



# basic education

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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL TECHNOLOGY**

**NOVEMBER 2011**

**MARKS: 200**

**TIME: 3 hours**

**This question paper consists of 15 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 Overhead power lines carry a voltage of 11 000 volts which must be reduced by means of a ... in order to provide the 380 volts necessary to run pumps for irrigation purposes.
- A transformer  
B generator  
C alternator (2)
- 1.2 The carbon monoxide gas given off by the exhaust system of a petrol engine is ...
- A poisonous under dry conditions.  
B poisonous under moist conditions.  
C poisonous under all conditions. (2)
- 1.3 People can get infected with HIV and Aids under the following conditions:
- A By not wearing gloves when handling injured people  
B By sharing eating utensils  
C When safety boots are not worn in the workplace (2)
- 1.4 Pneumatic tools use ... to drive them.
- A oil  
B air pressure  
C water (2)
- 1.5 The MIG welding process uses inserted gas as a ... between the molten puddle and the surrounding atmosphere.
- A welding flux  
B welding paste  
C shield (2)
- 1.6 Farmers and workers must study the ...Act concerning certain safety rules relevant in the workshop.
- A Labour  
B DoE  
C OHS (safety) (2)

- 1.7 Energy obtained from earth gas, like methane, is called ... energy.
- A nuclear
  - B geothermal
  - C bio-
- (2)
- 1.8 The levelling box on the three-point coupling of a tractor is used to set the ... of a hitched implement, like a plough.
- A top link
  - B sensitivity element
  - C cross-angle setting
- (2)
- 1.9 Worn out piston rings is the reason for ... emissions from the exhaust of a diesel tractor.
- A white smoke
  - B dark mixture
  - C blue smoke
- (2)
- 1.10 A computer system capable of capturing, storing, analysing and displaying geographical reference information/data according to location, is called a ...
- A GIS.
  - B GPS.
  - C VRT.
- (2)
- 1.11 The ratio shown on a drawing plan refers to the scale drawing in relation to the end product:
- A 1 : 50
  - B 1 : 25
  - C A and B
- (2)
- 1.12 To prevent loose soil and stones from falling into a borehole, the borehole should be ...
- A lined.
  - B fenced off.
  - C covered with a lid.
- (2)
- 1.13 A water tank is placed on a stand near a water trough. Choose a suitable material for the manufacturing of the water tank from the following:
- A Wood
  - B Rubber
  - C Plastic
- (2)

- 1.14 Which of the following is applicable when working with an angle grinder?
- A Always wear goggles
  - B Guards should be in place
  - C Both A and B
- (2)
- 1.15 When welding a metal project, the technique of joining will be indicated by a welding symbol. Identify the symbol that indicates that welding is needed on both sides of the joint:
- A 
  - B 
  - C 
- (2)
- 1.16 When using electrical appliances users can be accidentally shocked due to faulty wiring. Which ONE of the following is designed to protect the user?
- A Earth-leakage switch
  - B Circuit breaker
  - C Overload protector
- (2)
- 1.17 Three-phase motors are used to drive heavy equipment on farms, such as pumps and hammer mills. What is the voltage used by three-phase motors in South Africa?
- A 380 V
  - B 240 V
  - C 120 V
- (2)
- 1.18 Various communication systems are available for use on a farm. Which ONE of the following is a practical way to inform neighbours of a veld fire?
- A Two-way radios, telephones and cellphones
  - B Local newspapers
  - C Agricultural magazines
- (2)
- 1.19 When inspecting a tractor's mechanical systems, it is important to be on the lookout for ...
- A leakages in any system.
  - B paint of the tractor.
  - C rust.
- (2)
- 1.20 According to the fire prevention rules a dry powder extinguisher can be used to extinguish ...
- A veld fires.
  - B all types of fire in a workshop.
  - C an electrical fire.
- (2)

