Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2011

CIVIL TECHNOLOGY

MARKS: **200**

TIME: **3 hours**

* C V L T E A *

This question paper consists of 12 pages.

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 (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.

QUESTION 1: CONSTRUCTION PROCESSES

1.1 What are the vital matters you should attend first to as a first aider? (2)

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

1.3 Steps must get special attention whilst under construction. Name FOUR rules that should be applied when working on these temporary open side stairs. (4)

1.4 Describe SIX safety rules which should be applied when working on machines. (6)

1.5 Name the THREE elements which must be present in any fire. (3)

1.6 How is the thickness of glass for windows determined? (2)

1.7 Aluminium is commonly used in the building industry. Name FOUR characteristics of aluminium. (4)

1.8 Name THREE reasons for using copper pipes for plumbing. (3)

1.9 Name THREE types of glass that can be used in windows and doors at a household. (3)

[30]

QUESTION 2: ADVANCED CONSTRUCTION PROCESSES

2.1 Indicate whether the following statements are TRUE or FALSE. Choose the correct answer and write only TRUE or FALSE next to the question number.

2.1.1 A circular saw is used to cut circles out of wood. (1)

2.1.2 When planning wide pieces of wood on the surface planer, you must remove the safety guards. (1)

2.1.3 An electrical hand drill is used for drilling holes in wood and metal. (1)

2.1.4 A hand hawk is used to plaster walls and for smoothing walls. (1)

2.1.5 A bench grinder is used to sand wood smooth. (1)

2.1.6 A spirit level is a measuring tool to check horizontal and vertical levels. (1)

2.2 Describe the function of the following power tools on a building site:

2.2.1 Bandsaw

2.2.2 Thicnesser

2.2.3 Drill press

2.2.4 Concrete mixer (4)

2.3 Describe the care and maintenance of electrical tools in a building environment. (7)

2.4 Which requirements must be taken into account when using reinforcement steel bars? (4)

2.5 Reinforcing in a concrete beam consists mainly of main bars, shear bars, anchor bars and stirrups. Explain the use of each bar. (4)

2.6 State the erecting requirements when doing **formwork** for a concrete column. (5)

2.7 Draw to scale 1:10 a vertical cross section through a horizontal concrete beam.
Show all the reinforcement bars in position and label all parts. The concrete beam is 500 mm high and 300 mm thick. (Draw on folio paper.) (10)
[40]

QUESTION 3: CIVIL SERVICES

3.1 What type of taps would you use for the following sanitary fittings?

3.1.1 Basin

3.1.2 Water closet

3.1.3 Gulley

3.1.4 Geyser system (4)

3.2 Galvanised pipes are commonly used in households. Name THREE advantages and THREE disadvantages of galvanised pipes. (6)

3.3 Explain the function of the following fittings which are used at water installations:

3.3.1 Ball valve (1)

3.3.2 P-trap (1)

3.3.3 Inspection eye (1)

3.3.4 Drip tray (1)

3.4 Different types of pipes are used for water installations in households. Name FIVE factors that should be taken into account when choosing pipes. (5)

3.5 Describe the tests you would use, to check for straightness and blockages in drain pipes. (4)

3.6 Explain the purpose of a meter box and a distribution box in an electrical system at a house. (2)

3.7 State the abbreviations for the following:

3.7.1 Inspection eye (1)

3.7.2 Manhole (1)

3.7.3 Gully (1)

3.7.4 Shower (1)

3.7.5 Waste pipe (1)

[30]

QUESTION 4: MATERIALS

4.1 As building contractor you are asked to do a concrete walkway in front of a house. The concrete walkway must be 1,5 metres wide, 9 metres long and 100 mm thick. Calculate the volume of concrete you would need to do the walkway. All calculations must be shown. (5)

