Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2013

CIVIL TECHNOLOGY

MARKS: **200**

TIME: **3 hours**

This question paper consists of 13 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX questions.
2. All questions are compulsory.
3. Answer each question as a whole. Do not separate sub-questions.
4. Use the mark scheme as a guide to the length of your answers.
5. Use your own discretion where dimensions and/or details have been omitted.
6. Answer QUESTIONS 4.1, 5.3, 6.1 and 6.2 on the answer sheets provided.

START EACH QUESTION ON A NEW PAGE.

QUESTION 1: CONSTRUCTION PROCESSES

1.1 The table below shows some of the materials used in the building industry. Copy the table in your answer book and complete by giving ONE property and ONE use of each material.

MATERIALS	PROPERTY	USE
Copper		
Brass		
Cast iron		

(3 + 3) (6)

1.2 Name FIVE pieces of equipment that workers can use to protect themselves when busy with building construction. (5)

1.3 Name THREE safety rules applicable when using an angle grinder. (3)

1.4 What type of fire extinguisher should be used to extinguish a fire caused by flammable liquids? (1)

1.5 Name FOUR characteristics of a successful entrepreneur. (4)

1.6 What precautions as first aider must be taken when you are treating someone where a lot of bleeding is involved to ensure that you are not infected with the MI-virus? (3)

1.7 Name THREE signs of a heart attack. (3)

1.8 Name FIVE safety rules when using hand tools. (5)

[30]

QUESTION 2: ADVANCED CONSTRUCTION PROCESSES

2.1 Choose the correct answer in COLUMN B which matches the machine in COLUMN A. Write only the letter (A–J) next to the question number (2.1.1–2.1.10) on you answer sheet, for example 2.1.11 K.

COLUMN A		COLUMN B	
2.1.1	Circular saw	A	Used to plain rough wood to a flat surface
2.1.2	Jointer plainer	B	Used to shape the edges of wood (mouldings)
2.1.3	Drill press	C	Used to break hard surfaces
2.1.4	Thicknesses plane	D	Used to cut bricks and metal
2.1.5	Wooden lathe	E	Used to cut curves out of wood
2.1.6	Portable router	F	Used to drill holes to a certain depth
2.1.7	Band saw	G	Used to sharpen chisels and drill bits
2.1.8	Jack hammer	H	Used for ripping and crosscutting wood
2.1.9	Angle grinder	I	Used for spindle turning of wood
2.1.10	Emery grinder	J	Used to plane wood to the required thickness

(10 x 1) 10)

2.2 Explain the purpose of a retaining wall. (1)

2.3 Different materials are used to manufacture window frames.

2.3.1 Name THREE materials that can be used. (3)

2.3.2 Name ONE advantage and ONE disadvantage of each material. (6)

2.4 What is meant by the term *scaffolding*? (2)

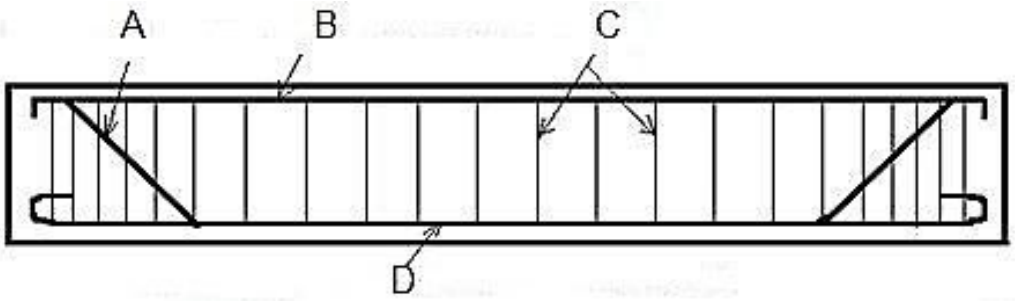
2.5 Name THREE defects that can occur in reinforced concrete during formwork. (3)

2.6 Name FOUR reasons why a building should be made damp-proof. (4)

2.7 What is the purpose of a cavity wall? (1)

2.8 Describe the cover width and wind pressure properties of corrugated iron roof sheets. (2)

2.9 The drawing below shows a concrete beam with steel reinforcement. Label the parts numbered A–D and explain the use of each one.



(8)
[40]

QUESTION 3: CIVIL SERVICES

3.1 Complete the following by writing down the missing word.

3.1.1 The purpose of a ... is to allow unpleasant odours coming from the sewage system to escape. (1)

3.1.2 A solar panel is dependent on the … for effective operation. (1)

3.1.3 The purpose of a … is to prevent foul gases from the sewage system from entering the building. (1)

3.1.4 The ... in a geyser protects the cylinder from vacuum collapse. (1)

3.1.5 The ... is installed inside the cistern of a water closet to stop water inflow at a certain level. (1)

3.2 Describe THREE advantages and THREE disadvantages of using PVC-pipes for water supply in a house. Redraw the table below in your answer book and complete.

