



# education

Department:  
Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 10**

**AGRICULTURAL TECHNOLOGY**

**EXEMPLAR PAPER**

**MARKS: 200**

**TIME: 3 hours**

**This question paper consists of 23 pages and an answer sheet.**

136 0 E

**INSTRUCTIONS AND INFORMATION****1. GENERAL INSTRUCTIONS**

1.1 This question paper consists of TWO sections: SECTION A and SECTION B.

1.2 BOTH sections are COMPULSORY.

**2. SECTION A: MULTIPLE-CHOICE QUESTIONS**

2.1 Answer the questions on the ANSWER SHEET provided.

2.2 Follow the instructions when answering these 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 in the ANSWER BOOK.

3.3 Number the answers correctly according to the numbering system used in this question paper.

3.4 It is in your own interest to pay attention to the accuracy and neat appearance of your work.

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

Various possible options are provided as answers to the following questions. Choose the correct answer and make a cross (X) over the letter (A - C) next to the question number (1.1 - 1.20) on the attached answer sheet, for example:

1.0	<input checked="" type="checkbox"/> A	B	C
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NO marks will be allocated if more than ONE answer is marked.

- 1.1 Wood is used according to its hardness. Which ONE of the following types of wood can be classified as a soft wood?

A Pine  
B Imbuia  
C Oak

(2)

- 1.2 Stone is a natural building material. Select from the following the type of stone that is NOT suitable for building:

A Crushed stone  
B Sand stone  
C Soft limestone

(2)

- 1.3 The builder has informed you that your shed will be built on soil with a high sand content. He has suggested three options.

The correct option to solve this problem would be to ...

A build a three-brick wall.  
B use reinforcing in the foundation and walls.  
C use a stronger cement mix.

(2)




- 1.4 Bricks can be made from mud, clay or cement. Which material CANNOT be used to make cement bricks on the farm?

A Cement  
B Sand  
C Stone

(2)

- 1.5 A boundary fence has to be constructed to fence off a plot. What can be used as a guide to place the fence correctly?
- A Beacons or boundary marks identified by a surveyor
  - B Maps from the municipality
  - C Advice from the neighbour
- 1.6 Identify the correct standard for a cattle fence:
- A 900 mm, 6 strands of barbed wire
  - B 1 200 mm, 6 strands of barbed wire
  - C 2 400 mm, 12 strands of barbed wire (2)
- 1.7 A water tank is placed on a stand near the water trough. Select a suitable material for the water tank from the following:
- A Cement
  - B Perspex
  - C Fibre glass (2)
- 1.8 A mallet is one of the various types of hammers used on a farm. The main function of a mallet is to ...
- A break concrete walls.
  - B hammer long thick nails into wood.
  - C bend and form copper and soft metals. (2)
- 1.9 A tri-square is used in the carpentry section of the farm. The most important characteristic of the tri-square is that ...
- A it is made of steel.
  - B it has a wooden handle.
  - C the blade is set into the stock/handle at exactly 90°. (2)
- 1.10 Portable grinders are some of the most versatile electrical tools in the workshop. Care should be taken when using this tool.
- Which of the following is NOT applicable when working with the portable grinder?
- A Always wear goggles
  - B Guards should be in place
  - C Keep the cutting disk sharp and cool (2)

- 1.11 To ensure that the drill bit does not slip initially, a pilot hole is made. Select the tool used to make a pilot hole for drilling purposes from the following:
- A Scriber
  - B Centre punch
  - C Cold chisel
- (2)
- 1.12 High-speed drill bits are manufactured from ...
- A high-carbon steel.
  - B stainless steel.
  - C aluminium.
- (2)
- 1.13 While cutting a 50 mm steel pipe, the blade of the hacksaw needs to be changed. In which direction must the teeth of the new blade face?
- A Upward
  - B Backward
  - C Frontward
- (2)
- 1.14 A 0,75 mm galvanised metal sheet has to be cut to the following rectangular dimensions: 150 mm x 250 mm. The tool that is the most practical to perform this task, would be ...
- A an oxy-acetylene cutting torch.
  - B an angle grinder.
  - C tin snips.
- (2)
- 1.15 The above-mentioned rectangular plate will be used to repair a hole in a galvanised iron chicken feeder. The most effective way to join the plate onto the feeder, would be to ... it.
- A weld
  - B pop rivet
  - C glue
- (2)