4.2 Name the basic joining methods to join steel roof truss parts as it is used in the building environment. (3)

4.3 Complete the following sentences by writing down the missing word:

4.3.1 The ... (type of joint) … is used for a drawer construction. (1)

4.3.2 The … (type of joint) ... is used for shelving construction. (1)

4.3.3 The ... (type of anchor) … is used to fix medium loads such as brackets to brickwork. (1)

4.3.4 Fitting for copper pipes that work with a nut which fit over a treaded end are called ... (type of joint). (1)

4.3.5 At cavity walls ... (type of tie) ... are used to join the two brick layers together. (1)

4.3.6 Prestressed lintels are used above ..(i).. and ...(ii).... in the building of a house. (2)

4.4 State FOUR advantages for using cavity walls for the outside walls of a house. (4)

4.5 Different methods can be used for installing glass bricks. Name THREE methods that can be used. (3)

4.6 Explain what a R-bar and a Y-bar is as types of steel that can be used for reinforcing. (2)

4.7 Name FOUR advantages of the use of precast concrete lintels. (4)

4.8 Name TWO types of materials that can be used as covering for hollow core doors. (2)

[30]

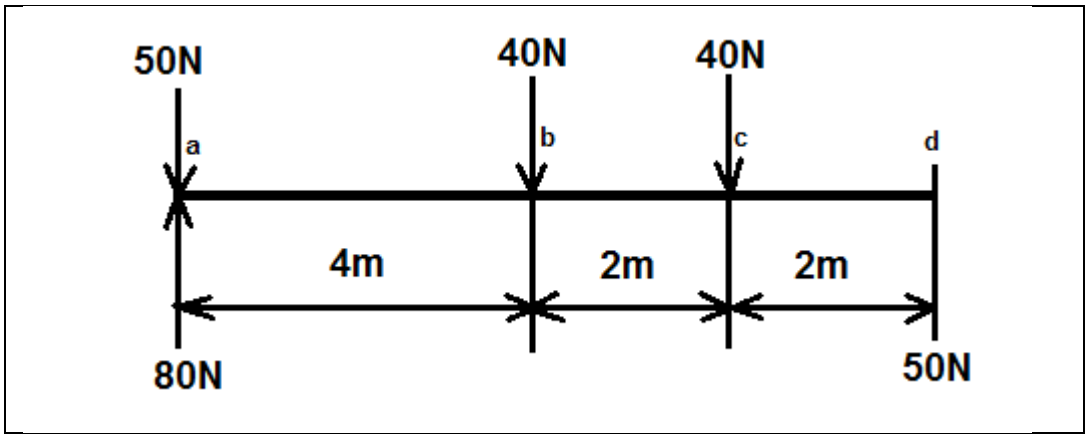
QUESTION 5: APPLIED MECHANICS

5.1 A beam with pointed loads are shown on ANSWERSHEET 5.1.
Calculate on ANSWERSHEET 5.1 the following:

5.1.1 The shear force values. (4)

5.1.2 Complete the shear force diagram according to the shear force values. (6)

5.2 A beam with pointed loads is shown below.
Determine the bending moment values and show all calculations. (8)



5.3 Calculate the centroid from point P and show all calculations and formula.
Use ANSWER SHEET 5.3 to complete the table and calculate the position of the centroid. (12)
[30]

QUESTION 6: GRAPHICS AND COMMMUNICATION

6.1 As draughtsman you are asked to design and draw a small building to be used as a storeroom and a bathroom for a sport club. Sports equipment will be kept in the storeroom and the bathroom will be used for coaches and referees.

Use the following specifications:

- Outside measurements of building is 8 000 mm x 5 000 mm.
- Bathroom is 5 000 mm x 3 500 mm.
- Outer doors for storeroom and bathroom are 800 mm x 2 000 mm.
- Bathroom has two windows of 900 mm x 900 mm.
- Storeroom has one window of 2 400 mm x 1 200 mm.
- Bathroom must have a shower, basin and water closet.
- Outer walls are cavity walls and the inner wall is a half brick wall.
- Show one built-in cabinet in the bathroom.

Use a scale of 1:50 to draw on ANSWER SHEET 6.1 the floor plan of the building. (24)

6.2 Use a scale of 1:10 to draw the front view of the three-panel door to be used as outer door for the building. Answer on ANSWER SHEET 6.2.

