



# basic education

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

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL TECHNOLOGY**

**NOVEMBER 2013**

**MARKS: 200**

**TIME: 3 hours**

**This question paper consists of 14 pages.**

**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 in this section in the ANSWER BOOK.
  - 2.2 Follow the instructions when answering the multiple-choice questions.
3. SECTION B: STRUCTURED QUESTIONS
  - 3.1 This section consists of FIVE questions.
  - 3.2 Answer the questions in 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 Non-programmable calculators may be used.

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

Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–C) next to the question number (1.1–1.20) in the ANSWER BOOK, for example 1.21 A.

- 1.1 A septic tank system should always contain live ...
- A yeast.
  - B enzymes.
  - C bacteria. (2)
- 1.2 The pipe connecting the sanitary system of a house to a septic tank is manufactured from ...
- A PVC.
  - B copper.
  - C asbestos. (2)
- 1.3 The function of ... in the septic tank system is to decompose all organic waste matter in the system.
- A inorganic enzymes
  - B bacteria
  - C chemicals (2)
- 1.4 The most important precautionary measure that should be taken when PVC pipes are laid is to ensure that the pipes ...
- A do not rust.
  - B do not leak.
  - C are resistant to wear and tear. (2)
- 1.5 An advantage of closed drains is that ...
- A technical skill and knowledge are required and implemented.
  - B the drain is not in the way of cultivation practices.
  - C installation cost is usually not a factor. (2)
- 1.6 The aim of ... is to help the farmer to save money because all farm implements and tractor spare parts should comply with certain requirements, such as being interchangeable and easy to handle.
- A mechanisation
  - B standardisation
  - C evaluation (2)

- 1.7 ... smoke will be seen at the exhaust outlet when a tractor uses too much oil.
- A White
  - B Black
  - C Blue
- (2)
- 1.8 Long-term credit can be used for ...
- A buildings.
  - B equipment and machinery.
  - C repairs, contract work and transport.
- (2)
- 1.9 An example of working or floating capital expenses associated with a tractor is ...
- A spare parts.
  - B contract work.
  - C wages.
- (2)
- 1.10 Most farmers prefer to use V-belts because they ...
- A do not slip easily from the pulley.
  - B can be joined easily.
  - C can be used over long distances.
- (2)
- 1.11 The function of grease in the moving joints of implements is to ...
- A cause wear and tear.
  - B increase corrosion.
  - C decrease friction.
- (2)
- 1.12 The three-point mechanism of the tractor was designed by ...
- A Harry Ferguson.
  - B John Deere.
  - C Henry Ford.
- (2)
- 1.13 The control valve of a tractor is activated by the ...
- A control-valve lever.
  - B operator.
  - C operator's assistant.
- (2)
- 1.14 The density of round bales can be increased or decreased by changing the ...
- A settings.
  - B tempo of baling.
  - C tyre size.
- (2)

- 1.15 The shielding gas that prevents the welding bead from coming into contact with oxygen during the MIG welding process is called ...
- A carbon dioxide.
  - B carbon monoxide.
  - C hydrogen gas.
- (2)
- 1.16 The standard size for bricks used for building purposes is ...
- A 200 x 100 x 70 mm.
  - B 210 x 110 x 75 mm.
  - C 222 x 106 x 73 mm.
- (2)
- 1.17 The function of a lintel is to give ... above window and door openings.
- A shape
  - B support
  - C neatness
- (2)
- 1.18 The reason for covering the power take-off (PTO) shaft situated between the tractor and implements is to ...
- A protect workers from injury.
  - B make it look neat.
  - C ensure proper functioning of the PTO.
- (2)
- 1.19 ... substances must be locked away to protect workers from injury.
- A Expensive
  - B Hazardous
  - C Oily
- (2)
- 1.20 When the noise levels of an implement are very high you should wear ... to protect your ears.
- A goggles.
  - B earmuffs/earplugs.
  - C a protective helmet.
- (2)

**TOTAL SECTION A: 40**

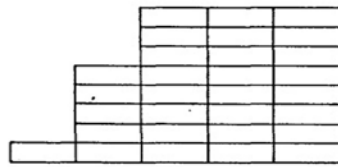
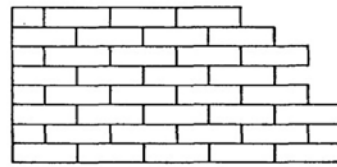
**SECTION B****QUESTION 2: MATERIALS AND STRUCTURES**

- 2.1 Fires on a farm can be very dangerous. Safety precautions and preventative measures are therefore very important.