- 1.16 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)
- 1.17 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)
- 1.18 Three-phase motors are used to drive heavy equipment on the farm, such as pumps and hammer mills. What is the voltage used by a three-phase motor in South Africa?
- A 380 V
- B 240 V
- C 120 V
- (2)
- 1.19 Various communication systems are available for use on the farm. Which ONE of the following is NOT a practical way to inform neighbours of a veldt fire?
- A Two-way radios
- B Telephones and cellphones
- C Local agricultural shows
- (2)
- 1.20 When inspecting the tractor's mechanical systems, it is important to be on the lookout for ...
- A leakages on any system.
- B all liquid levels on the tractor.
- C Both A and B
- (2)

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

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

- 2.1 The following picture was taken during the construction of a shed that included different building processes. Study the picture and answer the questions below.



- 2.1.1 Not any sand can be used for building. Write TWO properties of building sand that makes it unique for building. (2)
- 2.1.2 You found an opened bag of unused cement that was stored under the roof in an open shed. You use the cement in order not to waste money. Was it wise to use the cement? Substantiate your answer by giving ONE reason. (2)
- 2.1.3 While building a structure, too much cement was mixed. What is the most important rule to remember before using already mixed cement? (2)
- 2.1.4 Identify the support structure in the picture and name ONE a function of this structure. (2)

- 2.2 A one hectare (1 000 m x 1 000 m) field has to be fenced off to keep cattle in.
- 2.2.1 List THREE materials needed to construct this fence. (3)
- 2.2.2 State FOUR factors that should be considered when constructing an effective fence. (4)
- 2.2.3 You observe that the fence is not neat and does not keep the cattle in. Recommend TWO ways in which this problem can be solved. (2)
- 2.2.4 A gate has to be placed in a fence to let the cattle in and out. Make TWO drawings showing the TWO methods used to position and open a swing gate. (6)
- 2.2.5 Wooden poles are mainly used for corner posts in fencing.
- Identify the type of wood and give an example of wood that you would use for a corner post. (2)
- 2.2.6 Termites and woodbores can destroy the wooden poles.
- Discuss if painting these poles with PVA (water-based paint) will solve the problem and if NOT, suggest an effective alternative method of protection. (3)
- 2.3 Various types of wire netting are available on the market.
- Show the difference between *hog wire* and *bonnox* by stating the use of each. (2)
- 2.4 Metals are divided in two groups, namely ferrous and non-ferrous.
- 2.4.1 Explain what is meant by the term *non-ferrous metal* and give ONE example of a non-ferrous metal. (2)
- 2.4.2 Properties of metals have to be considered when working with metals. State THREE general properties of metals. (3)
- [35]**



**QUESTION 3: ENERGY**

- 3.1 While passing a workshop a shout is heard. You enter the workshop and find a person lying on the ground, not moving and holding an electrical lead.

List, in the correct order, FOUR actions that should be taken to secure the person.

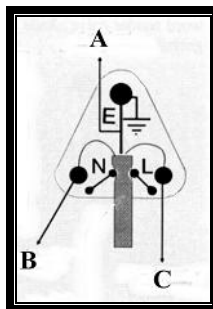
- 3.2 The following illustration shows a fire extinguisher that can be used for electrical fires:



- 3.2.1 Name the colour of the fire extinguisher used in electrical fires. (1)

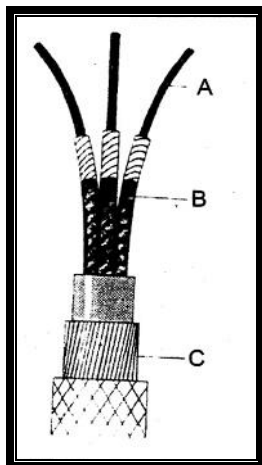
- 3.2.2 Explain why a foam extinguisher cannot be used on live electrical fires. (1)

