



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2020**

**CIVIL TECHNOLOGY: CIVIL SERVICES  
(EXEMPLAR)**

**MARKS: 200**

**TIME: 3 hours**

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This question paper consists of 15 pages, including 1 answer sheet.

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**REQUIREMENTS:**

1. ANSWER BOOK
2. Drawing instruments
3. A non-programmable pocket calculator

**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of SIX questions: THREE questions are generic and THREE questions are subject specific.
2. Answer ALL the questions.
3. Answer each question as a whole. Do NOT separate subsections of questions.
4. Start the answer to EACH question on a NEW page.
5. Do NOT write in the margins of the ANSWER BOOK.
6. You may use sketches to illustrate your answers.
7. Write ALL calculations and answers in the ANSWER BOOK or on the attached ANSWER SHEETS.
8. Use the mark allocation as a guide to the length of your answers.
9. Make drawings and sketches in pencil, fully dimensioned and neatly finished off with descriptive titles and notes to conform to the *SANS/SABS Code of Practice for Building Drawings*.
10. For the purpose of this question paper, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
11. Use your own discretion where dimensions and/or details have been omitted.
12. Answer QUESTIONS 5.1 and 5.2 on the attached ANSWER SHEETS, using drawing instruments where necessary.
13. Write your NAME on all ANSWER SHEETS and hand them in with your ANSWER BOOK, whether you have answered the question or not.
14. Drawings in the question paper are NOT to scale.

**QUESTION 1: SAFETY AND MATERIALS (GENERIC)**

Start this question on a NEW page.

- 1.1 What type of personal protective clothing is compulsory to wear on a building site at all times? (1)
- 1.2 Why should you remove your tie when you are operating machines with moving parts? (1)
- 1.3 Identify the following statements as TRUE or FALSE.
- 1.3.1 Two operators are allowed to operate a machine at the same time. (1)
- 1.3.2 Petrol engines may be used inside the workshop. (1)
- 1.3.3 Carry tools with sharp points facing downwards. (1)
- 1.3.4 Non-slip footwear is compulsory when you operate machinery. (1)
- 1.4 Answer the following questions with regard to the storing of materials on site.
- 1.4.1 What can materials be placed on if they cannot be stored directly onto the floor? (1)
- 1.4.2 Why should heaps of sand and stone be covered with plastic? (1)
- 1.4.3 Why should there be dividing walls to separate sand and stone? (1)
- 1.5 Calculate the maximum width of the stacked material if the stack is 1 800 mm high. (Show calculations.) (2)
- 1.6 What is the difference between unreinforced concrete and reinforced concrete? (1)
- 1.7 Name ONE purpose of coarse aggregate in a concrete mixture. (1)
- 1.8 What type of material increases the plasticity of mortar mixtures? (1)
- 1.9 What type of material is used as a levelling layer on concrete floors? (1)
- 1.10 Name the TWO main groups into which wood can be divided. (2 x 1) (2)
- 1.11 Name ONE use of plywood. (1)

- 1.12 Identify the following metals as FERROUS or NON-FERROUS:
- 1.12.1 Copper (1)
  - 1.12.2 Cast iron (1)
- 1.13 Name ONE use of lead in the building environment. (1)
- 1.14 Name ONE use of stainless steel in the building environment. (1)
- 1.15 Describe in steps how PVC adhesives must be used. (3 x 1) (3)
- 1.16 What is the minimum thickness of a windowpane? (1)
- 1.17 Name TWO uses of translucent glass. (2 x 1) (2)
- 1.18 Name the TWO main groups into which plastic can be divided. (2 x 1) (2)
- [30]**

**QUESTION 2: EQUIPMENT, TOOLS AND GRAPHICS (GENERIC)**

Start this question on a NEW page.

