



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2011**

**CIVIL TECHNOLOGY**

**MARKS: 200**

**TIME: 3 hours**

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This question paper consists of 10 pages.

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**REQUIREMENTS:**

1. Drawing instruments
2. A non-programmable calculator

**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. Start each question on a NEW page.
5. Sketches may be used to illustrate your answers.
6. ALL calculations and written answers must be done in the answer book.
7. Drawings and sketches must be fully dimensioned and neatly finished off with titles and labels to conform to SANS (SABS) Recommended Practice for Building Drawings.
8. For the purpose of this examination, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
9. Use your discretion where dimensions and/or details have been omitted.
10. Non-programmable pocket calculators may be used.
11. Answer QUESTION 5.1 and QUESTION 6 on the answer sheets provided, using drawing instruments where necessary.

**QUESTION 1: CONSTRUCTION PROCESSES**

- 1.1 Explain the difference between first aid and a medical emergency. (2)
- 1.2 A worker has fallen from a scaffold and broke his leg. Describe the necessary steps that you would take to help the worker and make him comfortable. (4)
- 1.3 How would you describe an entrepreneur? (2)
- 1.4 Name TWO regulations to protect the public when doing trench excavations. (2)
- 1.5 What safety factors should be kept in mind when stacking materials at the factory you are working at? (6)
- 1.6 Where in a house would you use obscure glass? (1)
- 1.7 Name TWO methods to install glass bricks. (2)
- 1.8 Which TWO factors will determine the thickness of the glazing for a window? (2)
- 1.9 Bricks can be laid in different bonds.

Draw to good proportion the front view of a wall in stretcher bond with racking back on one side and toothing on the other side of the wall. Show FIVE layers of bricks.

