



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2012

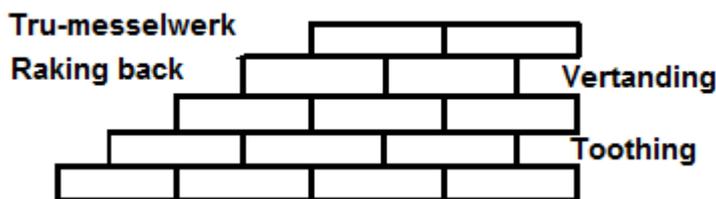
**CIVIL TECHNOLOGY
MEMORANDUM**

MARKS: 200

This memorandum of 8 pages.

QUESTION 1: CONSTRUCTION PROCESSES

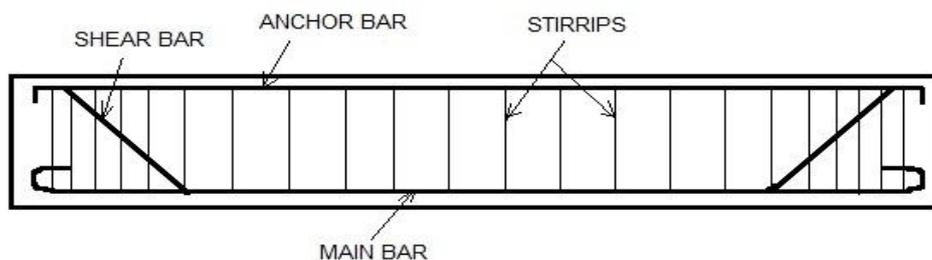
- 1.1 First aid is a temporary action to save life and limb before help arrives. Medical emergency is when somebody got sick and only a doctor can help. (2)
- 1.2
- Do not move the victim unless he is in immediate danger.
 - Do not try to push broken bones back into place or straighten fracture.
 - Place person in comfortable position.
 - Make sure leg cannot move by splinting the limb. (4)
- 1.3 The entrepreneur is somebody in pursuit of profit, who is constantly searching for new ideas and new products. (2)
- 1.4 Trenches must be protected with fences / Red warning lights must be placed. (2)
- 1.5
- Stack should be more than three times as high as it is wide.
 - Stacks should be bonded and interlocked.
 - Must be on strong, sound floor.
 - Choose site with care and avoid projection.
 - Should not obstruct fire-fighting equipment, lighting or ventilation.
 - Stacks in danger of falling down should be broken down immediately.
 - Climbing onto stacks without a ladder should be prohibited. (Any 6) (6)
- 1.6 Bathroom or toilet. (1)
- 1.7 Mortar / Silicon or fixing in wood frames. (2)
- 1.8 The size of window and wind pressure. (2)
- 1.9 Wall in stretcher bond.



(9)
[30]

QUESTION 2: ADVANCED CONSTRUCTION PROCESSES

- 2.1 Formwork is a moulded box into which concrete is poured to form a shape. (2)
- 2.2 Plastic spacer / steel cover stand. (2)
- 2.3
 - 2.3.1 FALSE (1)
 - 2.3.2 TRUE (1)
 - 2.3.3 TRUE (1)
 - 2.3.4 FALSE (1)
 - 2.3.5 FALSE (1)
 - 2.3.6 FALSE (1)
- 2.4 Concrete must be kept damp or be covered to prevent it from drying to fast and cause cracks. (2)
- 2.5 Trusses must be close together at a tiled roof and further apart for a corrugated iron roof. Tiled roofs are heavy in weight but corrugated iron roofs are light in weight. (4)
- 2.6 Flying shore / dead shore / raking shore. (3)
- 2.7 Scaffolding is temporary pipe frameworks which are constructed to support material, tools and workmen working at a high level above ground. (2)
- 2.8 The lock block makes it possible to fit a door lock and make it stable. (1)
- 2.9
 - Pressure exerted by the soil.
 - Type of soil on which wall is build.
 - Materials available.
 - The degree of sliding response.
 - The landscape.
 - Water filtering through. (Any 5)
- 2.10 Concrete cantilever walls / retaining walls with counter forts / precast concrete retaining structures. (5)
- 2.11 Vertical section through concrete beam with reinforcement.



