Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2020

AGRICULTURAL SCIENCES P2 (EXEMPLAR)

MARKS: **150**

TIME: **2½ hours**

* I A G R S E 2 *

This question paper consists of 15 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK.
3. Start EACH question on a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. You may use a non-programmable calculator.
6. Show ALL your calculations, including formulae, where applicable.
7. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write ONLY the letter (A–D) next to the question numbers (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 … is an example of a micro-element.

A Molybdenum
B Nitrogen
C Potassium
D Sulphur

1.1.2 The following occur during the light phase of photosynthesis, except …

A photolysis.
B formation of ATP.
C formation of a carbohydrate.
D formation of reduced coenzymes.

1.1.3 When storing farm manure, prevention of volatilisation is important because …

A volatilisation results in leaching of nutrients.
B volatilisation causes the loss of nitrogen in the form a gas.
C volatilisation might lead to soil pollution.
D volatilisation results in the infection of manure by pathogens.

1.1.4 The … is a non-sexual part of a flower.

A stamen
B pistil
C calyx
D stigma

1.1.5 Multiple fruits are fruits that …

A develop from several ovaries in a single flower.
B develop from several ovaries of an inflorescence.
C develop from a single ovary that has one or more pistils.
D develop from a ripened fruit and some other parts of the flower.

1.1.6 The following are characteristics of wind-pollinated plants:

(i) Produce large amounts of sticky pollen
(ii) They usually lack insect attracting smells
(iii) They have small, hidden stigmas
(iv) The flowers are small and densely packed

Choose the CORRECT combination:

A (i) and (ii)
B (i), (iii) and (iv)
C (i), (ii) and (iv)
D (ii), (iii) and (iv)

1.1.7 Which ONE of the following is NOT an advantage of crop rotation?

A Decreases the number of harmful insect species
B Improves soil structure
C Needs a workforce with a variety of skills
D Prevents nutrient imbalances

1.1.8 The picture below shows the … irrigation system.

A centre pivot
B drip
C flood
D micro-spray

1.1.9 … is an example of a marine species.

A African catfish
B Tilapia
C Brown trout
D Abalone

1.1.10 … is NOT a type of conservation tillage.

A Strip tillage
B No tillage
C Mulching
D Bare tillage (10 x 2) (20)

1.2 Choose a term/phrase from COLUMN B that matches a term in COLUMN A. Write only the letter (A–H) next to the question numbers (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 J.

COLUMN A		COLUMN B	
1.2.1	The movement of materials from leaves to other tissues throughout the plant	A	fallow
1.2.2	Calcium sulphate	B	biotechnology
1.2.3	Contaminated by a pathogenic micro-organism or agent	C	genetic engineering
1.2.4	A branch/study field of biology that uses living processes, organisms or systems to manufacture products	D	transpiration
1.2.5	Land ploughed but not planted	E	gypsum
		F	infected
		G	calcitic lime
		H	translocation

(5 x 2) (10)

1.3 Give ONE word/phrase for each of the following descriptions. Write ONLY the word/phrase next to the question numbers (1.3.1–1.3.5) in the ANSWER BOOK.

1.3.1 The suction force which aids in drawing water upwards from the roots to the leaves

1.3.2 Material of natural or synthetic origin that is applied to soil or to plant tissues to supply one or more plant nutrients

1.3.3 Transfer of ripe pollen grains from anthers to stigmas

1.3.4 A broad-based approach that integrates practices for economic control of pests

1.3.5 A structure with walls and roof made mainly of transparent material in which plants requiring regulated climatic conditions are grown

(5 x 2) (10)

1.4 Change the UNDERLINED WORD(S) in each of the following statements to make them TRUE. Write only the answer next to the question numbers in the ANSWER BOOK.

1.4.1 Osmosis is the movement of a substance from an area of high concentration to an area of low concentration

1.4.2 Fruit setting is the process by which an organism grows from a seed

1.4.3 The practice of planting only one crop in the same place year after year is referred to as crop rotation

1.4.4 Hydroponics is the farming of marine and freshwater aquatic organisms

1.4.5 Soil classification aims to produce a soil map that shows the different types of soil in a farming area (5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: PLANT STUDIES (NUTRITION)

Start this question on a NEW page.

