



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL TECHNOLOGY**

**FEBRUARY/MARCH 2012**

**MARKS: 200**

**TIME: 3 hours**

**This question paper consists of 12 pages and 1 answer sheet.**

**INSTRUCTIONS AND INFORMATION**

1. GENERAL INSTRUCTIONS AND INFORMATION
  - 1.1 This question paper consists of TWO sections, namely SECTION A and SECTION B.
  - 1.2 BOTH sections are COMPULSORY.
2. SECTION A: MULTIPLE-CHOICE QUESTIONS
  - 2.1 Answer the questions from this section on the attached ANSWER SHEET.
  - 2.2 Follow the instructions when answering the multiple-choice questions.
  - 2.3 Place the COMPLETED ANSWER SHEET in the ANSWER BOOK.
3. SECTION B: STRUCTURED QUESTIONS
  - 3.1 This section consists of FIVE questions.
  - 3.2 Answer the questions from this section in the ANSWER BOOK.
  - 3.3 Number the answers correctly according to the numbering system used in this question paper.
  - 3.4 Start EACH question on a NEW page.
  - 3.5 It is in your own interest to pay attention to the accuracy and neatness of your work.

**SECTION A****QUESTION 1**

Various options are provided as possible answers to the following questions. Choose the answer and make a cross (X) in the block (A–C) next to the question number (1.1–1.20) on the attached ANSWER SHEET.

EXAMPLE:

1.0	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C
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- 1.1 When the diesel mixture is too rich ... smoke can be seen at the exhaust of a diesel tractor.
- A blue  
B black  
C white (2)
- 1.2 A tool that is driven by oil is a(n) ... tool.
- A hydraulic  
B pneumatic  
C electrical (2)
- 1.3 The most important drawing used for the building of structures on the farm is the ... because it shows all the required detail.
- A locality plans  
B setting/laying-out drawings  
C site plan (2)
- 1.4 Light-absorbing screens are used around the ...
- A greenhouse.  
B welding station.  
C weather station. (2)
- 1.5 When welding cast iron, a specific electrode must be used. The type of material that will be used to manufacture the inner core of such an electrode is ...
- A copper.  
B mild steel.  
C nickel. (2)
- 1.6 The factor that can cause welding joints to distort is ...
- A using a direct current welder.  
B the wrong electrode coating.  
C the wrong welding procedure. (2)

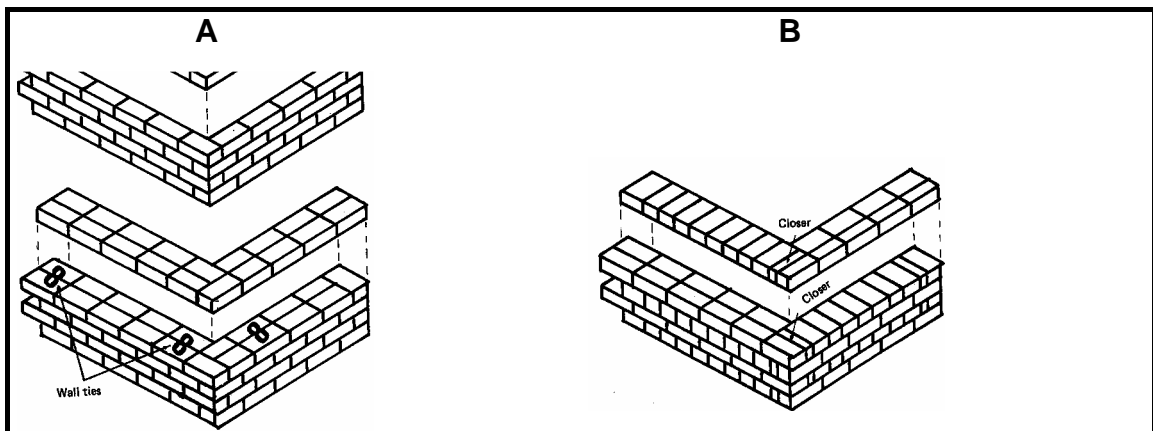
- 1.7 Give the reason why penetration problems appear during the welding process:
- A The wrong angle of the electrode in relation to the work piece
  - B Dirty metal
  - C The wrong welding technique (2)
- 1.8 If an alternating current is required, but only direct current is available, a(n) ... is used to change the direct current to alternating current.
- A transformer
  - B alternator
  - C distributor (2)
- 1.9 Perspex is an example of a plastic that is ...
- A very resistant to heat.
  - B the least heat resistant.
  - C temperature resistant. (2)
- 1.10 Energy that is obtained from plants like sunflowers, is called ...
- A nuclear energy.
  - B geothermal energy.
  - C bio-energy. (2)
- 1.11 Increasing or decreasing the resistance to the hay moving through the baling chamber of a rectangular baler ...
- A can change the tempo of baling.
  - B can change the form of the bales.
  - C can change the bale density. (2)
- 1.12 The main reason for metal fatigue in a hammer mill is ...
- A vibration.
  - B coarseness of the sieves.
  - C a clogged cyclone. (2)
- 1.13 Devices like cellphones and computers can be used to activate ...
- A mechanical systems.
  - B centre-pivot irrigation systems.
  - C feeding systems. (2)

