Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2012

CIVIL TECHNOLOGY MEMORANDUM

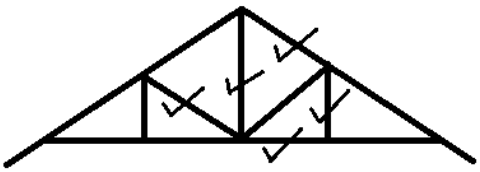
MARKS: **200**

This memorandum consists of 7 pages.

QUESTION 1 (CONSTRUCTION PROCESSES)

1.1
1.1.1 H
1.1.2 A
1.1.3 B
1.1.4 C
1.1.5 J
1.1.6 E
1.1.7 D
1.1.8 J
1.1.9 F
1.1.10 G (10x1) (10)

1.2 1.2.1



(5)

1.2.2

(5)

1.3 Weight of roof (1)

1.4 Keep roof trusses in position and strengthen trusses. (1)

1.5 Pattern glass (1)

1.6
- Above ground level and at floor level under walls.
- Under concrete floors.
- Under ground level at basements.
- At parapet walls.
- At windows under sill. (Any 4) (4)

1.7
- Wear rubber gloves
- Put direct pressure on wound with a pad and try not to get in contact with blood of injured person
- Wash hands with soap when finished (3)

[30]

QUESTION 2 (ADVANCED CONSTRUCTION PROCESSES)

2.1
- Spirit level
- Dumpy level (2)

2.2
- Steel must have ability to bend into a shape and have high tensile strength.
- Surface of steel must make adequate bond with concrete.
- Steel must be reasonably rust free and clean of mud or grease. (3)

2.3
- Concrete
- Steel reinforcement
- Hollow blocks
- Ribs (4)

2.4 Concrete is weak in tensile stress, steel gives it high in tensile strength. (1)

2.5
- Concrete slab
- Damp proof course
- Screed
- Hardcore filling (4)

2.6 Gusset plate (1)

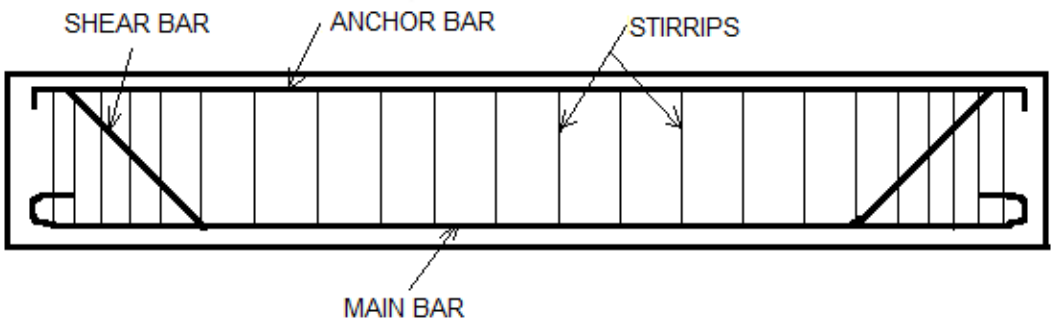
2.7
- Plastic blocks
- Steel cover stands
- Concrete cover blocks (3)

2.8
- Slump test
- Cube test (2)

2.9

2.9.1	TRUE	(1)	2.9.6	TRUE	(1)
2.9.2	FALSE	(1)	2.9.7	FALSE	(1)
2.9.3	TRUE	(1)	2.9.8	FALSE	(1)
2.9.4	TRUE	(1)	2.9.9	TRUE	(1)
2.9.5	FALSE	(1)	2.9.10	FALSE	(1)

2.10



Labels (4) Accuracy (6) (10)

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QUESTION 3 (CIVIL SERVICES)

3.1
- P-Trap
- S-Trap
- Used under basins, sink and baths to keep out bad smells. (4)

3.2 Used for soil water from kitchen sink to collect oils and fats to prevent pipes from blocking. (2)

3.3 45° (1)

3.4 It is installed where sewage pipes meet for easy access to pipes to do inspection and to clean blockages. (2)

3.5
- Septic tank
- Vacuum tank
- French drain (3)

3.6 Used at water closet and geyser to control the water level in the tank. (2)

3.7
- Drain pipes must be a minimum of 600 mm under the ground.
- Must be watertight.
- Must be laid at constant gradient.
- Must be laid in a straight line.
- Inspection equipment should be inserted at all direction changes.
- Where several drainpipes meet a manhole should be constructed.
- Drainpipes must have a 100 mm inside diameter.
- Drain pipes under a building must be cast in concrete.
- Rodding eyes and gullies must be strengthened with concrete.
- Taps should be installed at inlets of drains.
- In front of connection with municipal sewer there must be a manhole.
- The inside of pipes must be clean of loose objects.
- Junctions should meet at 45° angle. (Any 8) (8)

3.8
- Solar panels must face north.
- Must be installed at an angle of 35° towards sun.
- Must be SABS approved.
- Panels should be placed so that they are not in the shade.
- Pipes should be covered in isolation material. (Any 4) (4)