- 2.1.1 Briefly discuss EIGHT measures to prevent unwanted fires on a farm. (8)
- 2.1.2 Explain the safety measures that should be kept in mind when using fire extinguishers. (5)
- 2.2 Briefly describe FOUR measures to prevent power take-off accidents. (4)
- 2.3 What THREE effects will each of the following alloy elements have when stainless steel is formed:
- 2.3.1 Chromium (3)
- 2.3.2 Manganese (3)
- 2.3.3 Nickel (3)
- 2.4 Adhesives can be used for various types of repair jobs on a farm. Name TWO important aspects that should be considered when an adhesive is chosen. (2)
- 2.5 Name any TWO methods used to strengthen foundations and briefly describe each method. (4)

- 2.6 Identify the most suitable bond (**A** or **B**) that can be used for the construction of a brick wall as shown in the sketch below.

**A****B**

(1)

- 2.7 Give a valid reason for each of the following statements:

2.7.1 Clear fibreglass roof plates are used on the roof of a greenhouse. (1)

2.7.2 The wires of a fence must not be tensioned on a hot day. (1)

**[35]**

**QUESTION 3: ENERGY**

3.1 The photograph below shows a portable electric fence in a field. Answer the questions that follow.



- 3.1.1 Name an alternative energy source that can be used to charge the battery effectively and explain the reasons for your answer. (6)
- 3.1.2 Name any TWO uses of portable electric fences on a farm. (2)
- 3.1.3 State TWO benefits of using portable electric fences on a farm. (2)

3.2 The photograph below shows two different energy sources that are used to produce electricity for a milking parlour on a dairy farm. Use the photograph to answer the questions that follow.



- 3.2.1 List FOUR advantages of alternative energy sources. (4)
- 3.2.2 Discuss TWO types of energy sources and also how they will support each other when used simultaneously. (4)
- 3.3 Name TWO renewable energy sources that can be used to manufacture biodiesel. (2)

**[20]**



**QUESTION 4: SKILLS AND CONSTRUCTION PROCESSES**

- 4.1 The photograph below shows an inverter welding machine used for various welding processes on a farm. Answer the questions that follow.



- 4.1.1 Name TWO disadvantages of the inverter welding machine in comparison with the arc-welding machine. (2)
- 4.1.2 Name THREE general welding tips that should be kept in mind when welding with the inverter welding machine. (3)
- 4.2 Describe the procedure that should be followed when welding two pieces of metal with an oxy-acetylene welder using the rightward or backhand technique. (6)

- 4.3 The photograph below shows a welding apparatus. Answer the questions that follow.



- 4.3.1 Give the name of this type of welding machine. (1)
- 4.3.2 Explain the concept *MIG welding*. (3)
- 4.3.3 Name the THREE basic gases used in the MIG welding process. (3)
- 4.4 Make a neat sketch of a V-butt weld between two pieces of metal 10 mm thick and label the drawing. (5)
- 4.5 Name and explain the THREE different methods (technique) of oxy-acetylene welding. (3 x 2) (6)
- 4.6 Discuss distortion or shrinking caused by the heat generated during the welding process. (4)
- 4.7 State TWO ways to control distortion of welding runs. (2)