- 1.14 A GPS system that was developed by the government of the United States of America determines ...
- A your crop production.
  - B exact global positions.
  - C unproductive patches in your field. (2)
- 1.15 Stretching is a disadvantage of a ...
- A flat belt.
  - B V-belt.
  - C driving chain. (2)
- 1.16 Which ONE of the following best describes the process of electroplating?
- A Surface treatment of steel to prevent corrosion
  - B Changing the molecular structure of steel to make it more durable
  - C Painting the steel plates with zinc oxide for decorative purposes (2)
- 1.17 Standardisation of farm implements is done in order to ...
- A save money.
  - B keep fewer replacement parts in stock.
  - C Both A and B (2)
- 1.18 The ... welding machine is the best machine to use when welding thin sheet metal at a low temperature.
- A arc
  - B direct-current
  - C MIG (2)
- 1.19 A drainage pipe with a diameter of ... mm is usually connected to the outlet of a toilet.
- A 75
  - B 100
  - C 200 (2)
- 1.20 Depreciation of fixed expenses is associated with ... on the farm.
- A tractors
  - B wild animals
  - C natural water sources (2)

**TOTAL SECTION A: 40**

**SECTION B****QUESTION 2: MATERIALS AND STRUCTURES**

- 2.1 Explain FIVE advantages of adding an element like chromium to stainless steel. (5)
- 2.2 List the requirements that should be met when erecting fences on a farm. (7)
- 2.3 Describe any FOUR factors that should be kept in mind when installing water troughs for animals.
- 2.4 Answer the following questions on roof trusses.
- 2.4.1 Explain why pressed wood is not an effective material for roof trusses. Give a reason for your answer. (2)
- 2.4.2 Discuss the reasons why triangular constructions are used in the design of roof trusses. (4)
- 2.5 A farmer needs to take the applicable building rules into account when he/she wants to build a structure. Faulty constructions can lead to great losses due to the high cost of building material.



- 2.5.1 Identify the bonding method used for the construction of a brick wall as shown above in FIGURES A and B. (2)
- 2.5.2 Damp course can be used under the concrete slab of a foundation. Discuss the method and the reasons why and where damp course can be used. (5)
- 2.6 Describe the process of galvanising. Name the type of steel commonly used for this process. (6)
- [35]**

**QUESTION 3: ENERGY**

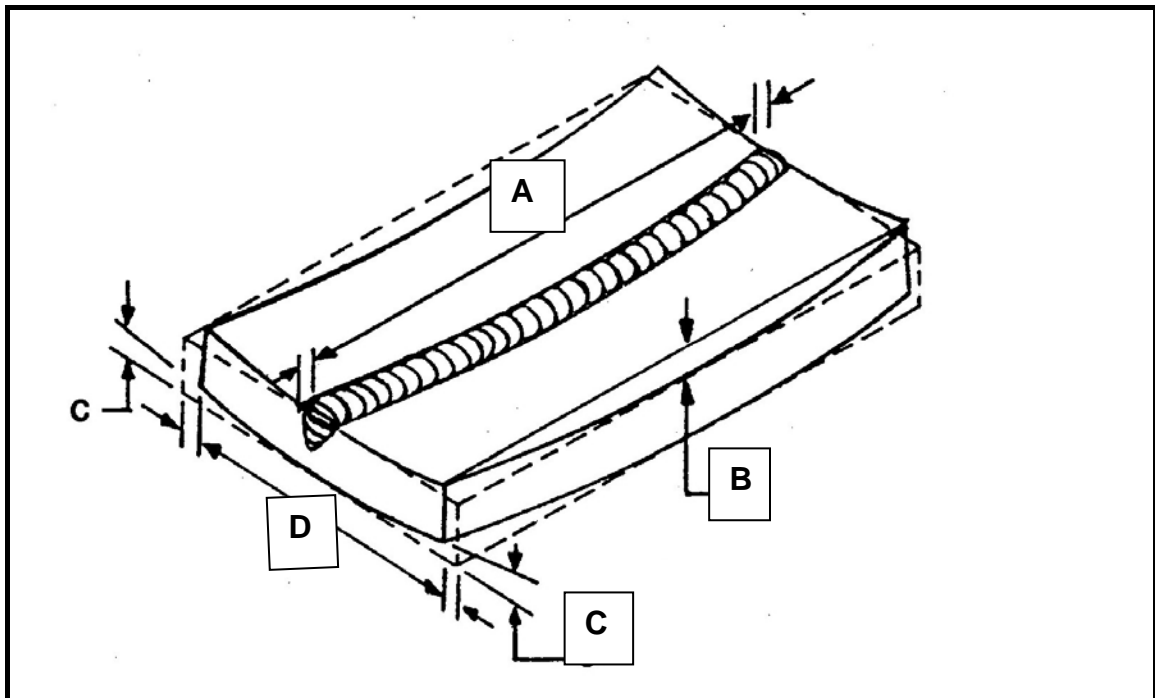
- 3.1 The photo below shows a solar energy electrical installation used by a farmer to provide water for animals.