3.9 3.9.1 B = bath

3.9.2 WC = water closet

3.9.3 VP = ventilation pipe

3.9.4 WM = water meter (4)

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QUESTION 4 (MATERIALS)

4.1 4.1.1
- at basins
- baths
- drain pipes
- lids for manholes (Any 1) (1)

4.1.2
- cooking appliances
- windows
- electric conductors (Any 1) (1)

4.1.3
- electric equipment
- water pipes (Any 1) (1)

4.1.4
- galvanized sheets
- water tanks (Any 1) (1)

4.2 Plastic pipes advantages:
- easy to bend
- light in weight
- durable
- easy to work with
- corrosion free (Any 2)

Plastic pipes disadvantages
- can easily be damaged
- cannot use for hot water (4)

4.3
- Saves time
- Less labour needed (2)

4.4
- Mechanical grading
- Visual grading (2)

4.5
- Length x breath x height = cubic meter.
- 12 000 mm x 500 mm x 200 mm = 12 000 000 mm^3 **or**
- 1,2 m x 0,5 m x 0,2 m = 1,2 m^3 (5)

4.6
- Must be kept in store where it cannot get wet.
- Must be above ground level, on wooden pallets.
- Must have strong floor to carry weight of cement. (3)

4.7
- Correct moisture content needed to prevent wood from swelling or shrinking.
- Stronger than wet wood.
- Wood glue and paint does not work on wet wood.
- Timber must be prevented from wrapping and losing its shape.
- Dry timber is not attacked by fungi.
- Most preservatives do not work on moist timber.
- Some wood beetles prefer moist wood.
- Dry timber is lighter in mass, easier to transport. (Any 5) (5)

4.8 PVA-glue (1)

4.9
- Consists of an odd number of layers.
- The grain of each layer runs at right angles to the adjoining layer.
- Maximum strength and toughness are obtained with minimum mass.
- Strength is almost the same over length and breath.
- Available in sheets with thicknesses of 3 mm to 25 mm. (Any 4) (4)

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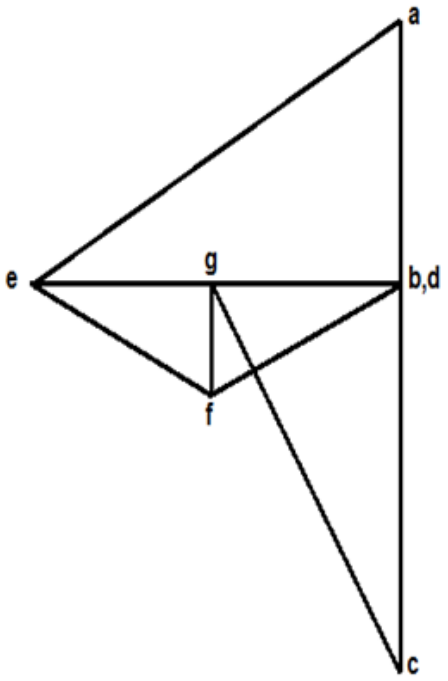
QUESTION 5 (APPLIED MECHANICS)

5.1



PART /	FORCE SIZE	
AE =	78 N	(1)
BF =	39 N	(1)
CG =	70 N	(1)
DG =	34 N	(1)
DE =	68 N	(1)
EF =	39 N	(1)
FG =	20 N	(1)

(7)

5.2 Reaction forces:

around A

LOM = ROM

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

B8N = 200N + 480N

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

B = 85 N

around B

ROM = LOM

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

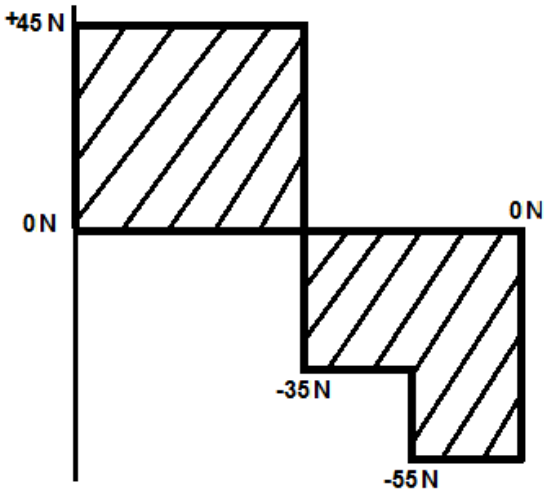
A8 N = 160 N + 600 N

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

A = 95 N (8)

5.3 Shear forces:

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)