ADVANTAGES	DISADVANTAGES

(6)

3.3 Name EIGHT basic principles that must be applied when constructing a drainage system. (8)

3.4 Draw the following drainage symbols:

3.4.1 Drain pipe

3.4.2 Manhole

3.4.3 Gully

3.4.5 Inspection eye

3.4.5 Shower (5)

3.5 Name THREE places in a sewage system where an inspection eye must be inserted. (3)

3.6 Explain the purpose of a manhole. (2)

3.7 Explain why you would prefer a high pressure geyser rather than a low pressure geyser for warm water supply to a house. (1)

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QUESTION 4: MATERIALS AND QUANTITIES

4.1 FIGURE 4.1 shows the front view of a one brick wall with two windows.

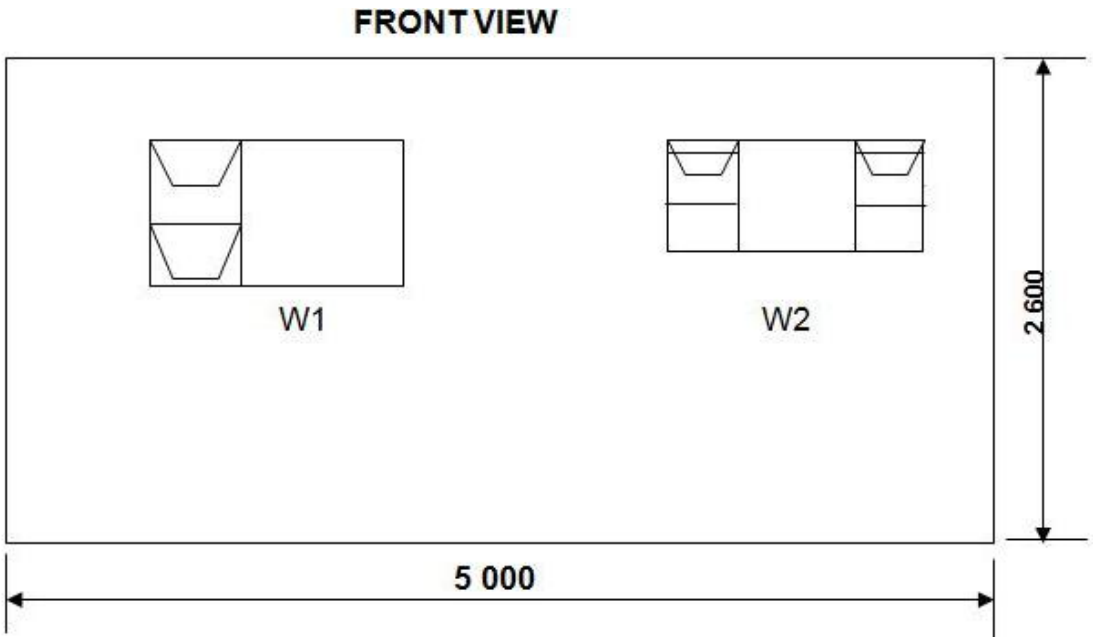

FIGURE 4.1

SPECIFICATIONS:

- 100 bricks were used to build one square meter of a 220 mm one brick wall.
- Window 1 (W1) is 1 200 mm wide and 900 mm high.
- Window 2 (W2) is 1 200 mm wide and 600 mm high.

Use the specifications above and calculate the following on ANSWER SHEET 4.1:

4.1.1 The total area of the wall, including windows. (Before deductions) (4)

4.1.2 The area of window 1 (3)

4.1.3 The area of window 2 (3)

4.1.4 The total wall area, excluding windows (3)

4.1.5 The total number of bricks required to build the wall (3)

4.2 What type of glue is used to glue wooden joints? (1)

4.3 Name THREE types of glass which are used for building construction. (3)

4.4 Name FOUR advantages of concrete. (4)

4.5 Draw neat sketches to show a cornice and a skirting. (Label each one) (4)

4.6 Name TWO uses of coal tar creosote. (2)

[30]

QUESTION 5: APPLIED MECHANICS

5.1 FIGURE 5.1 shows a beam with pointed loads. Calculate the reaction forces at points A and B.

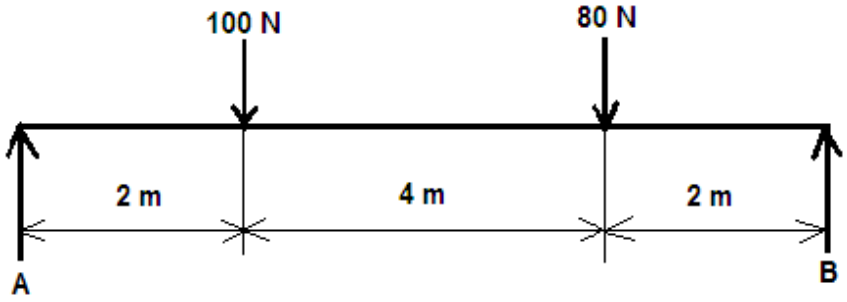

FIGURE 5.1 (8)