- 3.1.1 Briefly explain how solar energy is used to generate electricity. (5)
- 3.1.2 Describe the FIVE most important factors that can cause a decrease in the efficiency of solar energy electric systems. (5)
- 3.1.3 Name THREE advantages of using alternative energy sources. (3)
- 3.2 Biofuel will play an important role in the future. Answer the following questions on biofuel.
- 3.2.1 Briefly describe the term *biofuel*. (2)
- 3.2.2 Describe THREE disadvantages of biofuel. (3)
- 3.2.3 Briefly discuss methanol as a fuel. (2)
- [20]**

**QUESTION 4: SKILLS AND CONSTRUCTION PROCESSES**

- 4.1 Describe the procedure you would follow to weld a cast-iron part on a farm implement. (10)
- 4.2 Describe the process of *overhead gas welding*. (4)
- 4.3 The sketch below shows the types of shrinking that occur when a metalwork piece is subjected to the heat of the welding process.



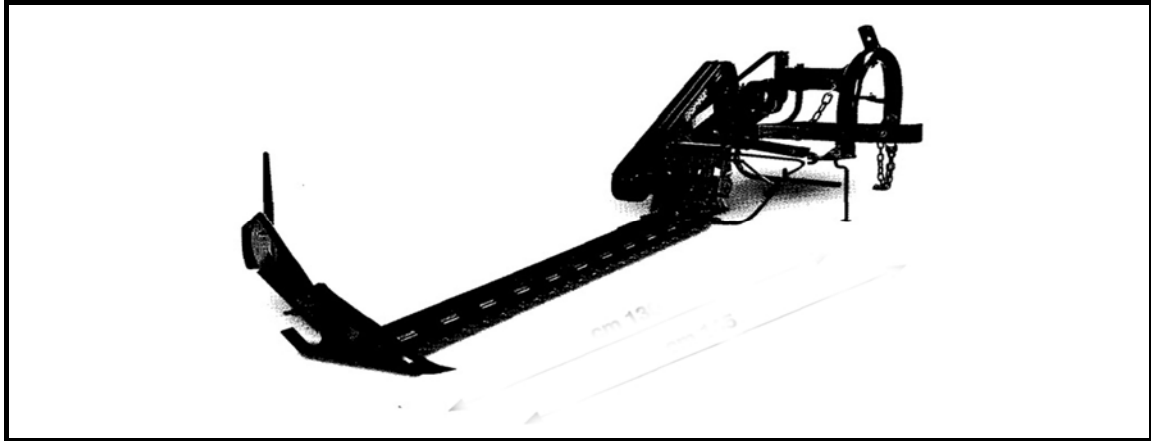
- 4.3.1 Provide labels for the shrinking processes labelled **A–D**. (4)
- 4.3.2 Name **THREE** factors that influence shrinking of a welding joint. (3)
- 4.3.3 Heat causes distortion of the metal during the welding process. Explain **FOUR** ways of controlling this distortion. (4)
- 4.4 Name the types of wear that the shear of a plough can be subjected to while ploughing. (4)
- 4.5 Make a neat, freehand drawing of a T-weld. (6)

**[35]**



**QUESTION 5: TOOLS, IMPLEMENTS AND EQUIPMENT**

- 5.1 The picture below shows a machine used on a farm to cut plants for various purposes.