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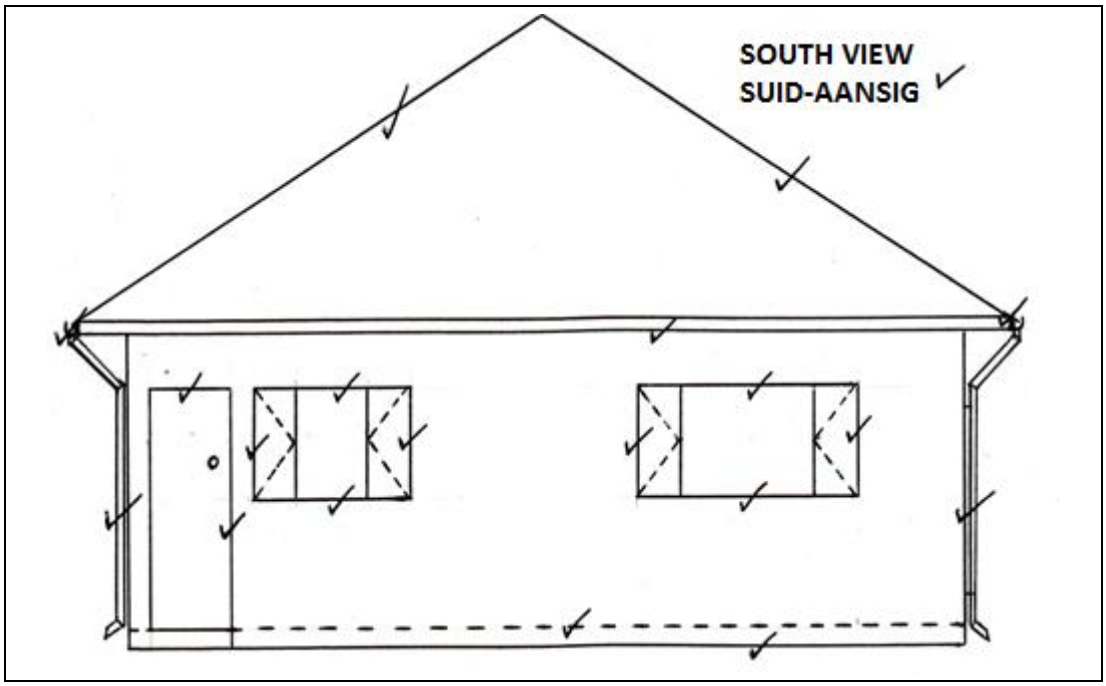
QUESTION 6 (GRAPHICS AND COMMUNICATION)

6.1 South view



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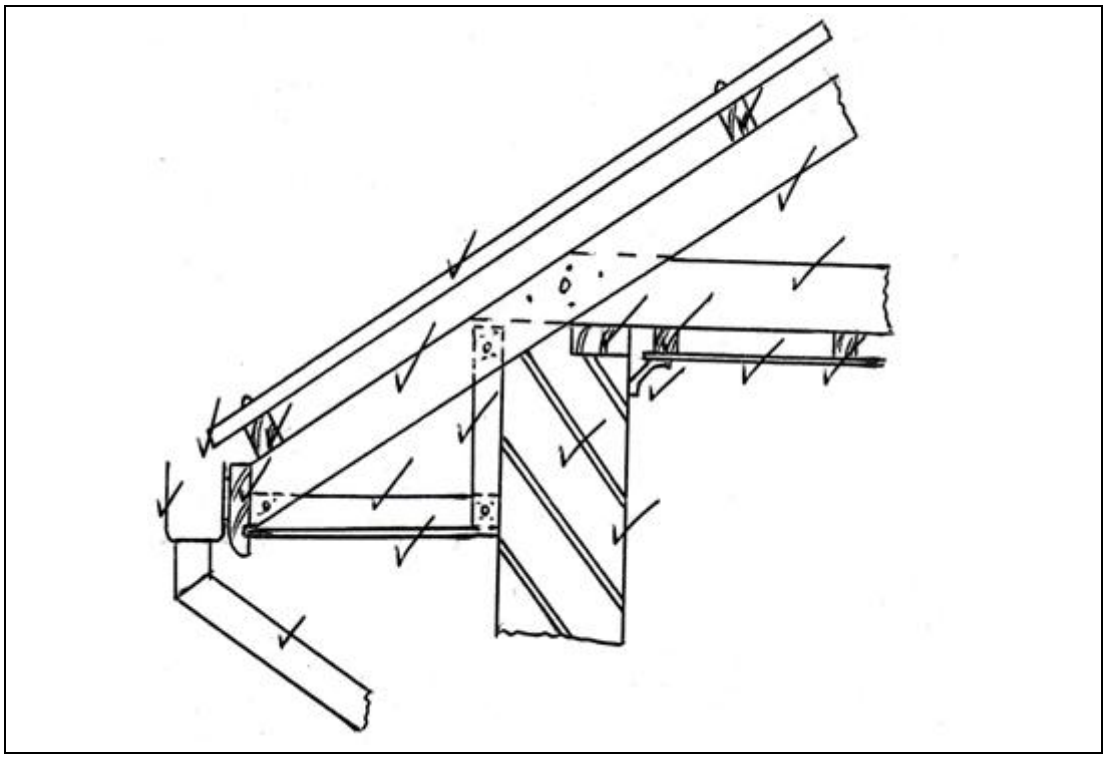
6.2 Roof eave



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TOTAL: 200