5.2 FIGURE 5.2 below shows a beam of 8 meter which is subjected to different loads.

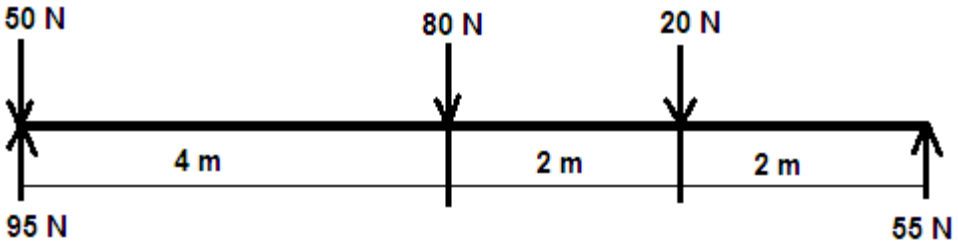

FIGURE 5.2

5.2.1 Determine the shear forces at each point. (4)

5.2.2 Draw the shear force diagram. Use a force scale of 1 mm = 1 N and a linear scale of 1 cm = 1 m. (4)

5.3 FIGURE 5.3 below shows the design of a roof truss. (Answer the questions about the roof truss on ANSWER SHEET 5.3.)

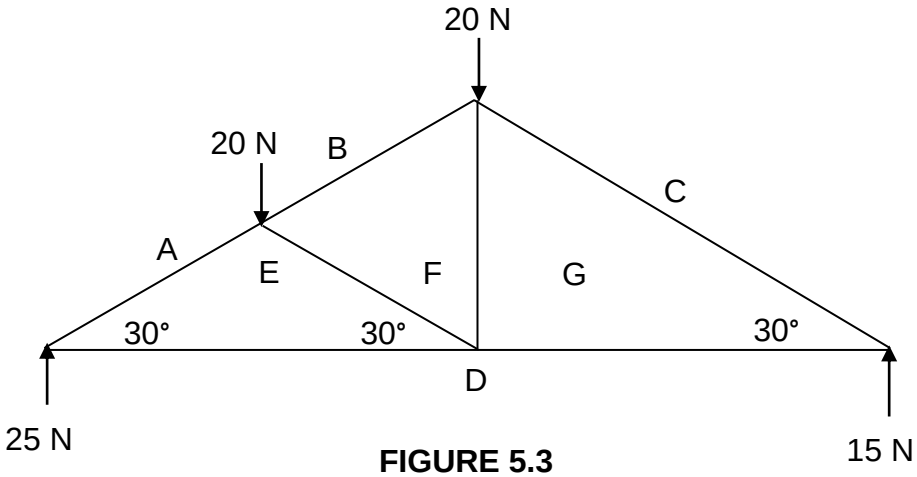

FIGURE 5.3

5.3.1 Determine graphically the size of the forces in each part of the roof truss. Use a scale of 3 mm = 1 N. (7)

5.3.2 Complete the table by indicating the size of the forces. (7)

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QUESTION 6: GRAPHIC COMMUNICATION