**TOTAL SECTION A: 40**

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

2.1 Metal is often used in materials and structures on the farm. Answer the following questions on metals.

2.1.1 Name any **THREE** non-ferrous metals often used on farms. (3)

2.1.2 Alloys are a combination of two or more metals melted together to form a new metal with new properties. Complete the table below in your **ANSWER BOOK** to show which metals are used to form the alloys as shown:

<b>ALLOY</b>	<b>METALS</b>	
(a) Stainless steel		(3)
(b) Brass		(2)
(c) Solder		(2)

2.2 Answer the following questions on adhesives used in materials and structures.

2.2.1 Name the **TWO** most important aspects to consider when an adhesive is chosen for a specific job. (2)

2.2.2 Teflon is a polymer product which shows exceptional resistance to some factors. Name any **TWO** of these factors. (2)

2.2.3 Name any **THREE** safety measures when using synthetic materials. (3)

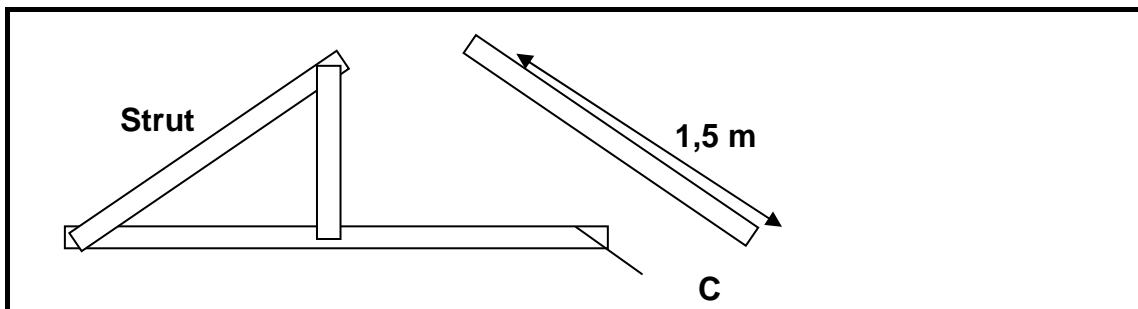
2.3 Farms cannot function properly without certain buildings. Answer the following questions on building structures on the farm.

2.3.1 Name the size of a normal foundation as stipulated in the code for building. (2)

2.3.2 Describe the function of lintels in a building. (2)

2.3.3 Name any **THREE** types of material that can be used as roof coverings. (3)

2.4 Answer the following questions on roofs.



2.4.1 Indicate the section of the roof truss labelled **C**. (1)

2.4.2 The timber (4 500 mm x 100 mm x 25 mm) had to be cut into various lengths. Describe the procedure and tools used to cut a piece of wood 1,5 m long. (4)

2.4.3 Name the type of insulation material that can be used between the roof and ceiling to keep a shed cool in summer and warm in winter. (1)

2.5 Answer the following questions on electric fences.

2.5.1 Name TWO methods to prevent lightning from damaging the energiser used in electric fencing. (2)

2.5.2 Electrical fences on a farm are not always the answer to a farmer's problem. Discuss the disadvantages of electrical fences. (3)

**[35]**

**QUESTION 3: ENERGY**

- 3.1 To generate wind power you need to be able to capture energy from the force of the wind by using a device similar to the one shown in the picture below.



- 3.1.1 Briefly describe how this wind energy generator works. (3)
- 3.1.2 Before purchasing a small wind turbine for the farm, the farmer should consider some of the factors which meet the requirements for installing a wind turbine. Explain FIVE requirements the farmer should consider. (5)
- 3.2 Using solar panels to heat water is becoming increasingly popular around the world due to the advantages associated with this method.



