



**CHIEF DIRECTORATE – CURRICULUM MANAGEMENT**

**GRADE 12 LEARNER SUPPORT  
PROGRAMME**

**REVISION AND REMEDIAL TEACHING  
INSTRUMENT:  
QUESTIONS AND ANSWERS**

**SUBJECT: CIVIL TECHNOLOGY**

**June 2009**

**This document consists of 10 pages.**

***Strictly not for test/examination purposes***

**REQUIREMENTS:**

1. Drawing instruments
2. A non-programmable calculator

**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of FIVE 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's (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 4.2, QUESTION 4.3 and QUESTION 5.3 on answer sheets A to C.

**QUESTION 1**

- 1.1 The workers on a building construction site must be protected against dangerous circumstances and occupational illnesses.
- 1.1.1 Name FIVE of the equipment used by the workers to protect themselves. (5)
- 1.1.2 Name the safety precautions to be applied by workers when using hand tools. (4)
- 1.2 You are a foreman in a building construction and it is your responsibility to ensure the safe use of power tools.
- 1.2.1 Name any FOUR safety rules which are applicable when working with machinery. (4)
- 1.2.2 Name any THREE safety rules applicable when using the angle grinder. (3)
- 1.3 Name TWO safety measures that should be applied when operating cranes. (2)
- 1.4 People use stairs when moving to a higher level of the building. Which safety measures must be applied with regard to the following:
- 1.4.1 Light (1)
- 1.4.2 Obstacles (1)
- 1.5 You are a carpenter and joiner on a site, and you are required to construct the roof trusses of a building.
- 1.5.1 Name TWO hand tools that you would require to make trusses and mention ONE important safety precaution you would apply when using each tool. (4)
- 1.5.2 Briefly explain FOUR safety precautions that you would apply using a power saw. (4)

- 1.6 The table below give some of the materials used in the building industry. Complete the table by giving ONE property and ONE use of each material.

	MATERIAL	PROPERTY	USE
1.6.1	Cast iron		
1.6.2	Zinc		
1.6.3	Aluminium		

(2)

(2)

(2)

- 1.7 A number of different types of materials are available for the supply of fresh water to a house. Redraw the table below in your answer book and complete it by stating ONE advantage and ONE disadvantage of each material.

	MATERIAL	ADVANTAGE	DISADVANTAGE
1.7.1	Galvanized pipes		
1.7.2	Copper pipes		
1.7.3	PVC pipes		

(2)

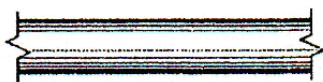
(2)

(2)

**[40]**

## QUESTION 2

- 2.1 Name FOUR materials used in the rib and block construction. (4)
- 2.2 In which unit is ready mix concrete measured? (1)
- 2.3 A flight of seven stairs is to be constructed with a landing on the top. The landing will tie into a one brick wall. Draw the formwork for the stairs to a scale 1:10 showing the section through the base of the concrete landing with concrete stairs in position. (15)
- 2.4 Define a scaffolding. (2)
- 2.5 Name TWO types of scaffolding. (2)
- 2.6 Identify the reinforcement bars labelled A to D in Figure 2.6.



2.6.A



2.6.B



2.6.C



2.6.D

(4)

- 2.7 Give the FOUR uses of the dumpy level. (4)
- 2.8 Name any FOUR parts of a dumpy level. (4)
- 2.9 Shoring or underpinning needs to be done to a building that is to be renovated. Name any TWO operations that need to be carried out to execute the smooth running of the renovation. (4)

**[40]****QUESTION 3**

- 3.1 Mr Adams must look for a suitable plot for his furniture factory. Name SEVEN factors which should be taken into account when choosing a building site and explain each factor shortly. (7x2) (14)
- 3.2 Explain TWO responsibilities of each the following role players in the building process:
- 3.2.1 Architect
- 3.2.2 Civil engineer
- 3.2.3 Building manager (6)
- 3.3 Name TWO methods to secure purlins to the rafter. (2)
- 3.4 Explain how the spacing of trusses for a tile roof differs from the spacing for a corrugated iron roof. Motivate your answer. (4)
- 3.5 What is the standard size of a wall plate for roof trusses to rest on. (2)
- 3.6 Name TWO methods to secure roof truss members when making a truss. (2)
- 3.7 Draw in good proportion a line diagram of the following roof trusses:
- 3.7.1 Howe truss (SA truss) (5)
- 3.7.2 Fink truss (5)

**[40]**

**QUESTION 4**

- 4.1 Figure 4.1 shows a beam with pointed loads.  
Calculate the reaction force of support A.