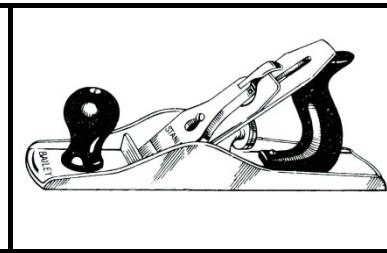
- 2.1 Why must a spade be oiled lightly when it is not used? (1)
- 2.2 Briefly explain the difference in the uses of the cold chisel and bolster. (2)
- 2.3 Name the tools in FIGURES 2.3.1 to 2.3.3 and name ONE use of each. (6)



**FIGURE 2.3.1**



**FIGURE 2.3.2**



**FIGURE 2.3.3**

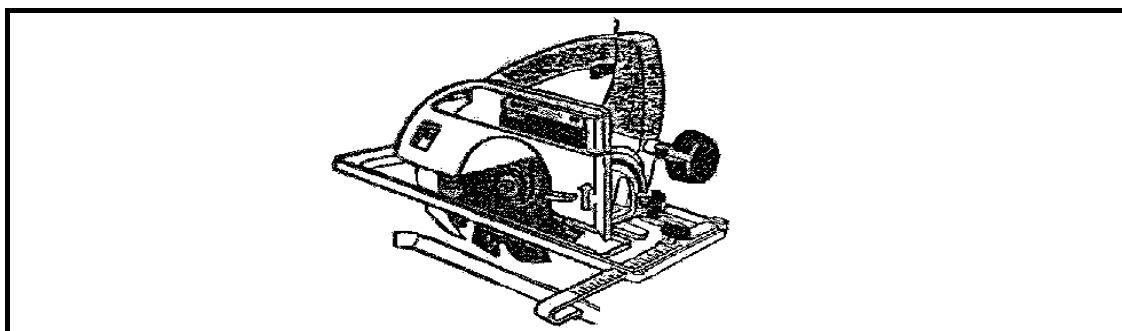
(3 x 2) (6)

- 2.4 Answer the following questions with regard to the tool in FIGURE 2.4.



**FIGURE 2.4**

- 2.4.1 What is this tool called? (1)
  - 2.4.2 Briefly explain how this tool will be used during the installation of a doorframe. (2)
  - 2.4.3 Name TWO caring measures of this tool. (2 x 1) (2)
- 2.5 Answer the following questions with regard to the tool in FIGURE 2.5.



**FIGURE 2.5**

- 2.5.1 What is this tool called? (1)
- 2.5.2 Name TWO uses of this tool. (2 x 1) (2)

- 2.6 Answer the following questions with regard to the detail drawing in FIGURE 2.6.