**[35]**

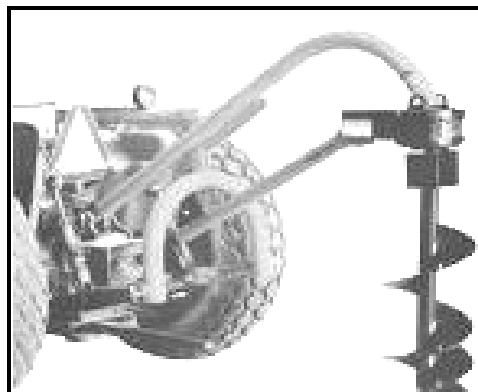
**QUESTION 5: TOOLS, IMPLEMENTS AND EQUIPMENT**

5.1 Study the photograph of a baling machine below and answer the questions that follow.



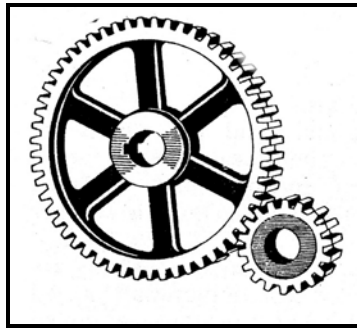
- 5.1.1 Explain the term *timing* of the bale mechanism as found on the ram-type baler. (2)
- 5.1.2 Name THREE tasks that should be performed during the maintenance of a baling machine. (3)
- 5.1.3 Indicate the safety mechanisms that can be found on the ram-type baling machine. (4)

5.2 The photograph below shows a farm implement connected to a tractor.

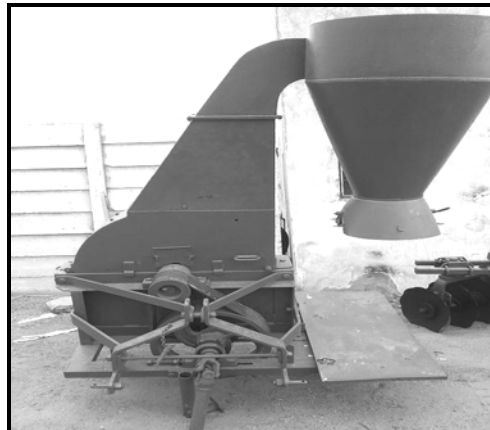


- 5.2.1 Describe the mechanism that is used for connecting the implement to the tractor. (3)
- 5.2.2 A power take-off (PTO) shaft is used as a drive shaft between the tractor and the implement. Name the device that enables the power take-off shaft to operate at different angles. (1)
- 5.2.3 State THREE requirements that a safety screen must comply with to prevent injuries. (3)

- 5.3 Name THREE types of capital associated with a farm enterprise. (3)
- 5.4 State FOUR problems that can occur when using a combine harvester. (4)
- 5.5 The efficient working of a tractor gearbox is made possible by a combination of gears to achieve the best possible ratio for the specific job. The illustration below shows one type of gear set that can be used in the gearbox of a tractor.



- 5.5.1 Identify the type of gear set shown in the illustration above. (1)
- 5.5.2 Name ONE advantage of this type of gear set. (1)
- 5.5.3 State the THREE types of gearboxes commonly used in tractors. (3)
- 5.6 A hammer mill, as shown below, is a very important implement on a farm. It helps a farmer to pulverise feeds to satisfy the feeding needs of different kinds and categories of farm animals.



- 5.6.1 State FOUR factors that must be considered when buying a new hammer mill. (4)
- 5.6.2 State THREE advantages of installing a hammer mill on a level surface. (3)
- 5.6.3 Name FIVE safety measures that should be taken when working with a hammer mill. (5)

**[40]**

**QUESTION 6: WATER MANAGEMENT**

6.1 The correct application of water is important for water conservation.

6.1.1 Name THREE factors that must be considered when planning a water scheduling programme. (3)

6.1.2 Explain the goal of irrigation scheduling. (4)

6.2 Choose a word/term from COLUMN B that matches a description from COLUMN A. Write down only the letter (A–G) next to the question number (6.2.1–6.2.5) in the ANSWER BOOK, for example 6.2.6 H.