6.1 FIGURE 6.1 below shows a line diagram of a floor plan of a building.

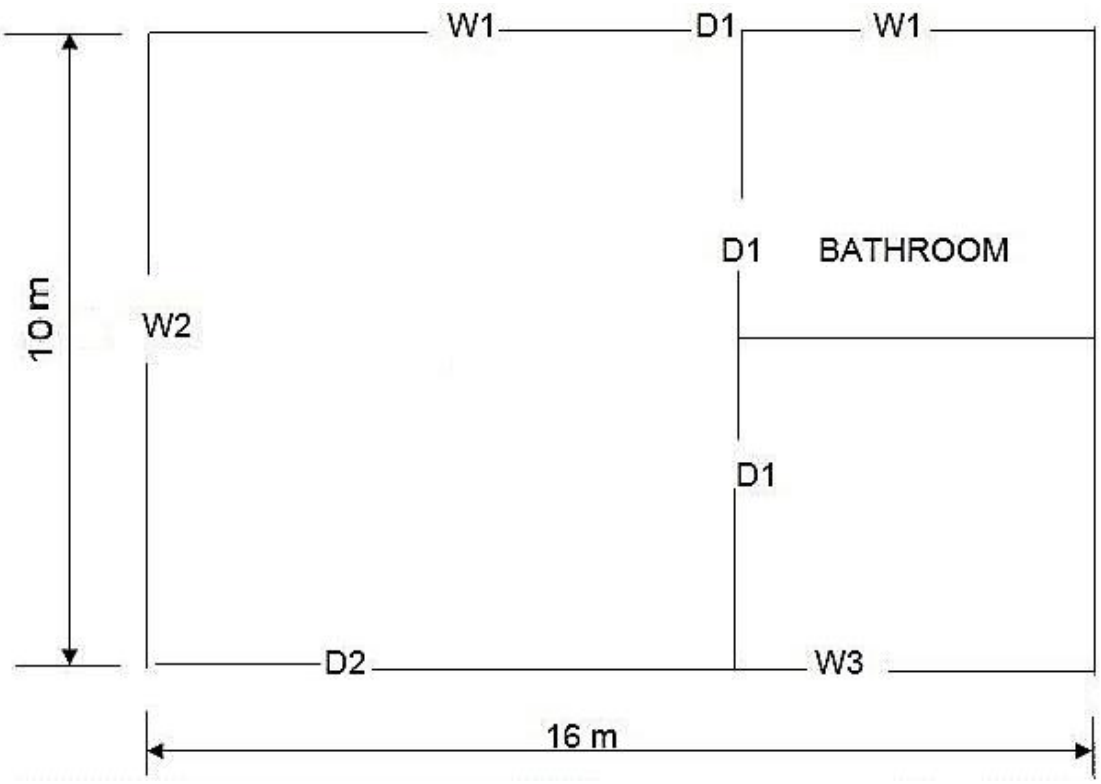


FIGURE 6.1

Draw the floor plan of the building to scale 1:100 and show all doors and windows as indicated on the line diagram. Draw on ANSWER SHEET 6.1.

Specifications:

- Window 1 (W1) is 1 500 mm wide and 1 500 mm high
- Window 2 (W2) is 2 400 mm wide and 1 500 mm high
- Window 3 (W3) is 2 000 mm wide and 1 500 mm high
- Outside walls are 220 mm thick and the internal walls are 110 mm thick
- Door 1 is 900 mm wide and 2 000 mm high
- Door 2 is a sliding door of 2 400 mm wide and 2 000 mm high
- Show shower, basin and water closet in bathroom
- Print title and scale on your drawing
- Show ONE measurement (26)

6.2 Draw to scale1:20 the front view of a King post roof truss (Howe truss) and label all parts.
Use the following specifications:

- Roof pitch: 30 degrees
- Length of tie beam is 4 000 mm
- All wood for truss is 114 mm x 38 mm
- Roof overhang is 400 mm
- Roof parts are joined with gang-nailed plates (14)

[40]

TOTAL: 200

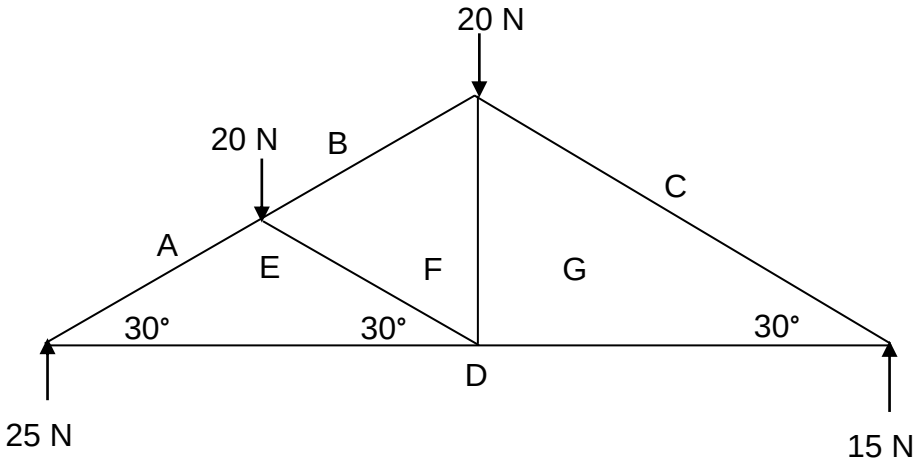
ANSWER SHEET 4.1

A	B	C	D
			Area of wall before deductions (4) Area of window 1 (3) Area of window 2 (3) Total area of wall excluding windows (3) Total number of bricks (3)

(16)

QUESTION 5.3

ANSWER SHEET 5.3 NAME OF CANDIDATE: ……..



Member	Size of force
AE	
BF	
CG	
DE	
DG	
EF	
FG	

QUESTION 6.1

ANSWER SHEET 6.1 NAME OF CANDIDATE: ……

QUESTION 6.2

ANSWER SHEET 6.2 NAME OF CANDIDATE: ……