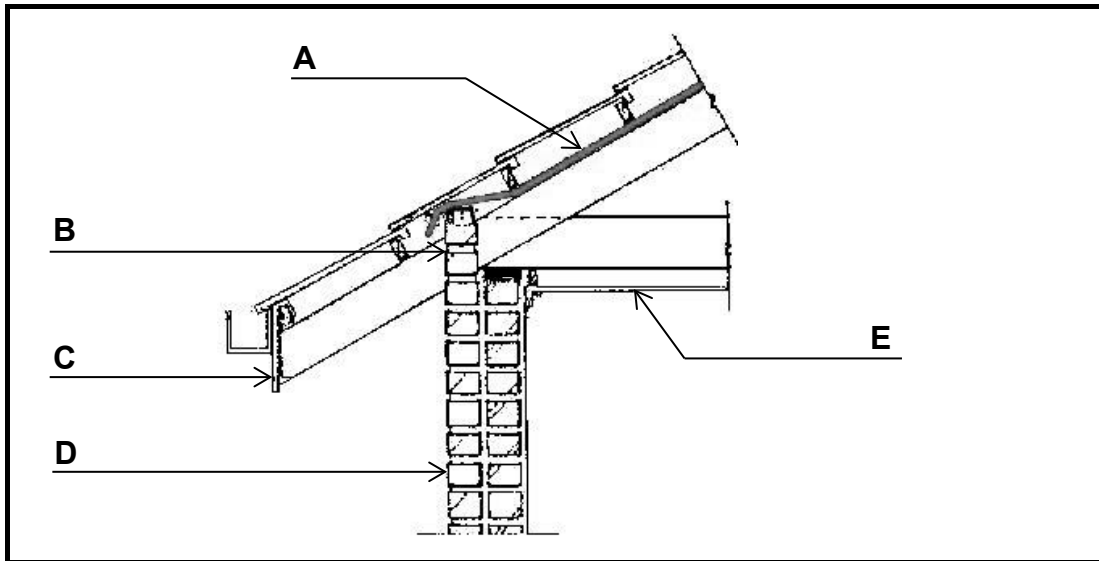


FIGURE 2.6

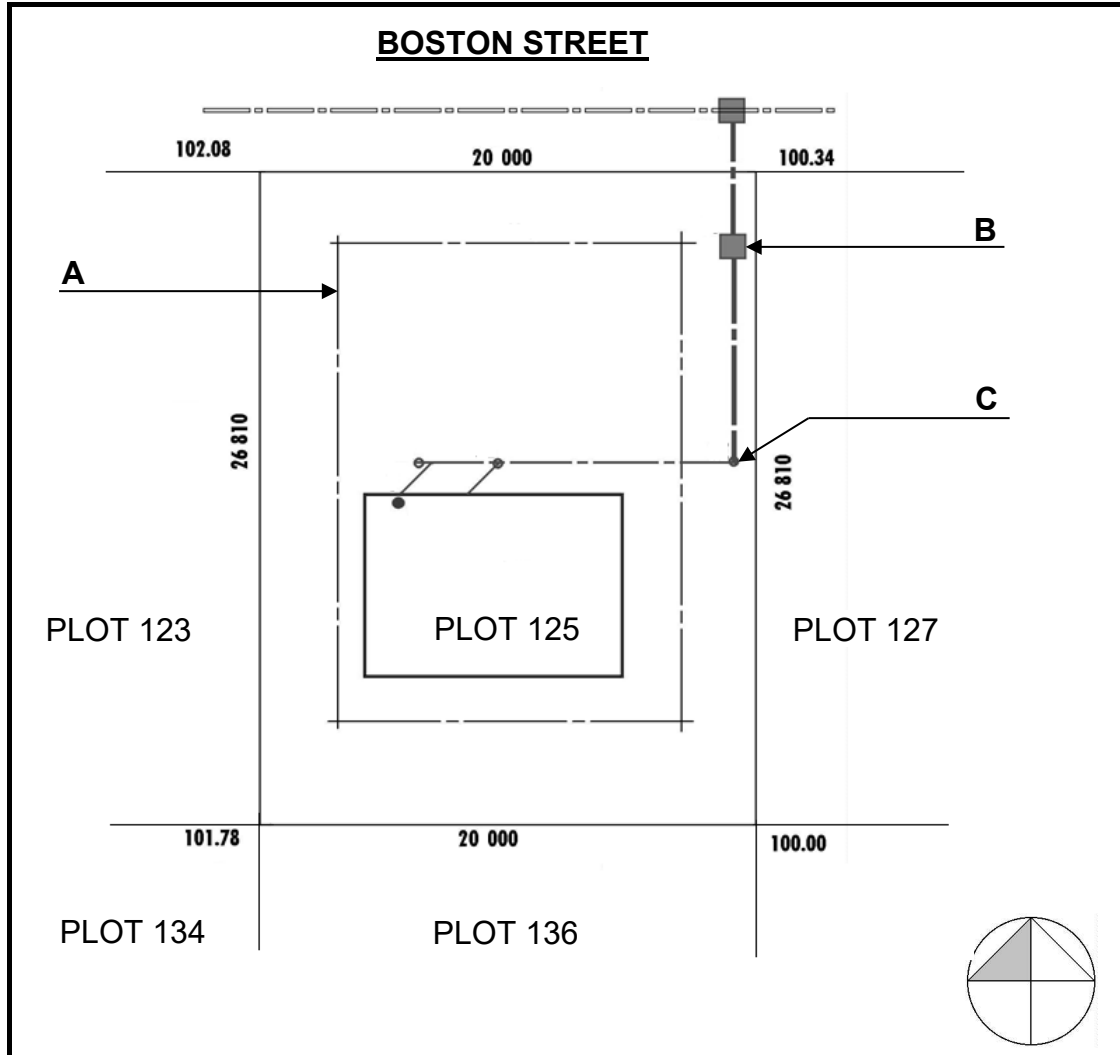
- 2.6.1 Why are detail drawings drawn on an enlarged scale? (1)
- 2.6.2 Briefly motivate why descriptive notes are included on detail drawings. (2)
- 2.6.3 Which type of eave construction is illustrated in FIGURE 2.6? (1)
- 2.6.4 Name parts **A** to **E**. (5)
- 2.6.5 What is the purpose of part **B**? (1)
- 2.6.6 What is the purpose of part **C**? (1)
- 2.7 Explain the purpose of the control test for floor plan dimensions. (2)
- 2.8 Explain the position, on the drawing sheet for building plans, where the north arrow must be indicated. (2)
- 2.9 On which scale are floor plans usually drawn? (1)
- 2.10 Identify the following abbreviations on elevations of buildings:
- 2.10.1 NGL (1)
- 2.10.2 FFL (1)
- 2.11 Make neat sketches to illustrate the following symbols on floor plans:
- 2.11.1 Window (2)
- 2.11.2 Electricity meter (2)
- 2.11.3 Drain (1)

[40]

**QUESTION 3: JOINING AND GRAPHICS (GENERIC)**

Start this question on a NEW page.