(3)
[40]

QUESTION 3: CIVIL SERVICES

- 3.1 A – Bib tap
B – P-Trap
C – PVC access bend
D – PVC Pipe
E – Holderbat
F – Concrete gully top
G – Gully
H – Water trap (8 x 1) (8)
- 3.2 A ball valve controls the inlet of water into a warm water cylinder. A built in element heats the water. The thermostat regulates the temperature. Copper pipes convey warm water to the taps in the house. (4)
- 3.3 Ball valve (1)
- 3.4 Bath, shower, basin, water closet, sink. (Any 4 x 1) (4)
- 3.5 Manhole is an access point to do inspection and unblock drains when blocked. Cast iron is used for lid of manhole. (3)
- 3.6 Advantages of copper pipes
- Corrosion resistant.
 - Used for warm and cold water.
 - Easy to work with.
 - Easy to bend.
 - Low maintenance.
 - No heavy equipment needed to do piping. (Any 5 x 1) (5)
- 3.7 Regulations for storm water
- Rainwater must be drained away from building.
 - Illegal to direct storm water into sewerage system.
 - Illegal to direct sewage water into rain water channels.
 - Where artificial channels connect with natural watercourse it must correspond with natural flow of water.
 - Storm water construction must adapt to environment.
 - Constructions must comply with local and national regulations. (Any 5 x 1) (5)
- [30]**

QUESTION 4: MATERIALS4.1 Missing word

- 4.1.1 Mortise and tenon joint. (1)
- 4.1.2 Countersunk screw. (1)
- 4.1.3 PVA-glue (1)
- 4.1.4 100 mm (1)
- 4.1.5 Vacuum breaker. (1)
- 4.1.6 Distribution box. (1)

4.2 Gang nailed plates / Bolts and nuts. (2)

4.3 Thermo-plastic – soft and can bend easy. (4)
Thermo-hardened plastic – hard and keep its shape after manufactured.

4.4 Mechanical grading is done with machine to test strength of wood. Visual grading is done by eye to look for knots / cracks in wood. (4)

4.5 Use and properties of material:

- 4.5.1 Cast iron – manhole lid – hard and brittle. (2)
- 4.5.2 Safety glass – sliding door – strong. (2)

4.6 Preservatives characteristics

- Must not spoil appearance of wood.
- Must not interfere with dimensions of timber
- Must not resist paint or glue.
- Must not smell unpleasant.
- Must not be harmful to humans and animals.
- Must not reduce strength of wood.
- Must not cause corrosion. (Any 4 x 1) (4)

4.7 Tiling:

Area of floor – $3\text{ m} \times 4\text{ m} = 12\text{ m}^2$

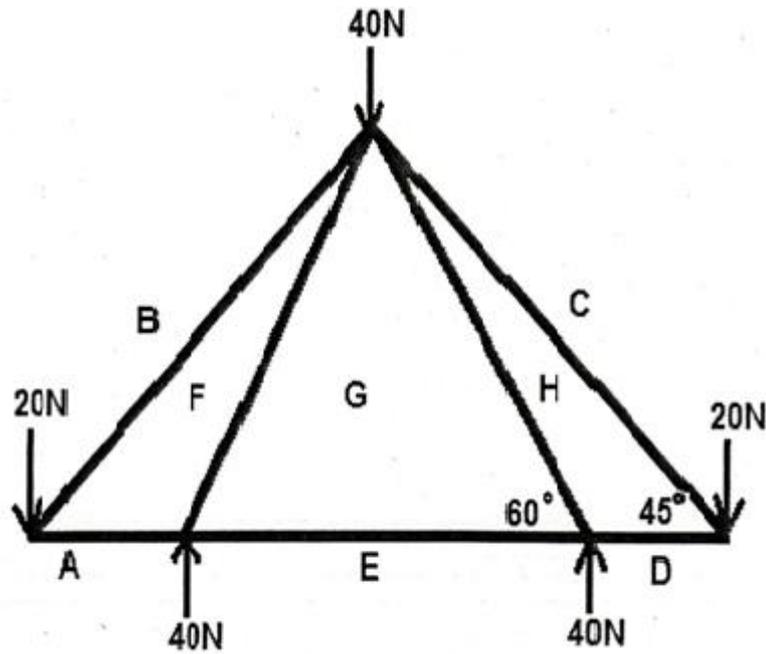
Amount of tiles needed - one tile = $250\text{ mm} \times 250\text{ mm}$ – 16 tiles per m^2