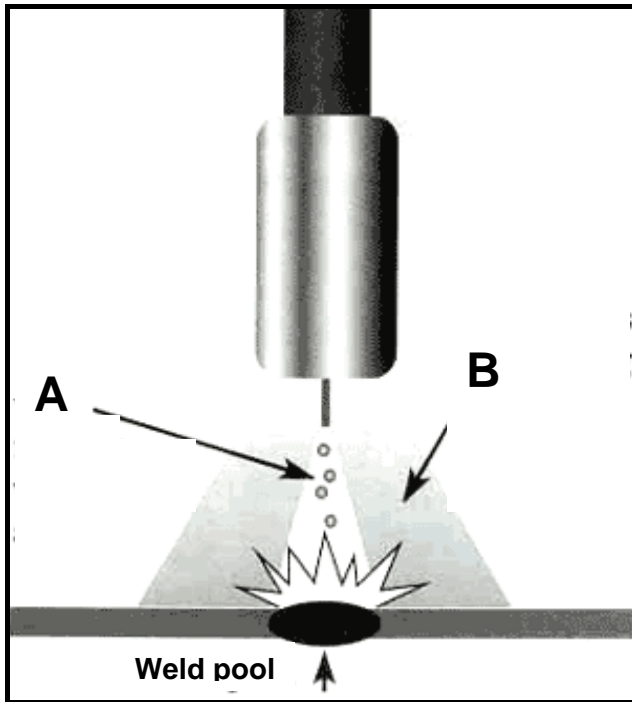
- 3.2.1 Name TWO advantages of using solar energy. (2)
- 3.2.2 Explain the circulation of hot water through a solar panel and a typical geyser. (4)



- 3.3 The increasing price of crude oil is the main reason why biofuel offers a cheaper solution to our energy needs. Explain THREE advantages of biofuels. (3)
- 3.4 The following alternative fuels are of plant origin. Give ONE example of EACH of the following:
- 3.4.1 Methanol (1)
- 3.4.2 Ethanol (1)
- 3.4.3 Methane gas (1)
- [20]**

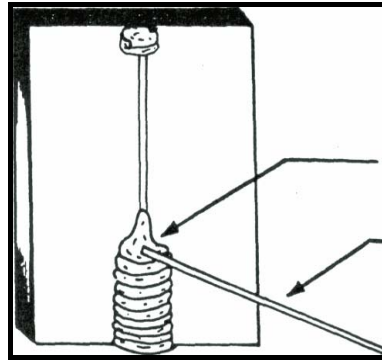
**QUESTION 4: SKILLS AND CONSTRUCTION PROCESSES**

- 4.1 Make a neat, labelled drawing of the right-hand welding technique when using the oxy-acetylene welding apparatus and indicate the thickness of the metal to be welded. (10)
- 4.2 Answer the following questions on the MIG welding process as shown in the sketch below.



- 4.2.1 Identify the substance indicated by arrow **A**. State the function of **A**. (2)
- 4.2.2 State the name and function of the part labelled **B** in the MIG welding process. (2)
- 4.2.3 Name the **THREE** different gases used in the MIG welding process. (3)

4.3 The sketch below shows the vertically upwards arc-welding process.



4.3.1 Briefly describe this welding process. (6)

4.3.2 Name THREE factors that influence distortion of a welding run. (3)

4.3.3 Name THREE ways of controlling distortion caused by the heat of welding runs. (3)

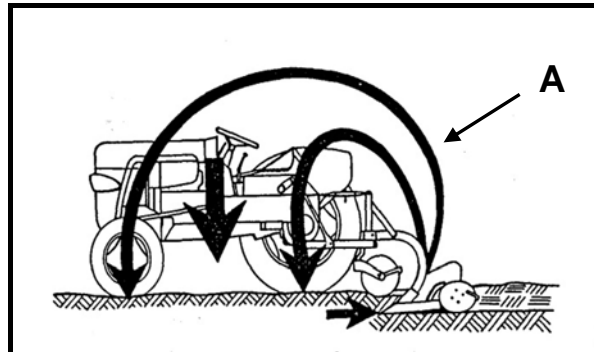
4.3.4 Describe the process of shrinking welding joints. (3)