- 3.3 The following diagram is an adaptor used in electricity:



- Identify the colour of the wires indicated A, B and C. (3)

- 3.4 An electrical cable consists of three essential parts. Study the diagram below and answer the questions that follow:

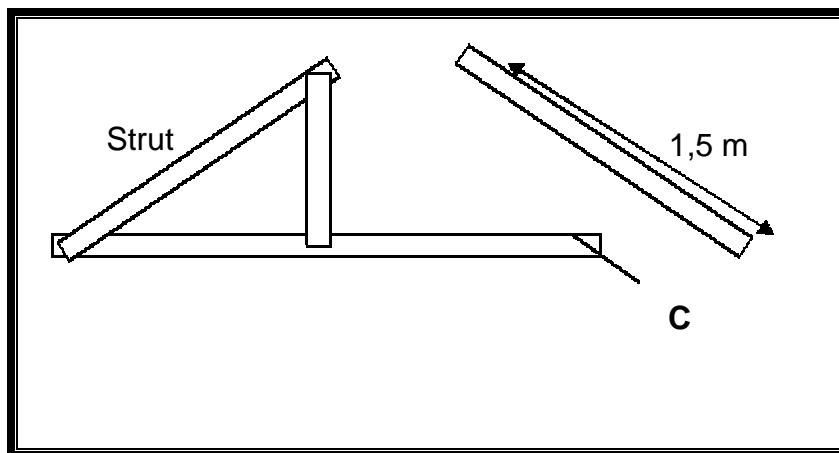


- 3.4.1 Identify the section that conducts the electrical current. (Write only the letter A, B or C.) (1)
- 3.4.2 Describe the function of the covering indicated by label B. (1)
- 3.4.3 The section labelled C is designed for protection. Give an example of damage that this protection is designed for. (1)
- 3.5 You have to connect a spotlight to the back of the tractor before the ploughing season. The potential difference of the battery is 12 volts.
- 3.5.1 Calculate the resistance of the bulb needed, if the current is 3 amperes. (4)
- 3.5.2 How will the brightness of the bulb (current) be affected if a globe of a larger resistance is used? Choose the correct answer from the following: brighter; no change; dimmer (1)
- 3.6 Two globes are marked '60 W; 240 V' and '100 W; 240 V'.
- 3.6.1 Watt (W) is the unit for ... . (1)
- 3.6.2 Choose the globe that will burn the brightest and give a reason for your answer. (2)

**[20]**

**QUESTION 4: SKILLS AND CONSTRUCTION PROCESSES**

4.1 A roof construction of wood (SA pine) is erected over a new shed.



- 4.1.1 What is the function of a roof truss? (1)
- 4.1.2 Name the section of the roof truss labelled C. (1)
- 4.1.3 The timber (4 500 mm x 100 mm x 25 mm) has to be cut into various lengths. Describe the procedure and tools used to cut a 1,5 m strut. (6)
- 4.1.4 Various methods can be used to join the different sections of the roof trusses.  
What method is used to join these trusses quickly and effectively? (1)
- 4.1.5 Explain why press board is NOT an effective material for roof trusses. (2)

- 4.2 Welding is a process that is extensively used on the farm, however, it can be potentially dangerous if safety measures are not adhered to.



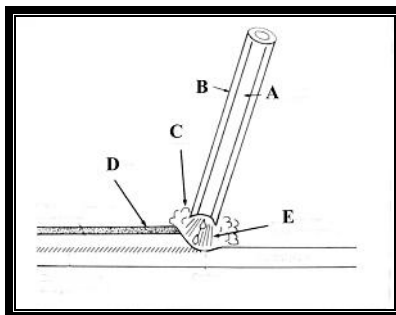
Study the illustration above and name FOUR safety measures that have to be remembered when welding with an electric-arc welding machine.

(4)

- 4.3 Both types of currents (AC and DC) are suitable for welding. State the use of each that will show the difference between AC and DC welding.