$12\text{ m}^2 = \text{area to be tiled} - 12 \times 16 = 192\text{ tiles needed.}$

(6)
[30]

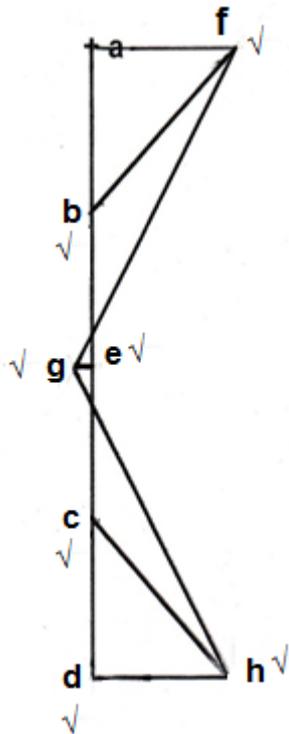
QUESTION 5.1

ANSWER SHEET 5.1



5.1.1 Diagram (scale 1 mm = 1 N)

(7)



5.1.2

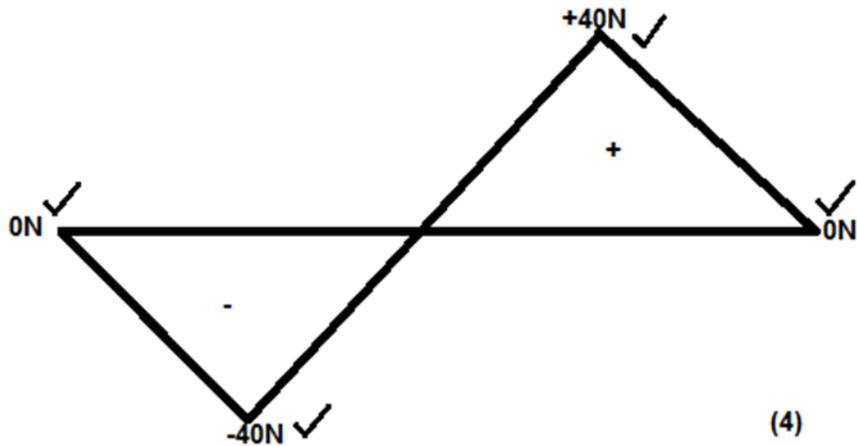
Part	Size
BF	√ 29 N
CH	√ 29 N
DH	√ 20 N
EG	√ 3 N
AF	√ 20 N
FG	√ 46 N
GH	√ 46 N

(7)
[14]

5.2 Bending moments.

5.2.1 $a = 20 \text{ N} \times 0 = 0 \text{ N}$
 $b = (120 \text{ N} \times 0 \text{ m}) + (80 \text{ N} \times 0 \text{ m}) + (-20 \text{ N} \times 2 \text{ m}) = -40 \text{ N}$
 $c = (40 \text{ N} \times 0 \text{ m}) + (-80 \text{ N} \times 4 \text{ m}) + (-20 \text{ N} \times 6 \text{ m}) + (120 \times 4)$
 $0 + -320 + -120 + 480 = + 40 \text{ N}$
 $d = (-20 \text{ N} \times 8 \text{ m}) + (-80 \text{ N} \times 6 \text{ m}) + (-40 \text{ N} \times 2 \text{ m}) + (10 \text{ N} \times 0 \text{ m}) +$
 $(120 \times 6 \text{ m}) + (30 \text{ N} \times 0 \text{ m})$
 $-160 \text{ N} + -480 \text{ N} + -80 \text{ N} + 0 \text{ N} + 720 \text{ N} + 0 \text{ N} = 0 \text{ N}$ (4)

