

NAME OF CANDIDATE: _____



(15)

Marking Memo					
Foundation	2	Ground level	1	Floor	2
Wall	4	DPC	2	Title and scale	2
Neatness	2				

(15)