Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2013

CIVIL TECHNOLOGY MEMORANDUM

MARKS: **200**

This memorandum consists of 9 pages.

QUESTION 1: CONSTRUCTION PROCESSES

1.1 Give ONE property and ONE use of each material.

MATERIALS	PROPERTY	USE
Copper	Non-ferrous metal, non-corrosive	Pipes, electrical wires
Brass	Non-ferrous metal, non-corrosive	Taps, hinges, screws
Cast iron	Hard, brittle, grey in colour	Pipes, manhole covers

(6)

1.2
- Overalls
- Gloves
- Welding helmet
- Safety boots
- Safety goggles
- Gas mask
- Safety helmet

(Any 5 x 1) (5)

1.3
- Keep power cord away from the cutting wheel.
- Keep safety guards on.
- Cutting wheel must be in good condition.
- Use safety goggles and dust mask.
- Keep power cord in good condition.
- Stand firm and keep firm grip on machine

(Any 3 x 1) (3)

1.4 CO_2-type or foam type extinguisher. (1)

1.5
- Ambitious, motivated
- Full of ideas, do not give up easily
- Hardworking, organised
- Realistic, plans ahead

(4)

1.6
- Avoid touching blood with bare hands
- Use plastic gloves
- Cover wound as promptly as possible and wash hands with soap

(3 x 1) (3)

1.7
- Severe pains in chest
- Pain that radiates from chest to arms or neck
- Sweating, vomiting, weakness and anxiety

(3 x 1) (3)

1.8
- Keep cutting tools sharp.
- Use for the purpose they are designed for.
- Do not work with broken tools.
- Do not place tools near edge of bench.
- Do not test sharpness of blades with fingers.
- Adhere to safety rules for each tool.

(Any 5 x 1) (5)

[30]

QUESTION 2: ADVANCED CONSTRUCTION PROCESSES

2.1 Choose the correct answer from COLUMN B that fits with the machine in COLUMN A.

2.1.1 H
2.1.2 A
2.1.3 F
2.1.4 J
2.1.5 I
2.1.6 B
2.1.7 E
2.1.8 C
2.1.9 D
2.1.10 G (10)

2.2 Used to retain masses of soil at any angle. (1)

2.3 2.3.1 Steel – very strong, can rust. (3)

2.3.2 Wood – easy to work with, must be treated to last long.
Aluminium – corrosion resistant, bend easily. (6)

2.4 Temporary pipe structure which allow you to reach high places. (2)

2.5
- Blowholes
- Discolouring
- Cracks if stripped to early (3)

2.6
- Dampness weakens walls.
- Dampness in air is unhealthy.
- Destroys paint work.
- Difficult to remove dampness once it is in wall. (4 x 1) (4)

2.7 Prevent water from entering the house. (1)

2.8 Cover width is 610 mm and is vulnerable against wind pressure and can bend. (2)

2.9 A – Shear bar – to act against shearing forces
B – Anchor bar – to act against the compressive
C – Stirrups – to bind main bars together
D – Main bar – to act against the tensile forces (8)

[40]

QUESTION 3: CIVIL SERVICES

3.1 Missing word.

3.1.1 vent pipe (1)
3.1.2 sun (1)
3.1.3 p-trap/s-trap (1)
3.1.4 vacuum breaker (1)
3.1.5 ball valve (1)

3.2

ADVANTAGES	DISADVANTAGES
Do not rust, easy to bend	Can easily be damaged by sharp object
Water does not freeze in pipes	Cannot be used for hot water
Light in weight, last long	Not fire proof

(3 + 3) (6)

3.3 Basic principles when constructing a sewage system.

- Drain pipes must be watertight.
- Pipes must be laid at a gradient.
- Pipes must be laid in a straight line.
- Manholes where needed.
- Inspection eyes where needed.
- Drain pipes under building must be covered in concrete.
- System must have at least one gully.
- Drain pipes should be at least 100 mm in diameter.
- At least one vent pipe in system.
- Vent pipes must extend at least 1 meter over lowest point of roof.
- Application for sewer connection must be made in advance to local authorities. (8)

3.4 3.4.1 Drain pipe ———————— – ———

3.4.2 Manhole MG

3.4.3 Gully RG

3.4.4 Inspection I IE

3.4.5 Shower (5)

3.5
- Where pipe changes direction
- At the start of drain pipe
- At the start of any branch longer than three meters (3)