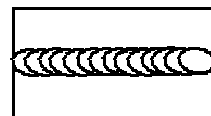
(2)

- 4.4 The following is a sketch showing welding with an electrode. Study the sketch and answer the following questions:



- 4.4.1 Give an alternative name for an electrode. (1)
- 4.4.2 Label the sketch marked from A to E. (5)
- 4.4.3 The electrode is the product of metallurgical research. Indicate TWO purposes of the part labelled B. (2)
- 4.4.4 Formation of a slag covering is essential. Describe TWO functions of the covering. (2)
- 4.4.5 After the weld has cooled, the slag is chipped away. What tool will you use to chip the slag? (1)
- 4.4.6 The first welding bead will indicate if the correct settings and welding method has been used.

A normal bead has the following appearance:



Your first attempt has the following appearance:



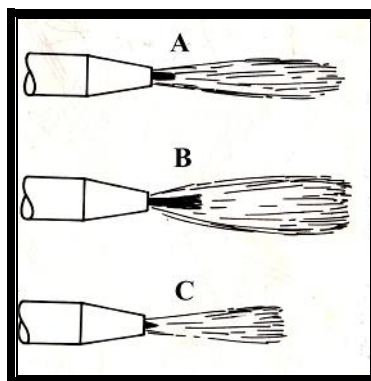
Give a reason why the paddles are uneven. (2)

4.5 Gas welding is an alternative welding method and is more flexible due to the fact that the equipment is portable.

4.5.1 Describe how you would detect leakages on the oxy-acetylene apparatus. (1)

4.5.2 When lighting the flame, which gas cylinder should be opened first? (1)

Three types of oxy-acetylene welding flames are illustrated in the sketch below. Answer the following questions by referring to the sketch.

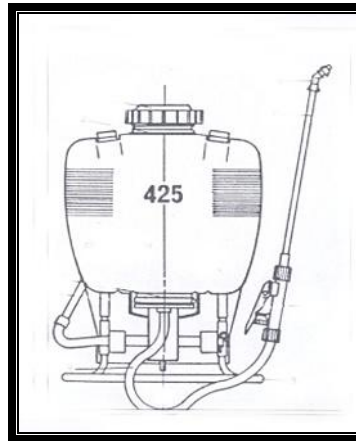


4.5.3 Name the flame labelled B. (1)

4.5.4 Compare flame A and flame C by referring to the amount of oxygen used in each. (2)  
[35]

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

- 5.1 To control weeds and pests in an orchard one would use a knapsack spray to apply the pesticide. Study the illustration below and answer the questions that follow:



- 5.1.1 Discuss TWO safety measures that have to be taken into account when using the knapsack sprayer in an orchard. (2)
- 5.1.2 State TWO safe practices that you need to carry out on the knapsack sprayer when doing maintenance after a day's work. (2)
- 5.1.3 How do you expose of empty pesticide containers? (1)

- 5.2 Agriculture developed into a highly mechanised industry during the 20th century. In some instances implements that are drawn by animals are still used.



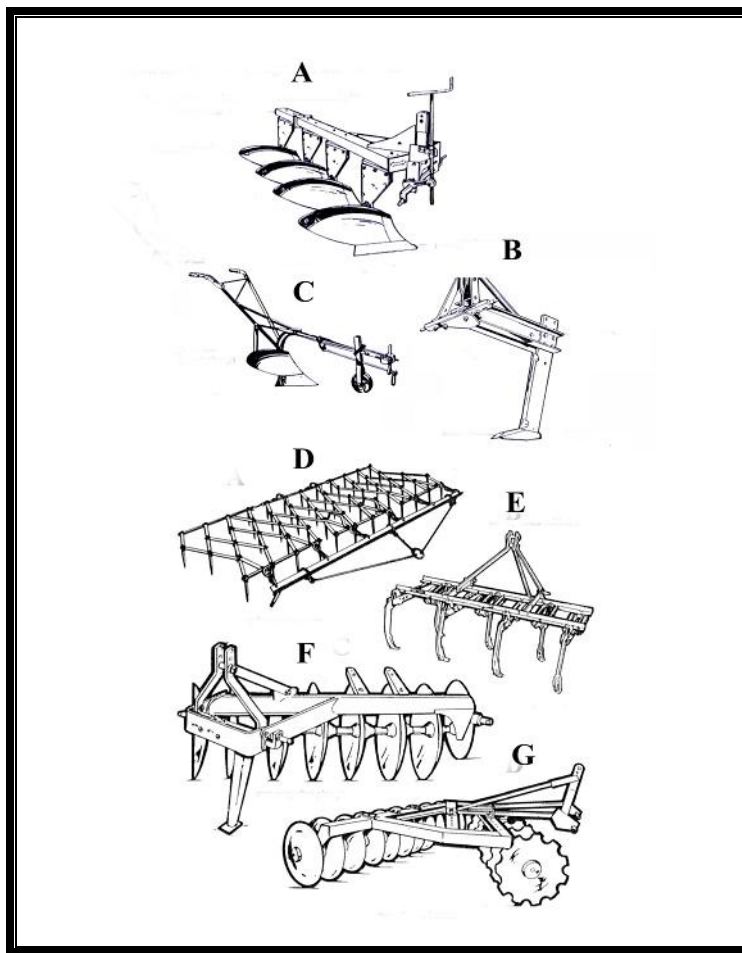
Evaluate the use of animal-drawn implements versus mechanised implements by referring to TWO advantages of implements that are drawn by animals.