(6)

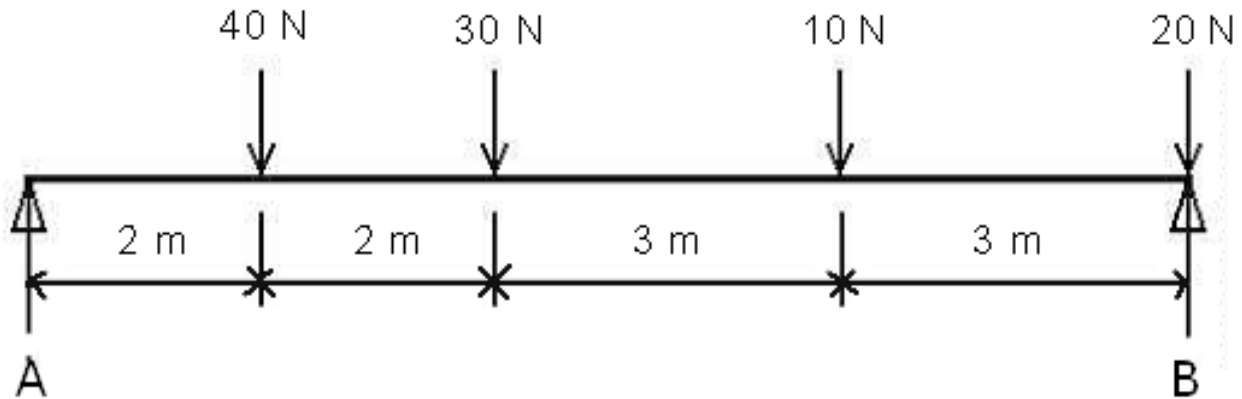


FIGURE 4.1

- 4.2 Figure 4.2 on answer sheet A shows a beam with pointed loads.  
Do the following on sheet A:

4.2.1 Calculate the shear force values

(4)

4.2.2 Complete the shear force diagram according to the shear force values

(4)

- 4.3 Figure 4.3 on answer sheet B shows a loaded roof truss. Answer the following questions with regard to the roof truss on answer sheet B:

4.3.1 Draw the force diagram of the roof truss and calculate the sizes and the nature of the forces in the parts of the roof truss.

(9)

4.3.2 Complete the table by tabulating the sizes and the nature of the forces.

(4)

- 4.4 A bar of 1,2 m has a diameter of 10 mm and lengthens by 0,3 mm when it is subjected to a load of 150 kN.

Calculate the following values of the bar:

**Show all calculations and formulae**

4.4.1 The stress value in the bar

(6)

4.4.2 The strain

(3)

4.4.3 The elasticity value of the bar

(4)

**[40]**

**QUESTION 5**

5.1 Why must sketch drawings first be submitted to the owner before the working drawings are done? (2)

5.2 Figure 5.2 shows the section view of a part of a building. Name TEN elements which are to be indicated on section views. (10)

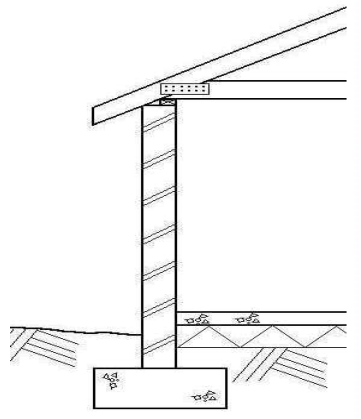


FIGURE 5.2

5.3 Figure 5.3 on answer sheet C shows a partly completed floor plan. Complete the floor plan by applying the following building drawing practices:

5.3.1 Complete the measurements of the north elevation according to the standard building drawing practice. (10)

5.3.2 Draw in the missing doors at 5.3 A and 5.3 B. (5)

5.3.3 Draw in the missing window at 5.3 C. (2)

5.3.4 Draw in the missing built-in cabinet at 5.3 D. (3)

5.3.5 Draw in good ratio the following sanitary appliances in the bath room:  
- Toilet  
- Bath  
- Shower (6)

5.4 Briefly describe the purpose of a specification list. (2)  
**[40]**

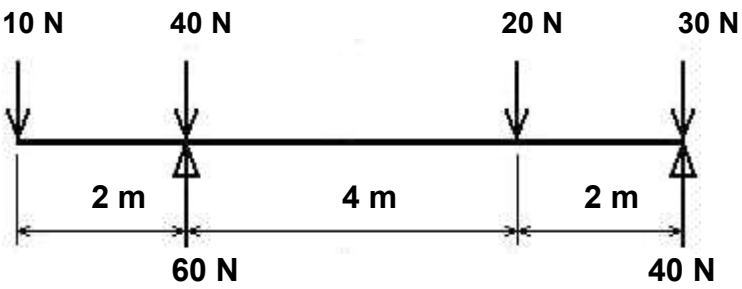
**TOTAL: 200**



ANTWOORDBLAD	<b>A</b>	SIVIELE TEGNOLOGIE	NAAM: _____
ANSWER SHEET		CIVIL TECHNOLOGY	NAME: _____

**FIG. 4.2**

**SCALE/SKAAL: 2 mm = 1 N**



4.2.1 Die skuifkragwaardes / The shear force values (4)

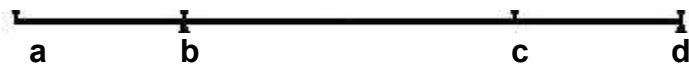
a = .....

b = .....

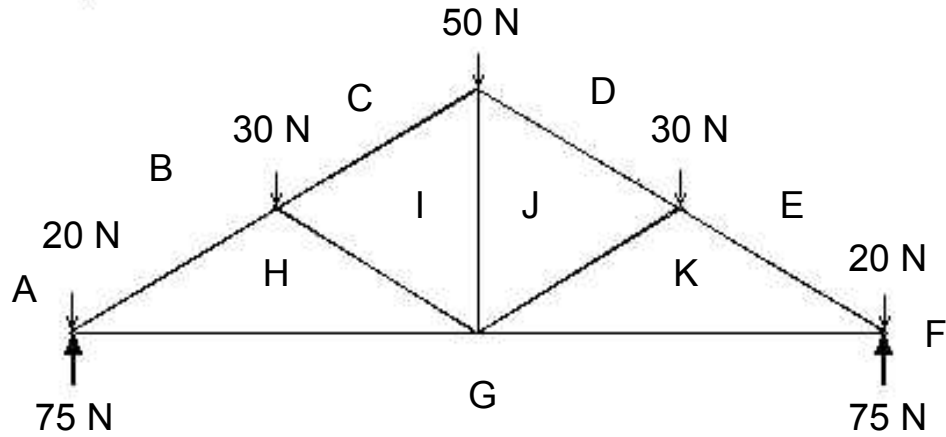
c = .....

d = .....

4.2.2 Die skuifkragdiagram / The shear force diagram (4)



ANTWOORDBLAD ANSWER SHEET	<b>B</b>	SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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**FIG. 4.3**