3.6 Manhole is used as an inspection chamber and to clean underground drainage systems. (2)

3.7 High pressure geysers provide high pressure at all taps, even if more than one tap is opened at the same time. (1)

[30]

QUESTION 4: MATERIALS AND QUANTITIES

ANSWER SHEET 4.3

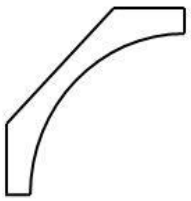
A	B	C	D		
1	5,0 m 2,6 m	13 m^2	Area of wall before deductions 5 000 mm x 2 600 mm	(4)	
1	1,2 m 0,9 m	1,08 m^2	Area of window 1 1 200 mm x 900 mm	(3)	
1	1,2 m 0,6 m	0,72 m^2	Area of window 2 1 200 mm x 600 mm	(3)	
			Area of wall excluding windows 13 m^2 – 1,8 m^2 = 11,2 m^2 1,08 m^2 + 0,72 m^2 = 1,8 m^2	(3)	
			Total number of bricks 11,2 m^2 x 100 bricks = 1 120 bricks	(3)	(16)

4.2 PVA-glue (1)

4.3 Clear glass
Obscure glass
Special glass (safety glass) (3)

4.4
- Concrete lasts long.
- Easy to handle/prepare.
- Strong and clean.
- Low in maintenance and not affected by water.
- Can be made watertight and a smooth surface can be obtained.
- Can be cast in any shape. (Any 4) (4)

4.5 cornice skirting



(4)

4.6 Coal tar creosote

Used outside for poles and wooden fences. (2)

[30]

QUESTION 5: APPLIED MECHANICS

5.1 Reaction forces:

Around A

LOM = ROM

(B x 8 m) = (100 N x 2 m) + (80 N x 6 m)

B8 N = 200 N + 480 N

$$B = \frac{680\ N}{8\ m}$$

B = 85 N

Around B

ROM = LOM

(A x 8 m) = (80 N x 2 m) + (100 N x 6 m)

A8 N = 160 N + 600 N

$$A = \frac{760\ N}{8\ m}$$

A = 95 N (8)

5.2 Shear forces:

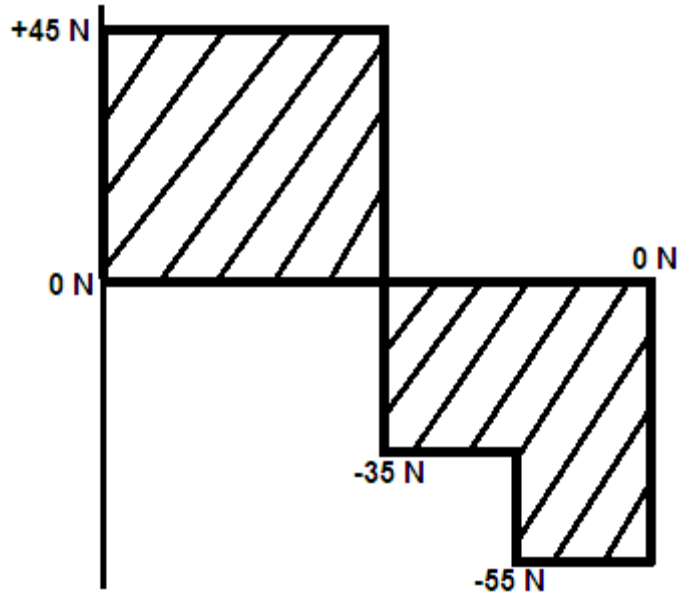
5.2.1 a = -50 N + 95 N = +45 N

b = +45 N – 80 N = -35 N

c = -35 N -25 N = -55 N

d = -55 N +55 N = 0 N (4)