(9)  
**[30]**

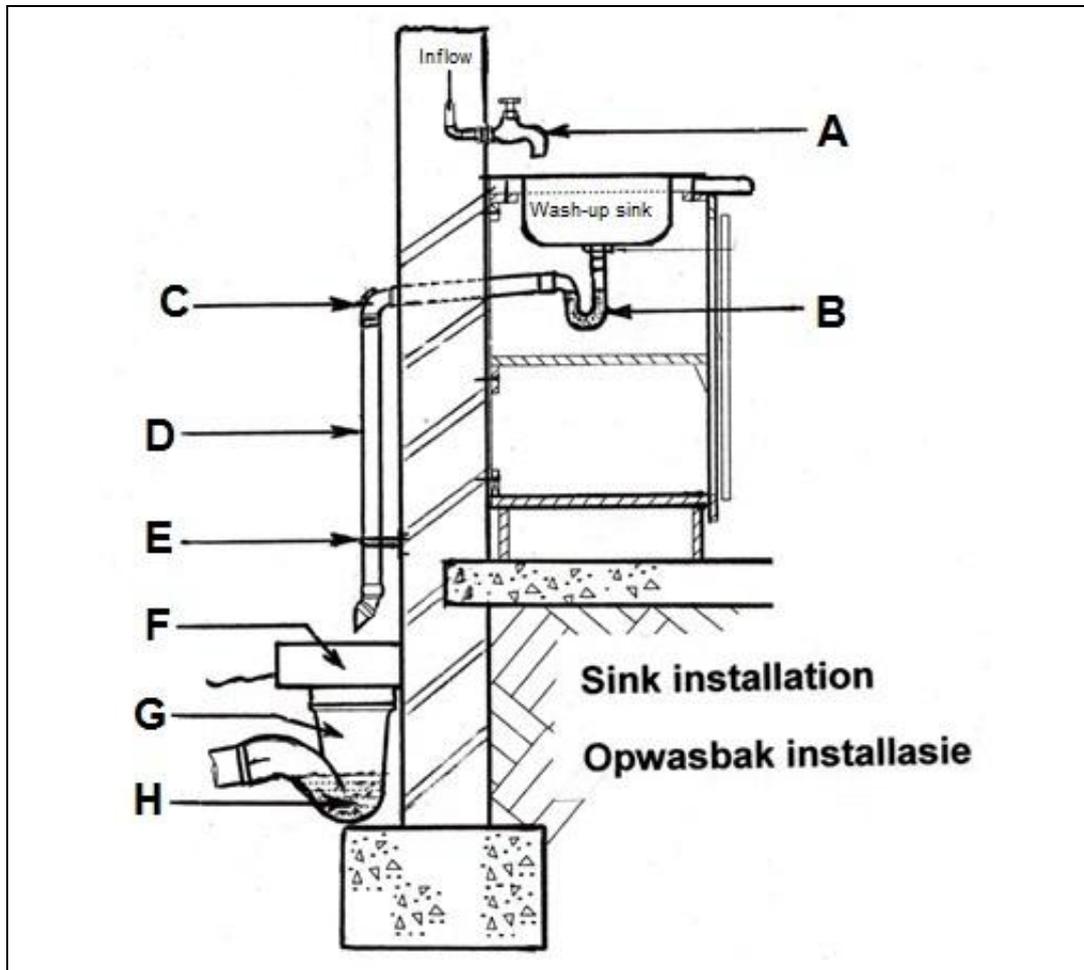
**QUESTION 2: ADVANCED CONSTRUCTION PROCESSES**

- 2.1 Describe what is meant by formwork for concrete. (2)
- 2.2 Name TWO items that are used when doing formwork to prevent the steel reinforcement from touching the sides of the boxing. (2)
- 2.3 Indicate whether the following statements are TRUE or FALSE. Write down only true or false next to the question number. (1)
- 2.3.1 The use of concrete lintels is time consuming. (1)
- 2.3.2 Where a wall is below the surface it must be protected with a horizontal and vertical damp proof course. (1)
- 2.3.3 The main purpose of the wall plate is to distribute the load of the roof uniformly to the wall below. (1)
- 2.3.4 The Tyrolene plastering machine is used to make plastered walls smooth. (1)
- 2.3.5 The surface planer consists of two adjustable tables. The rear table is adjusted to the required depth of cut when planing. (1)
- 2.3.6 The fascia board is used to finish off the edges of a wooden floor. (1)
- 2.4 What is meant with the after treatment of concrete? (2)
- 2.5 How does the spacing of trusses for a corrugated iron roof differ from the spacing of trusses for a tiled roof? Give reasons for your answer. (4)
- 2.6 Shoring is used to support walls and trenches. Name THREE types of shoring. (3)
- 2.7 What is meant with the term *scaffolding*? (2)
- 2.8 Explain the purpose of a lock block at a hollow core door. (1)
- 2.9 Name FIVE factors which should be taken in consideration when designing a retaining wall. (5)
- 2.10 Name THREE types of retaining walls. (3)
- 2.11 Draw to scale 1:20 a vertical section through the length of a concrete beam of 3 200 mm x 400 mm x 250 mm to show all the reinforcement in the beam. Label all the parts on your drawing. (10)

**[40]**

**QUESTION 3: CIVIL SERVICES**

3.1 Label all the parts from A to H as shown in the drawing of a sink construction (FIGURE 3.1). (8)



**FIGURE 3.1**

3.2 Electrical geysers are commonly used in households to warm water. Explain shortly how an electrical low pressure geyser works. (4)

3.3 What type of valve is used inside the cistern of a water closet to keep the water level at a certain height? (1)

3.4 Name FOUR sanitary fittings which are used in houses. (4)

3.5 Describe the purpose of a manhole and name the material which is used for the lid of the manhole. (3)

3.6 Name FIVE advantages of using copper pipes for water installations. (5)

3.7 Describe the regulations concerning storm water drainage. (5)

**[30]**

**QUESTION 4: MATERIALS**

- 4.1 Complete the following sentences by writing down the missing word.
- 4.1.1 The ... (joint) ... is used to join the stiles and rails of a panel door. (1)
- 4.1.2 The ... (screw) ... is used where the head of the screw must be below the surface of the wood. (1)
- 4.1.3 Wooden joints are glued with ... (glue) .... (1)
- 4.1.4 PVC drain pipes must have a minimum inside diameter of ... (mm)... . (1)
- 4.1.5 THE ... (valve) ... is used to regulate the water pressure in a high pressure geyser. (1)
- 4.1.6 The electric box in a house that distributes electricity into the electrical circuits of a house is called a ... . (1)
- 4.2 Which TWO methods are used to connect wooden roof truss parts? (2)
- 4.3 Plastic are commonly used in the manufacturing of household appliances and can be divided into two groups. Name the TWO groups and give ONE characteristic of each one. (4)
- 4.4 Explain the mechanical and visual grading of timber. (4)
- 4.5 Different materials are used in the build environment. Write down the names of the following materials and give ONE use and ONE characteristic of each one.
- 4.5.1 Cast iron (2)
- 4.5.2 Safety glass (2)
- 4.6 Timber products have to be treated with a preservative to protect it. Name FOUR characteristics of a good preservative. (4)
- 4.7 You get the task to tile a patio of 3 meter x 4 meter. Calculate the area of the patio and determine how much tiles will be needed to tile the patio. Each tile is 250 mm x 250 mm and is laid next to each other with no gap in between. Show all calculations. (6)