4.4 Explain the process of hard-facing. (3)

**[35]**

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

5.1 The illustration below shows a tractor pulling a plough.



5.1.1 Briefly describe what arrow **A** illustrates. Give a reason for your answer. (2)

5.1.2 Explain THREE factors that have an influence on the depth-control system of a tractor. (3)

5.2 Flat belts are commonly used on farms to drive a variety of different machines and implements.

5.2.1 Discuss FIVE advantages of the use of flat drive belts between a power source and a pump. (5)

5.2.2 Safety screens installed on machines and farm implements must comply with certain requirements. Name any FOUR of these requirements. (4)

5.3 All farm implements and tractor spares should comply with certain requirements like being interchangeable. Describe any FOUR advantages of the standardisation of spare parts. (4)

5.4 The picture below shows a silage-cutting machine. Answer the questions that follow.



5.4.1 Name THREE safety precautions that should be followed when using this machine. (3)

5.4.2 Describe the procedure to follow when this silage-cutting machine is prepared for use. (5)

- 5.5 Describe the role of computers and satellite-positioning systems in modern combine harvesters. (4)
- 5.6 Name ONE other method of maize harvesting. (2)
- 5.7 Why should cultivators be set to work effectively? (1)
- 5.8 A hammer mill is essential when farming with livestock.
- 5.8.1 Name the factors that have to be considered when a hammer mill is bought. (4)
- 5.8.2 Identify THREE major causes of metal fatigue in hammer mills. (3)
- [40]**

**QUESTION 6: WATER MANAGEMENT**

6.1 Answer the following questions on water scheduling.

6.1.1 Irrigation scheduling is used by irrigation managers to determine the correct frequency, duration and quantity of water to be applied for irrigation purposes at the correct time. Give TWO reasons for irrigation scheduling. (2)

6.1.2 Name TWO pieces of equipment that can be used to determine the evaporation in a specific field. (2)

6.2 Drainage is a process to remove excess or free water from the upper layers of waterlogged soil.

6.2.1 Name FOUR types of closed drainage systems. (4)

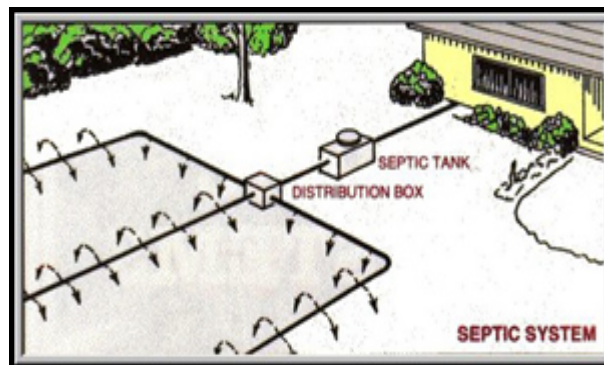
6.2.2 Give TWO reasons why it is sometimes necessary for the farmer to determine the flow rate in a pipe delivery system. (2)

6.2.3 Calculate the flow rate of water in a pipe delivery system by using the following data:

The capacity of the tank is 8 000 litres  
It took 8 hours to fill the tank to the top

(4)

6.3 The picture below shows a septic system on a farm. Answer the questions that follow.



6.3.1 Briefly describe how a septic tank operates. (3)

6.3.2 If properly maintained, a well-designed drainage system will last almost indefinitely. Name TWO problems that can occur if a system is neglected for a long time. (2)

6.3.3 Explain the important measures that should be taken into account by users of a septic tank system for the system to function properly. (5)

6.3.4 Briefly describe the factors to consider when a farmer plans to build a new septic tank. (4)

- 6.4 Irrigation pipes are often buried underneath the soil. Name TWO precautionary measures that should be taken when these pipes are laid. (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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