5.3 Bending moment diagram.



5.3 Om A / around A

$(B \times 8 \text{ m}) = (80 \text{ N} \times 2 \text{ m})$

$B \times 8 \text{ N/m} = 160 \text{ N/m} \checkmark$

$B = \frac{160 \text{ N/m}}{8} \checkmark$

$B = 20 \checkmark \text{ N} \checkmark$

Om B / around A

$(A \times 8 \text{ m}) = (80 \text{ N} \times 6 \text{ m})$

$A \times 8 \text{ N/m} = 480 \text{ N/m} \checkmark$

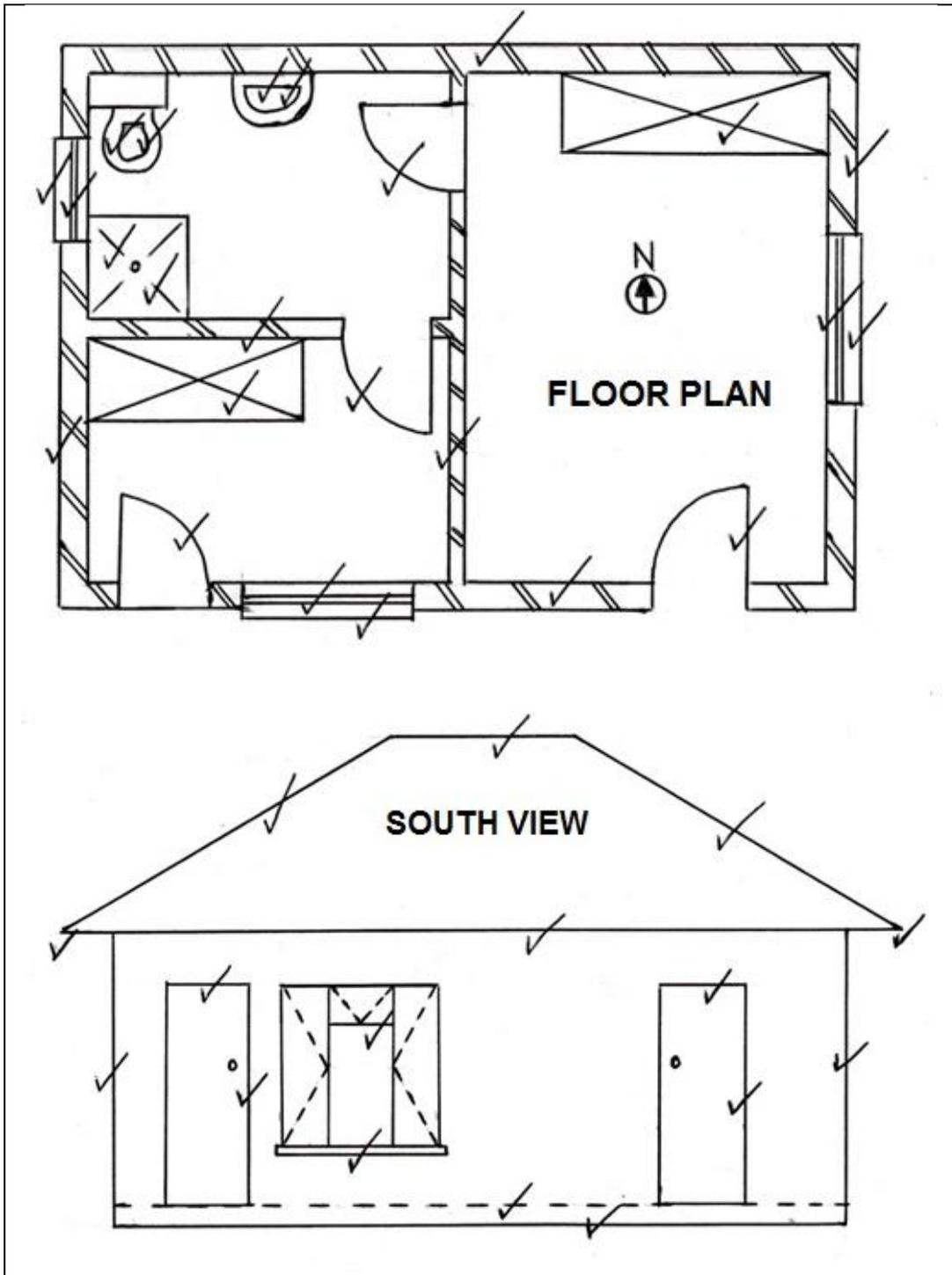
$A = \frac{480 \text{ N/m}}{8} \checkmark$

$A = 60 \checkmark \text{ N} \checkmark$

(8)
[30]

QUESTION 6

6.1



(24)

(16)
[40]

TOTAL: 200