**[30]**

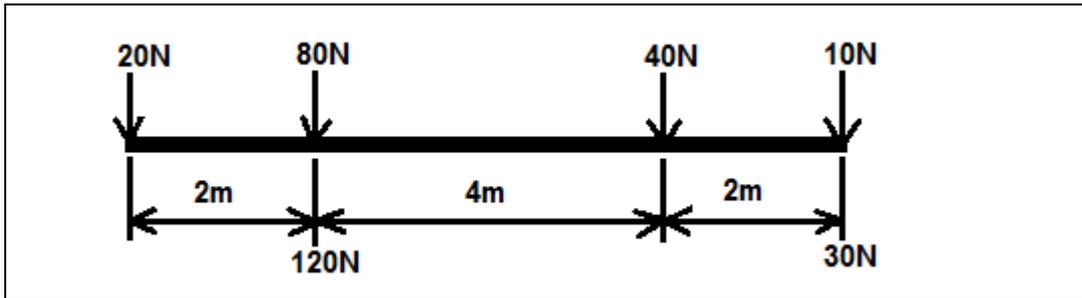
**QUESTION 5: MECHANICS**

5.1 FIGURE 5.1 show the design of a roof truss for a building.

5.1.1 Determine graphically the size of the forces in the structure. (7)

5.1.2 Complete the table on ANSWER SHEET 5.1 to show the size of the force. (7)

5.2 FIGURE 5.2 show a beam with pointed loads.



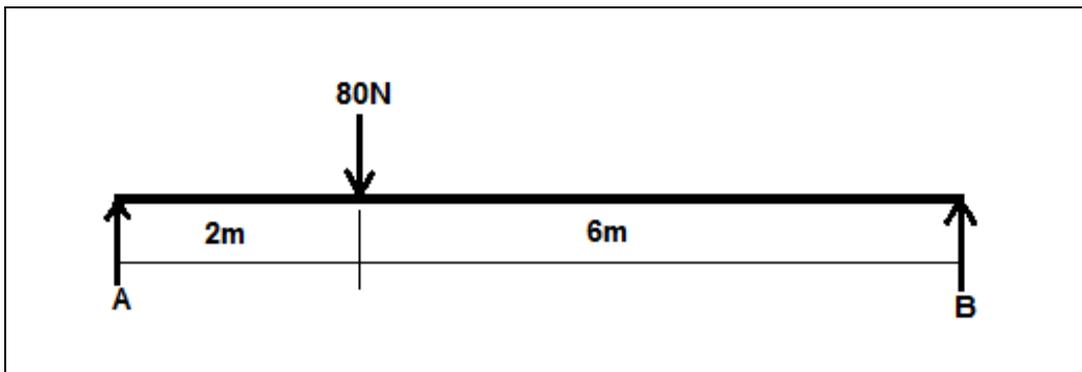
**FIGURE 5.2**

5.2.1 Calculate the bending moments at each point. (Answer on folio page.) (4)

5.2.2 Draw the bending moment diagram. (Draw on folio.)  
Use a linear scale of:  
1 mm = 1 N and a force scale of 1 cm = 1 meter. (4)

5.3 FIGURE 5.3 show a beam with pointed loads.

Calculate the reaction forces at A and B.