3.1 Answer the following questions with regard to the plan elevation in FIGURE 3.1.



**FIGURE 3.1**

- 3.1.1 What is the plan elevation called? (1)
- 3.1.2 What is the plot number of the plot at the west side of plot 125? (1)
- 3.1.3 What are the lines at **A** called? (1)
- 3.1.4 Identify the symbols at **B** and **C**. (2 x 1) (2)

- 3.2 Name ONE use of PVC glue. (1)
- 3.3 Which adhesive joining material consists of glue? (1)
- 3.4 Make neat sketches to illustrate the following symbols on a floor plan:
- 3.4.1 Gully (2)
- 3.4.2 Earth (2)
- 3.4.3 Dressed wood (2)
- 3.5 Briefly describe the application steps of PVA adhesive. (3 x 1) (3)
- 3.6 Briefly name THREE precautions when using contact glue. (3 x 1) (3)
- 3.7 Name any FIVE uses of silicone. (5 x 1) (5)
- 3.8 State TWO properties of EACH of the following adhesives:
- 3.8.1 Silicone (2)
- 3.8.2 Contact glue (2)
- 3.8.3 PVA glue (2)

**[30]**



**QUESTION 4: SAFETY, MATERIAL, EQUIPMENT AND JOINING (SPECIFIC)**

Start this question on a NEW page.

- 4.1 Briefly describe how sewage from informal settlements influences the water quality of dams. (2)
- 4.2 Briefly explain why sewage is a health risk. (2)
- 4.3 What is the best method to treat a light burn wound caused by a solder iron? (1)
- 4.4 Name THREE uses of ceramic products in a home. (3 x 1) (3)
- 4.5 Which type of metal is used in the manufacturing of the following plumbing materials?
- 4.5.1 Manhole covers (1)
- 4.5.2 Sinks (1)
- 4.5.3 Pressure control valves (1)
- 4.5.4 Vacuum breakers (1)
- 4.5.5 Hot-water pipes (1)
- 4.6 Choose a tool in COLUMN B that fits the use in COLUMN A. Write only the letter (A–E) next to the question numbers (4.6.1–4.6.3) in the ANSWER BOOK for example 4.6.4 F.

COLUMN A	COLUMN B
4.6.1 Tightening of bolts	A Ball-peen hammer
4.6.2 Clamping work pieces to be sawed	B Tin snips
4.6.3 Forming the new head of a rivet	C Spanners
	D Pliers
	E Bench vice

(3 x 1) (3)

- 4.7 Name TWO maintenance measures applicable to the rolling machine. (2 x 1) (2)
- 4.8 Name the TWO methods of bending low-pressure polythene pipes. (2 x 1) (2)

4.9 Answer the following questions with regard to the tool in FIGURE 4.9.



**FIGURE 4.9**

- 4.9.1 What is this tool called? (1)
- 4.9.2 Name the use of this tool. (1)
- 4.9.3 Describe in point form the method in which this tool must be used. (4)
- 4.10 Fully motivate why pipes must be secured firmly during the installation process. (2)
- 4.11 What is the purpose of teflon tape when pipes are joined? (1)
- 4.12 What is the purpose of the pre-made weak spot of the pop rivet pin? (1)

**[30]**

**QUESTION 5: GRAPHICS, CONSTRUCTION AND JOINING (SPECIFIC)**

Start this question on a NEW page.