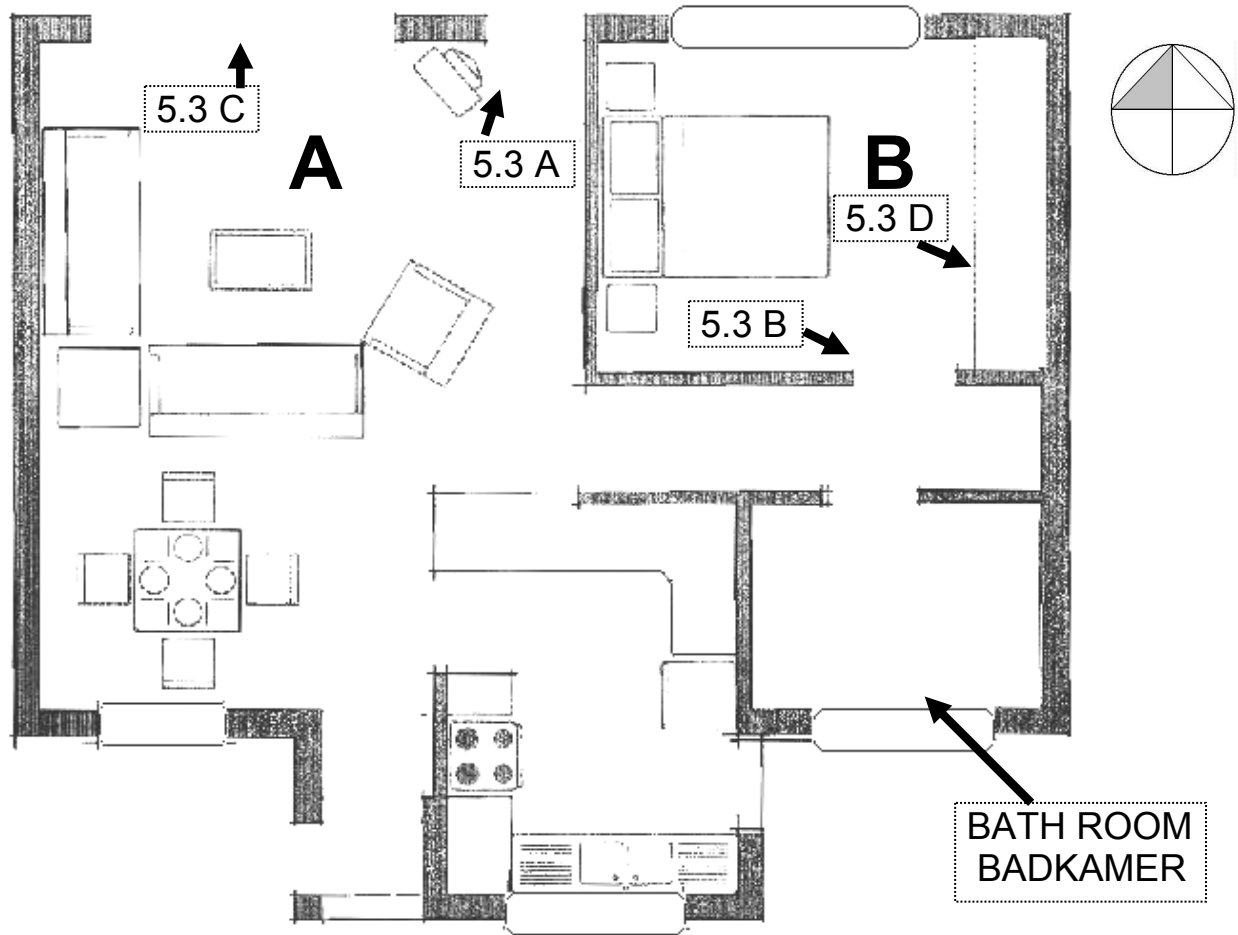
**KRAGTEDIAGRAM**  
**FORCE DIAGRAM**

Skaal/Skale: 1 N = 1 mm

DEEL PART	GROOTTE SIZE	AARD / NATURE	
		STUT STRUT	STANG TIE
BH			
CI			
DJ			
EK			
GK			
GH			
HI			
IJ			
JK			

<b>ANTWOORDBLAD</b> <b>ANSWER SHEET</b>	<b>C</b>	<b>SIVIELE TEGNOLOGIE</b>	<b>NAAM:</b> _____
		<b>CIVIL TECHNOLOGY</b>	<b>NAME:</b> _____

**FIG. 5.3**



**Buitemure / Outer walls = 220 mm**  
**Binne muur / Inner wall = 110 mm**  
**Kamer A / Room A = 7 m**  
**Kamer B / Room B = 6 m**