5.2.2

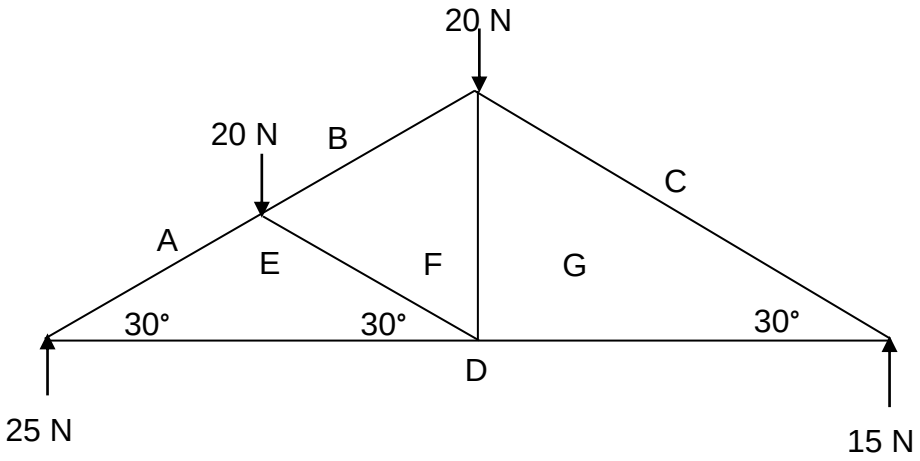


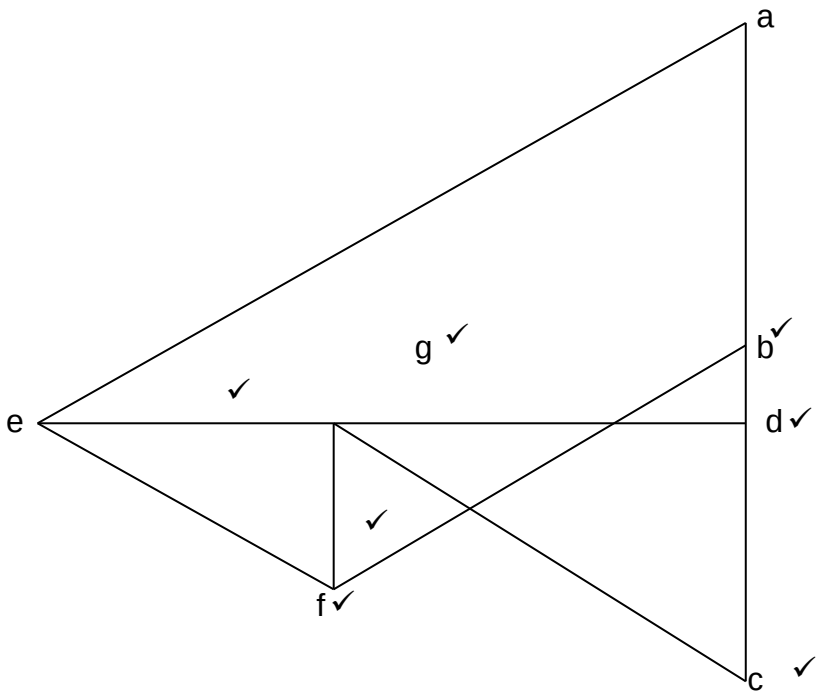
(4)