- 5.1 Use your drawing instruments and divide the line XY on ANSWER SHEET 1 into six equal parts. Show all construction lines. (3)
- 5.2 FIGURE 5.2 on ANSWER SHEET 1 shows the top and side views of a 250 x 250 mm square pipe with a length of 500 mm. The joint of the pipe is in the middle of side AD.
- Use ANSWER SHEET 1 and develop and draw the development of the pipe on scale 1 : 10. (11)
- 5.3 Briefly motivate why the casting of concrete on very cold days must be avoided. (2)
- 5.4 What is the minimum thickness of the concrete slab for a manhole? (1)
- 5.5 Indicate whether the following statements are TRUE or FALSE. Write only the word 'true' or 'false' next to the number in the ANSWER BOOK.
- 5.5.1 The placing of concrete must be started in the corners nearest to the concrete mixer. (1)
- 5.5.2 Concrete should be poured 200 mm higher than the correct height to provide for the settling of the concrete. (1)
- 5.5.3 Concrete should be left to harden for two days before building on it. (1)
- 5.6 Briefly explain the procedure of levelling a compacted concrete slab with a wooden beam. (2)
- 5.7 Name TWO reasons for floating concrete. (2 x 1) (2)
- 5.8 When copper pipes are bent by means of sand, the sand must comply with certain properties. Name TWO properties of this kind of sand. (2 x 1) (2)
- 5.9 Describe in point form the method of joining polythene pipes with heat fusion. (4)

**[30]**

### QUESTION 6: COLD- AND HOT WATER SUPPLY, DRAINAGE AND SANITARY FITMENTS (SPECIFIC)

Start this question on a NEW page.

6.1 Answer the following questions with regard to the water supply system for a household in FIGURE 6.1.

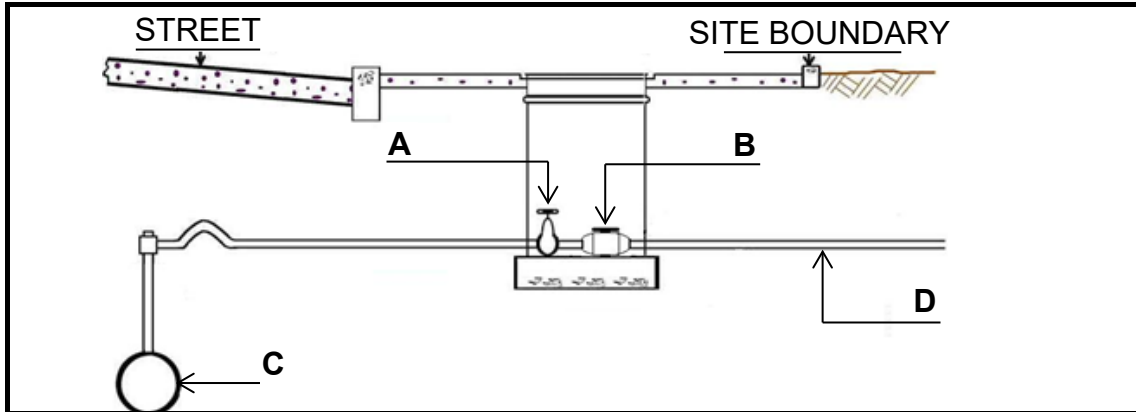


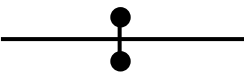


FIGURE 6.1

- 6.1.1 Name the installations **A** and **B**. (2)
- 6.1.2 What is the purpose of installation **B**? (1)
- 6.1.3 Name the pipelines **C** and **D**. (2)
- 6.1.4 What is the diameter size of the pipe at **D**? (1)
- 6.1.5 Motivate why the pipeline at **D** must be laid at least 450 mm underground. (2)
- 6.2 Name THREE disadvantages of the use of galvanised pipe for water supply. (3 x 1) (3)
- 6.3 Answer the following questions with regard to the fitting in FIGURE 6.3.



FIGURE 6.3

- 6.3.1 What is this fitting called? (1)
- 6.3.2 Which type of pipe is joined with this type of fitting? (1)
- 6.3.3 Which joining method is used to join this fitting to pipes? (1)