COLUMN A		COLUMN B
6.2.1	Ditches are dug at regular intervals to a suitable depth to remove free water from waterlogged soil	A stone drain B septic tank
6.2.2	The bottom of the trench is loosely packed with large stones, covered with smaller stones and finally with soil	C herringbone drain D sieve
6.2.3	The waste-water management system that uses biological principles to break down the waste	E open drain F manhole cover
6.2.4	The lateral drain runs into the main drain at an angle of about 45°	G tile drain
6.2.5	The opening of the drain should be covered with this	

(5 x 1) (5)

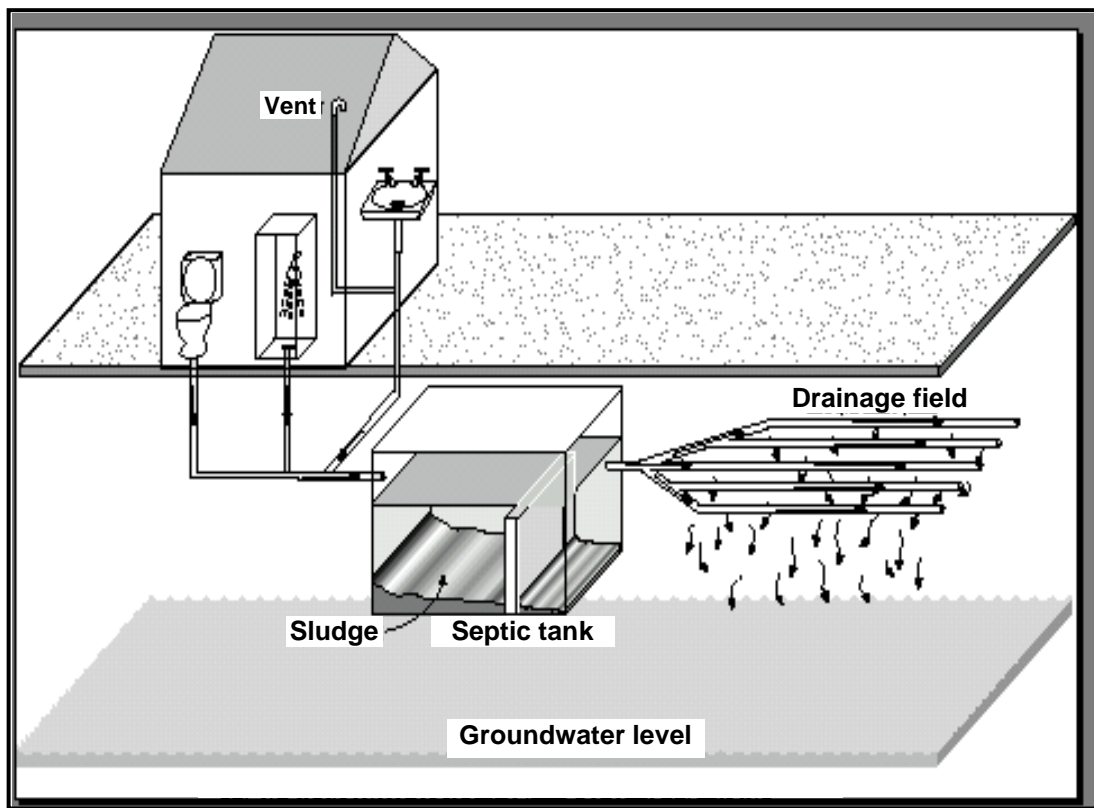
6.3 Drainage is the removal of excess or free water from the upper layers of soil.

6.3.1 Identify the TWO drainage systems most commonly used on farms. (2)

6.3.2 Briefly describe the process of building a pole drain. (3)

6.3.3 Discuss THREE disadvantages of closed drains. (3)

6.4 The sketch below shows a typical septic tank system used on a farm. Study the sketch and answer the questions that follow.



**Septic tank with drainage field system**

- 6.4.1 Give the reason for placing the outlet pipe of the drainage field at the top level of the septic tank. (2)
- 6.4.2 Name FIVE components of a waste-water system. (5)
- 6.4.3 Name THREE factors that can kill micro-organisms in the septic tank system. (3)

**[30]**

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