QUESTION 5.3

ANSWER SHEET 5.3

Scale: 3 mm = 1 N





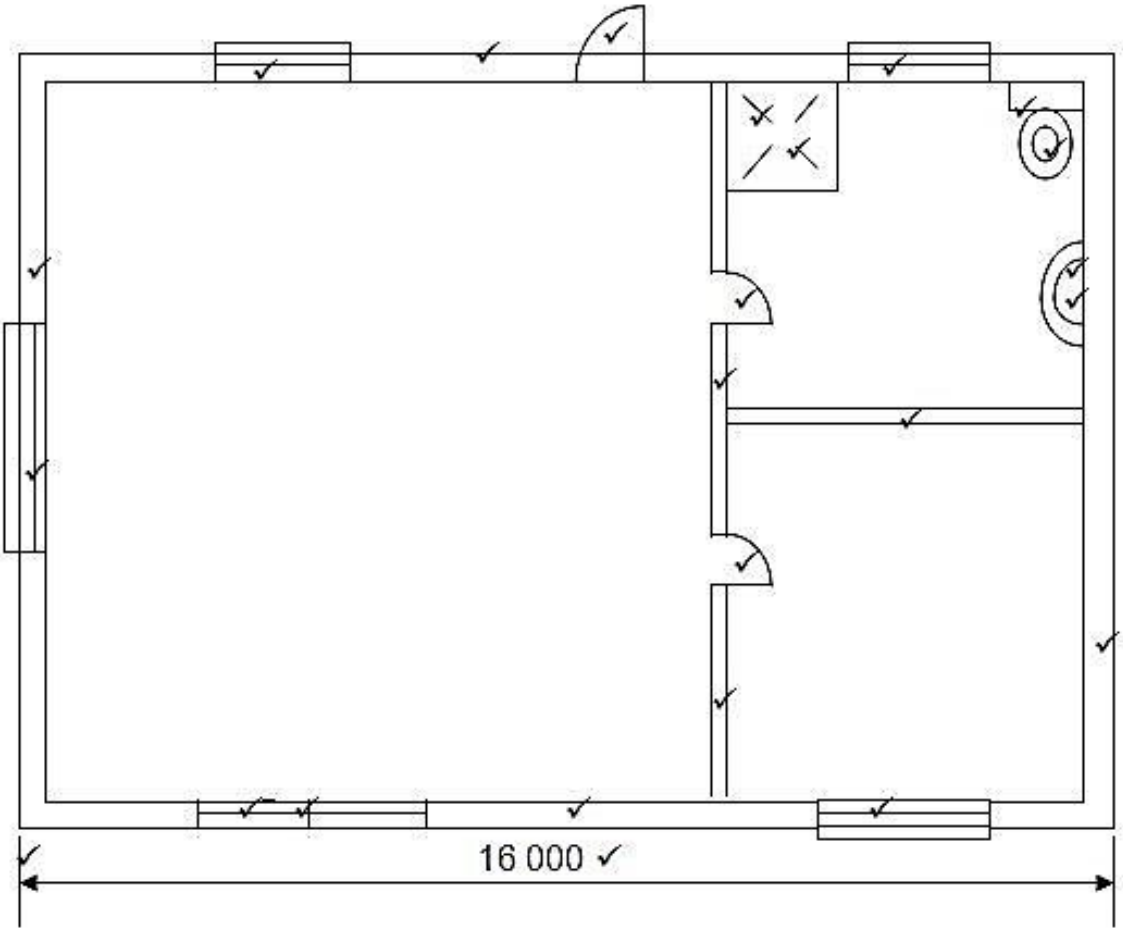
(7)

Member	Size of force
AE	75 N ✓
BF	45 N ✓
CG	45 N ✓
DE	65 N ✓
DG	39 N ✓
EF	30 N ✓
FG	15 N ✓

(7)
[30]

QUESTION 6.1: ANSWER SHEET 6.1

VLOERPLAN/FLOOR PLAN ✓
SKAAL/SCALE 1:100 ✓



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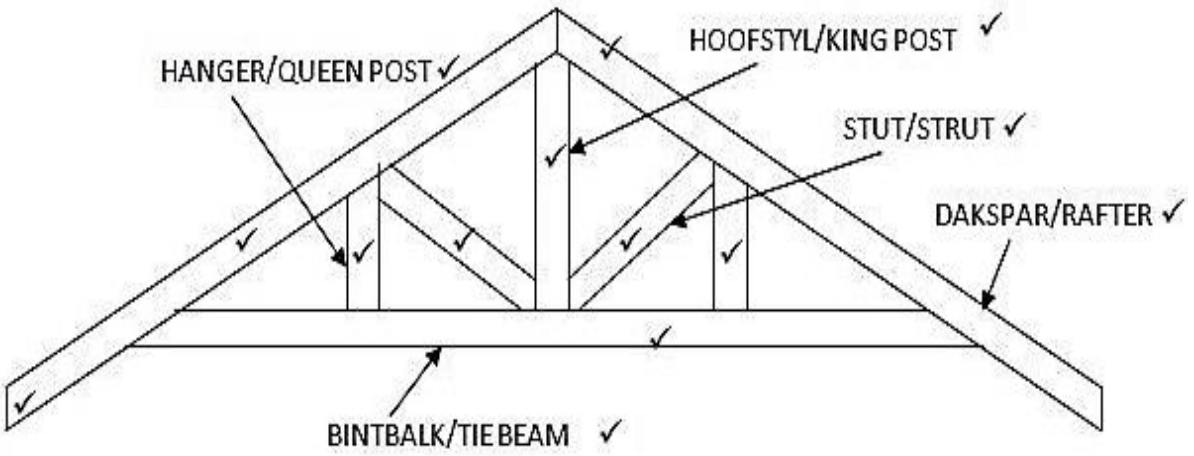
QUESTION 6.2: ANSWER SHEET 6.2



✓

(14)
[40]

TOTAL: 200