- 6.4 Identify the following symbols that are used for cold water systems:
- 6.4.1  (1)
- 6.4.2  (1)
- 6.4.3  (1)
- 6.5 Briefly motivate why the cold-water inlet pipe is at the bottom side of the high-pressure geyser. (2)
- 6.6 Explain the purpose of the thermostat in the high-pressure geyser. (2)
- 6.7 Explain why the hot-water outlet pipe is at the top of a high-pressure geyser. (2)
- 6.8 Choose the correct answer from those in brackets and write it next to the question numbers (6.8.1–6.8.3) in the ANSWER BOOK.
- 6.8.1 The (**anode / element**) heats up the water in the geyser. (1)
- 6.8.2 Vacuum breakers are installed (**300 mm / 330 mm**) above the geyser. (1)
- 6.8.3 A (**20 mm / 50 mm**) drainpipe is connected to the drip tray. (1)
- 6.9 Name TWO reasons why hot-water pipes from geysers must be isolated. (2 x 1) (2)
- 6.10 When storm water subsoil drainage pipes are installed, holes must be drilled into both sides of the upper third of the pipes. What is the purpose of these holes? (1)
- 6.11 Briefly motivate why storm water must be led away from buildings. (1)
- 6.12 Describe the regulation which is applicable when soil fixtures are permanently disconnected. (2)
- 6.13 Identify the following abbreviations for drainage systems:
- 6.13.1 RWP (1)
- 6.13.2 ST (1)
- 6.13.3 WHB (1)

- 6.14 Briefly motivate why the stub-stack system is cheaper than other drainage systems. (2)
- 6.15 Identify parts **A** to **C** of the cistern in FIGURE 6.15. (3)

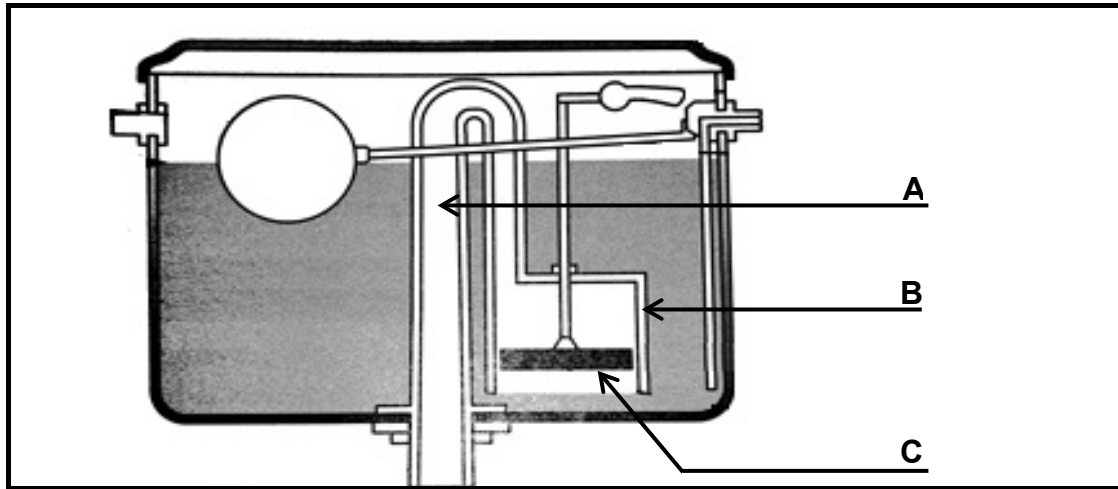


FIGURE 6.15

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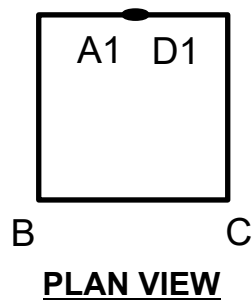
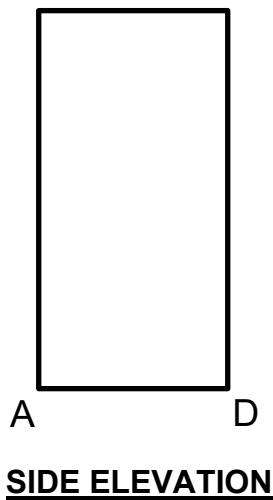
TOTAL: 200

<b>ANSWER SHEET 1</b>	<b>CIVIL TECHNOLOGY CIVIL SERVICES</b>	NAME: _____

5.1 Use your drawing instruments and divide the line XY on ANSWER SHEET 1 into six equal parts. Show all construction lines. (3)



5.2 FIGURE 5.2 on ANSWER SHEET 1 shows the top and side views of a 250 x 250 mm square pipe with a length of 500 mm. The joint of the pipe is in the middle of side AD. Use ANSWER SHEET 1 and develop and draw the development of the pipe on scale 1 : 10. (11)



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Baseline	2	
Corner lines	6	
Joint allowance	2	
Scale	1	
<b>TOTAL</b>	<b>11</b>	