(2)



5.3 Various implements are used before and after planting crop, for example maize.

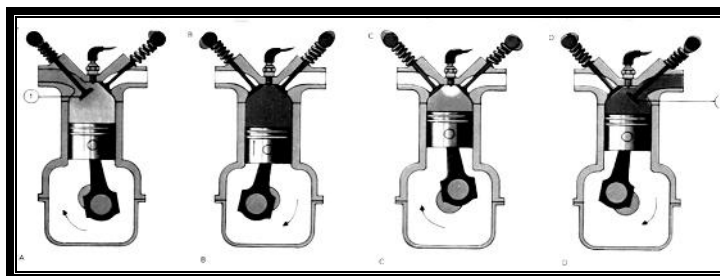
Study the illustrations of some of the implements used in cultivation and answer the related questions:



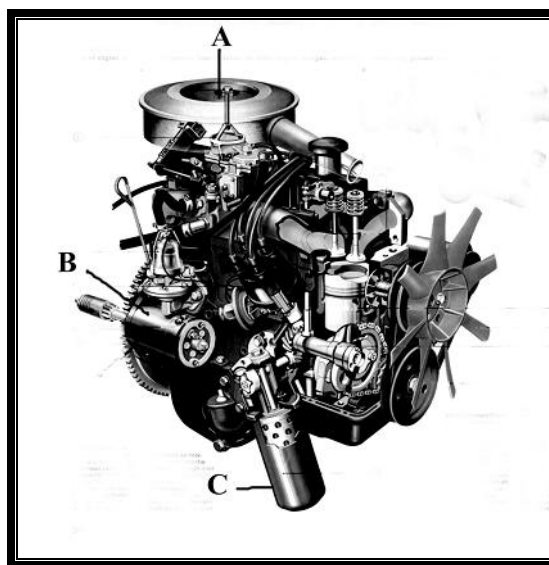
- 5.3.1 Name the implements labelled A and F. (2)
- 5.3.2 Identify ONE implement that can be used for primary cultivation. (Write only the letter A - F.) (1)
- 5.3.3 Describe ONE use of the implement labelled B. (2)
- 5.3.4 Large-teethed implements (field span) are designed for a specific purpose. State ONE advantage of the larger implements that distinguish them from smaller implements. (1)

5.4 Different engines, for example two-stroke engines, four-stroke engines and diesel engines are used in agriculture.

5.4.1 Name the FOUR strokes of the four-stroke engine as illustrated below:



The following illustration shows the different parts of a four-stroke engine:



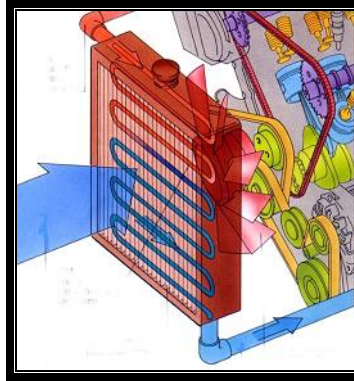
5.4.2 Label the parts A, B and C in the illustration. (3)