Specifications:

- The three panels are raised and fielded panels.
- All stiles are 100 mm wide.
- Lock rail and bottom rail is 200 mm wide.
- Top rail is 100 mm wide.
- Door is 2 000 mm high and 800 mm wide.

Label all parts and show the outer measurement of the door. (16)
[40]

TOTAL: 200

ANSWER SHEET 5.1

NAME AND SURNAME: .....

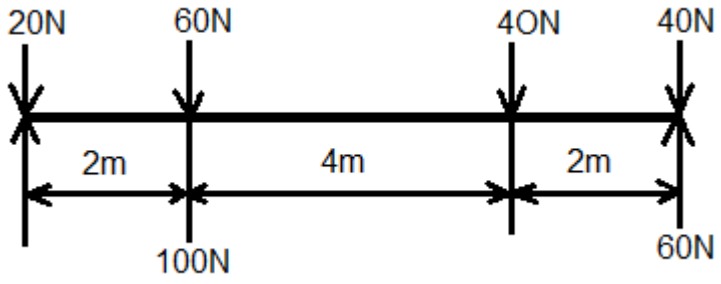
QUESTION 5.1

5.1 5.1.1 The shear force values.

a = ...
b = ...
c = ...
d = ... (4)

5.1.2 The shear force diagram. (6)

SCALE: 1 mm = 2 N

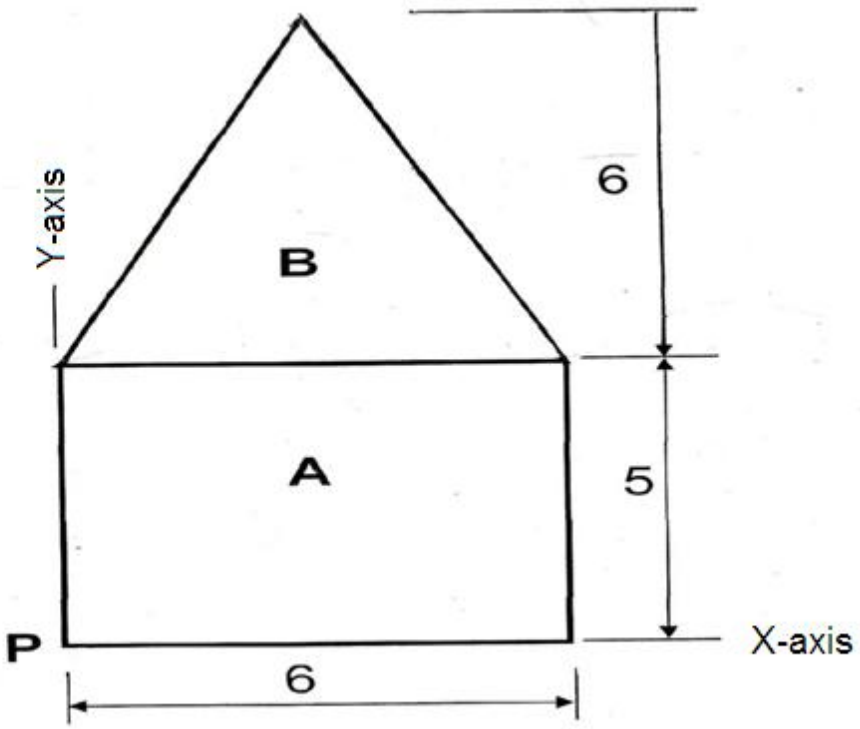


a **b** **c** **d**

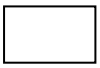
[10]

QUESTION 5.3

NAME AND SURNAME: .....



√ = ½
√ = 1

Form	Area	X	AX	Y	AY
A 	(1)	(1)	(½)	(1)	(½)
B 	(1)	(1)	(½)	(1)	(½)
Total	(1)		(½)		(½)

X= — (½) = …3 ….(½) Y = — √ (½) = ….(½) (25)

QUESTION 6.1 **NAME OF CANDIDATE:** _____

ANSWER SHEET 6.1

(24)

QUESTION 6.2 **NAME OF CANDIDATE:** _____

ANSWER SHEET 6.2

(16)