**FIGURE 5.3**

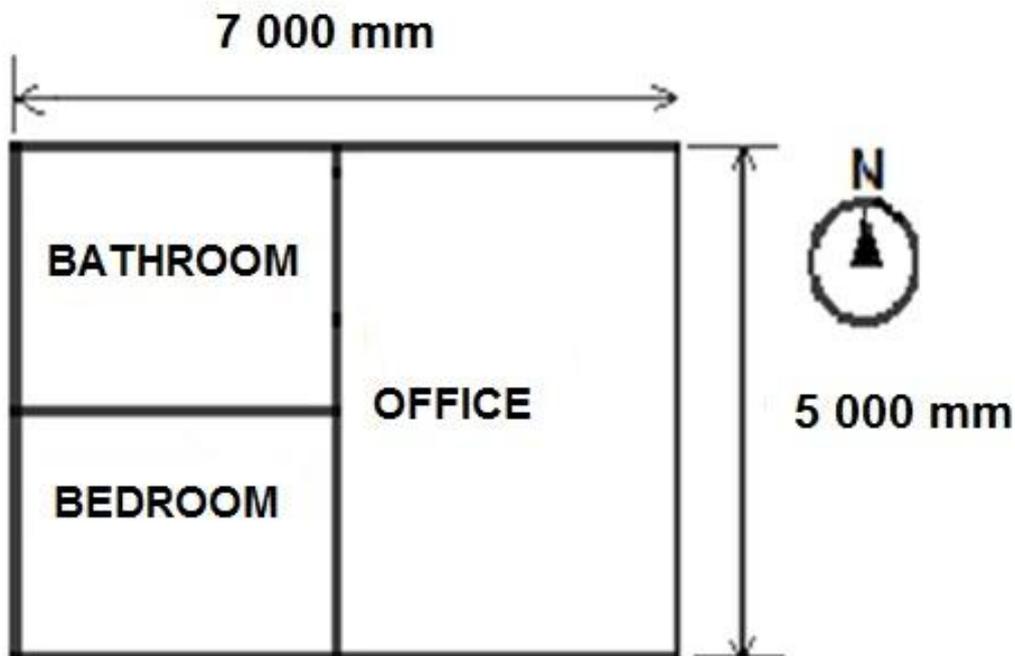
(8)  
**[30]**

**QUESTION 6: GRAPHICS AND COMMUNICATION**

- 6.1 As draughtsman you get the task to design a small building to be used by security officials at a townhouse complex. The room must have a bedroom, bathroom and an office.

Use the following specifications:

- Outside measurements of building is 7 000 mm x 5 000 mm.
- Outside doors for bedroom and office on southern side of building – 800 mm x 2 000 mm.
- Inside door between bedroom and bathroom – 800 mm x 2 000 mm
- Inside door between bathroom and office – 800 mm x 2 000 mm.
- Outside doors are cavity walls and inside walls are half brick walls.
- Bathroom has one window of 900 mm x 900 mm.
- Office has one window of 1 500 mm x 1 500 mm
- Bedroom has one window of 1 500 mm x 1 500 mm on southern side of building.
- Show shower, basin and water closet in bathroom.
- Show cabinet in bedroom and office.
- The height from floor to ceiling is 2 600 mm.
- The building has a hip roof construction with a  $30^{\circ}$  pitch and 500 mm overhang.



- 6.1 Use a scale of 1:50 and draw on ANSWER SHEET 6.1 the **floor plan** and the **south view** of the building.

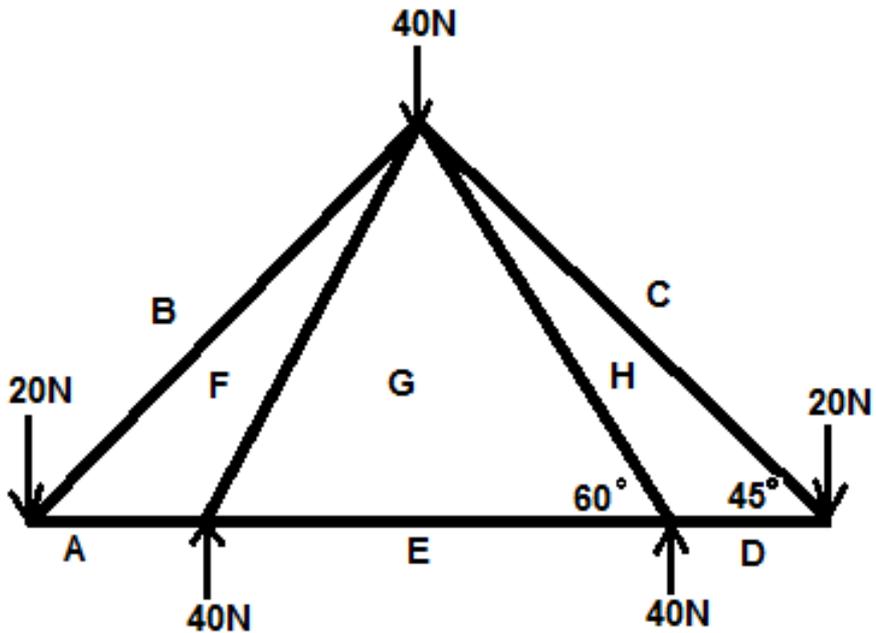
Floor plan (24) South view (16)

[40]

QUESTION 5.1

ANSWER SHEET 5.1

NAME OF CANDIDATE: \_\_\_\_\_



5.1.1 Diagram (scale 1 mm = 1 N)

(7)

+ a

5.1.2

Part	Size
BF	
CH	
DH	
EG	
AF	
FG	
GH	

(7)  
[14]



**QUESTION 6.1**

**ANSWER SHEET 6.1**

**NAME OF CANDIDATE:** \_\_\_\_\_