- 5.1.1 Briefly describe the maintenance of this machine. (6)
- 5.1.2 Name TWO types of roller-baler systems that can be used on a farm. (2)
- 5.1.3 List the safety mechanisms on a baling machine. (4)
- 5.2 The combine harvester is used on farms for crop harvesting. Answer the following questions on these machines.
- 5.2.1 Name FIVE advantages of the combine harvesting machine. (5)
- 5.2.2 Give TWO reasons why a combine harvester must be calibrated properly. (2)

- 5.3 The picture below shows a PTO drive shaft on a tractor. Answer the following questions on this device.



- 5.3.1 Name the device that facilitates the PTO drive shaft to operate at an angle. (1)
- 5.3.2 The PTO drive shaft must always be screened off to prevent people from being injured. Explain FOUR requirements that these screens must comply with. (4)
- 5.4 Tractors were one of the first mechanised machines manufactured to facilitate the production of crops on the farm.
- 5.4.1 Name the parts that should receive special attention when examining the tractor before everyday use. (6)
- 5.4.2 List the factors that must be considered about the purpose/use when a suitable tractor is to be purchased. (4)
- 5.5 Name TWO types of hydraulic cylinders used on farm implements. (2)
- 5.6 Explain the function of the levelling box on the tractor. (2)
- 5.7 Explain the function of the top link as used on tractors. (2)
- [40]**

**QUESTION 6: WATER MANAGEMENT**

6.1 Drains are a common feature on most farms. Answer the following questions on different types of draining systems.

6.1.1 Name the TWO types of drains that are commonly used. (2)

6.1.2 Briefly explain the components of the three layers of a stone drain. (3)

6.1.3 Describe THREE disadvantages of closed drains. (3)

6.1.4 Give ONE word/term for each of the descriptions by choosing a word/term from the list below. Write only the word/term next to the question number (6.1.4(a)–6.1.4(e)) in the ANSWER BOOK.

stone drain; septic tank; fishbone/herringbone drain; sieve; open drain
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(a) Ditches are dug to a suitable depth to remove free water from waterlogged soil at regular intervals

(b) The bottom of the trench is loosely packed with large stones, covered with smaller stones and finally with soil

(c) This wastewater management system uses biological principles to break down the waste.

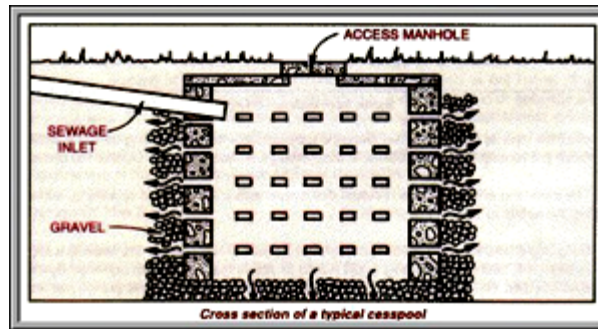
(d) The lateral drain runs into the main drain at an angle of about 45°

(e) The opening of the drain should be covered with this (5)

6.1.5 Briefly discuss the factors that affect the depth of drains. (5)

6.1.6 A typical household sewage treatment system consists of four components. List the FOUR components. (4)

6.2 The illustration below shows a cesspool (similar to a septic system). Answer the questions that follow.



- 6.2.1 State TWO problems that can arise when the system is not well maintained. (2)
  - 6.2.2 Name FOUR substances that may be responsible for the killing of bacteria in a septic-tank system. (4)
  - 6.3 Septic tanks are sensitive systems. Describe any TWO important measures that must be taken to ensure that a septic-tank system functions properly. (2)
- [30]**

**TOTAL SECTION B: 160**  
**GRAND TOTAL: 200**

**ANSWER SHEET****CENTRE NUMBER:**

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**EXAMINATION  
NUMBER:**

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**SECTION A****QUESTION 1**

1.1	A	B	C
1.2	A	B	C
1.3	A	B	C
1.4	A	B	C
1.5	A	B	C
1.6	A	B	C
1.7	A	B	C
1.8	A	B	C
1.9	A	B	C
1.10	A	B	C
1.11	A	B	C
1.12	A	B	C
1.13	A	B	C
1.14	A	B	C
1.15	A	B	C
1.16	A	B	C
1.17	A	B	C
1.18	A	B	C
1.19	A	B	C
1.20	A	B	C

**TOTAL SECTION A: (20 x 2) 40****TOTAL:**

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