5.4.3 What is the function of the part labelled A? (1)

5.4.4 Give the function of a dipstick. (1)

5.4.5 Describe the difference in ignition between petrol and diesel machines with reference to the combustion chamber. (4)

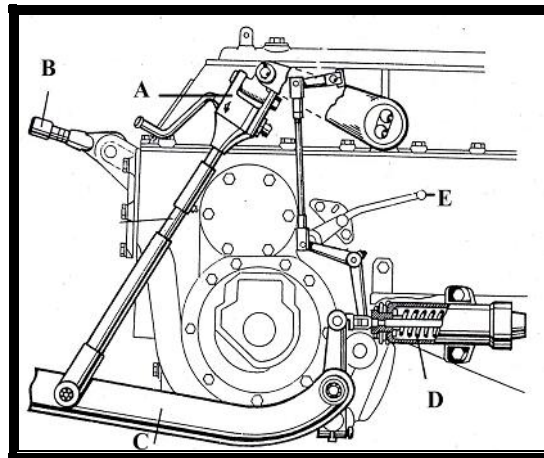
- 5.5 When looking at the picture, you see that there is a radiator connected to the engine with pipes. There is also a fan behind the radiator.



- 5.5.1 Analyse this information and state the method that is used for temperature control in this four-stroke engine. (1)
- 5.5.2 What is the alternative method that can be used for cooling an engine? (1)
- 5.5.3 Name TWO materials that are used to manufacture a radiator. (2)
- 5.5.4 Which TWO types of belts can be used as driving belts in the engine? (2)

- 5.6 The mechanism in the sketch below is used to mount implements (for example ploughs and rippers) on the tractor.

Study the following illustration of the mechanised system and answer the questions that follow:



- 5.6.1 What is the name of this mechanism? (1)
- 5.6.2 Name the parts labelled B to E. (4)
- 5.6.3 Describe the function of A. (1)
- 5.6.4 Explain what will happen to the implement if the part labelled B is removed. (1)
- 5.6.5 Describe the function of D when the implement is forced out of the soil by a hard layer. (1)

(1)  
**[40]**

**QUESTION 6: IRRIGATION**

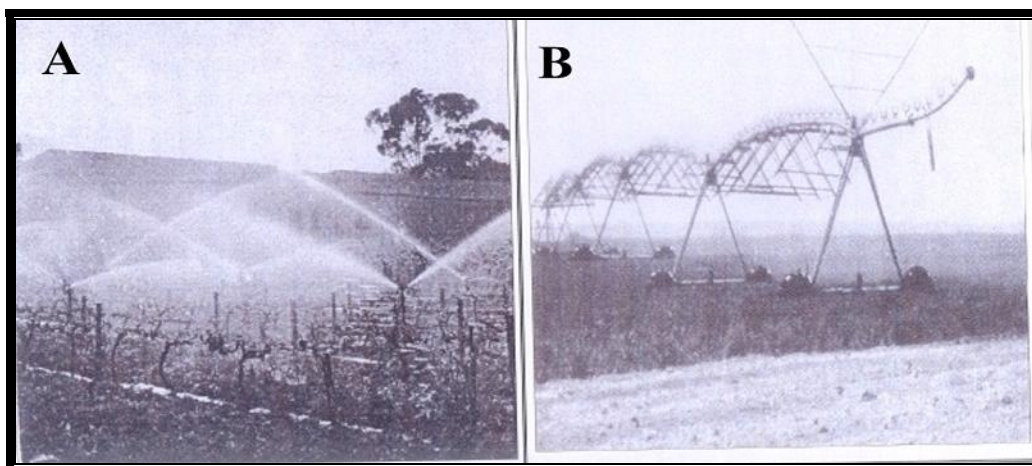
6.1 Water is one of the essential requirements for farming. Certain areas in South Africa have a low rainfall, but rivers flowing through the area make irrigation possible. Various types of irrigation are available to suit the needs of the farmer.

6.1.1 Flood and sprinkler irrigation are two types that are used for supplying water to planted lands.

When will sprinkler irrigation be preferred to flood irrigation? (3)

6.1.2 Sprinkler irrigation consists of four primary parts. List these FOUR primary parts. (4)

Two types of sprinkler irrigation systems are illustrated below:

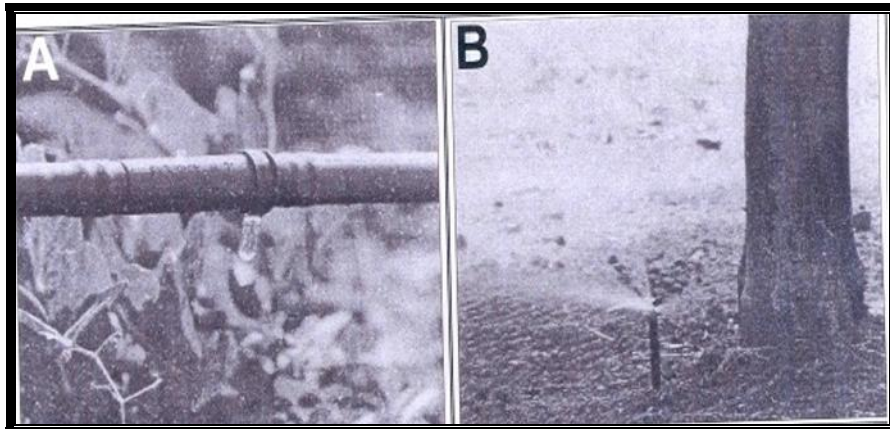


6.1.3 Name the kind of irrigation system shown in B. (1)

6.1.4 Under what conditions will system B be a better option than system A? (1)

6.1.5 If macro-irrigation systems are not controlled efficiently they will have negative effects on the environment. Name any THREE of these negative effects. (3)

6.2 The images below illustrate two micro-irrigation systems commonly used:



6.2.1 What is the system in A called? (1)

6.2.2 Give an example where system B can be used effectively. (1)

6.2.3 Briefly explain the difference between *micro-* and *macro-irrigation* in terms of water distribution. (2)

6.3 PVC and aluminium are materials used to manufacture water pipes because of certain properties.

6.3.1 State TWO advantages of using PVC pipes in irrigation. (2)

6.3.2 Using PVC pipes has certain limitations. State any TWO disadvantages. (2)

6.3.3 The end of the pipe has to be closed to prevent water spillage and to create pressure in the pipe. Name the part that can be used to close or to block off the end of the PVC water pipe. (1)

6.3.4 The following photograph shows a worker handling an aluminium irrigation pipe. Use the information shown in the photograph and describe safety measures regarding electricity, when working in irrigation fields.



(2)

6.4 Water pumps are needed to deliver water for irrigation. Different water pumps are available on the market that are used for different applications.

6.4.1 Name FOUR criteria that can be considered in the choice of an appropriate pump.

The major types of water pumps available on the market are listed below:

- A Centrifugal pumps
- B Rotary pumps
- C Electrical submersible pumps
- D Jet pumps

Choose, from the list above, the pump that best matches the descriptions, by writing only the letter (A - D) next to the question number (a - c) that represents the pump.

- (a) A pump that is maintenance free and can be submerged motor and all (1)
  - (b) A pump that is used in a very deep water holes and is working with a shaft (1)
  - (c) A pump that forces water through the pipes with vanes on the impeller and which is movable (1)
- [30]**

**TOTAL SECTION B: 160**

**GRAND TOTAL: 200**

NSC  
**AGRICULTURAL SCIENCE**  
**LANDBOUTEAGNOLOGIE**  
**Examination**  
**Eksamen**  
**Gr 10**  
 Answer Sheet/Antwoordblad

<b>A</b>
<b>B</b>
<b>TOTAL</b>

Surname/Van: \_\_\_\_\_

Initials/Voorletters: \_\_\_\_\_

Teacher/Onderwyser: \_\_\_\_\_

**QUESTION 1/VRAAG 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/TOTAAL AFDELING A: (20 x 2)      40**