2.1 Analyse the chemical reaction below and answer the questions which follow.

$$CO_2 + H_2O \longrightarrow \underset{\textbf{B}}{C_6H_{12}O_6} + O_2$$

2.1.1 Identify the process represented by the chemical equation above. (1)

2.1.2 Name the compound **B** in the equation above. (1)

2.1.3 Give TWO organs in plants where the compound **B** can be found. (2)

2.1.4 Suggest TWO methods farmers can use to speed up the process represented by the equation above. (2)

2.2 Below is a picture of a desert plant.

2.2.1 Give TWO important functions of water in the plant above. (2)

2.2.2 Identify THREE adaptations visible on the plant above to reduce water loss. (3)

2.2.3 Deduce TWO consequences of lack of such adaptations by plants. (2)

2.3 Below is a picture of a fertiliser.

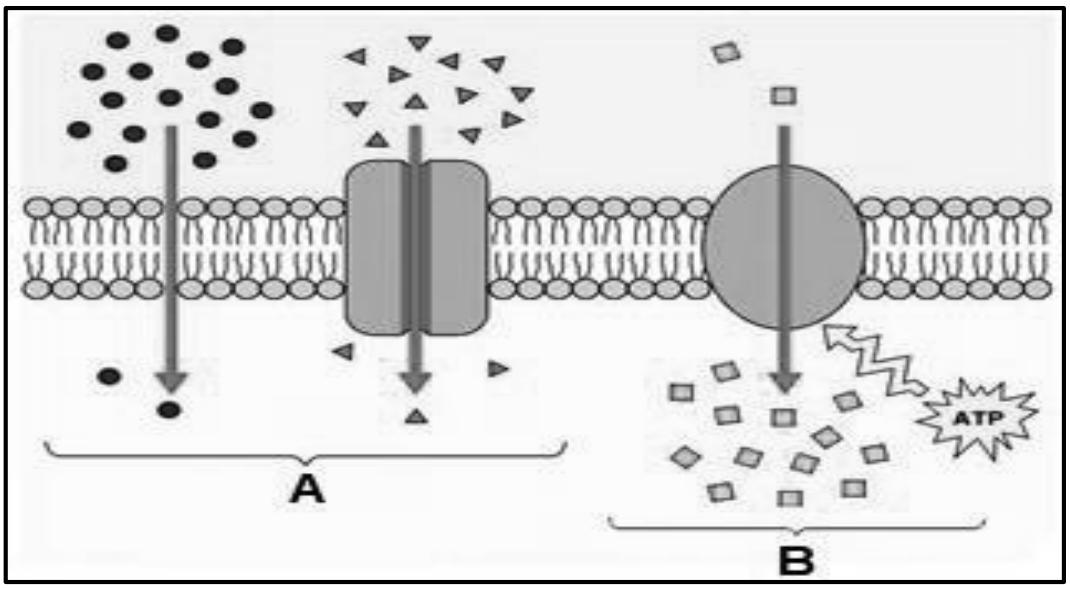
2.3.1 Classify the fertiliser above. (1)

2.3.2 Give TWO examples of phosphorus fertilisers. (2)

2.3.3 Calculate the percentage constituted by the element nitrogen in the bag above. (2)

2.3.4 From the image above, identify features that show the role of the state in fertiliser production. (2)

2.4 The diagram below shows transport mechanisms in cells.



2.4.1 Identify structure **C** in the diagram above. (1)

2.4.2 Identify the transport mechanisms **A** and **B** in the diagram above. (2)

2.4.3 Give the reason for your answer to QUESTION 2.4.1 above. (2)

2.5 Use the words in the list below to describe EACH of the definitions which follow.

fertigation; basal application; top-dressing; broadcasting; band placing; foliar application

2.5.1 Application of fertiliser at planting (1)

2.5.2 The even distribution of fertiliser over the whole surface of a field (1)

2.5.3 Plant nutrients are dissolved in water and sprayed onto leaves (1)

2.5.4 The adding of fertilisers on one or both sides of a row of plants or underneath plants (1)

2.5.5 Fertilisers are dissolved in irrigation water and applied using irrigation infrastructure (1)

2.6 Green manuring is the ploughing under or soil incorporation of any green manure crops while they are green or soon after they flower. Green manures are forage or leguminous crops that are grown for their leafy materials needed for soil conservation.

2.6.1 Deduce an advantage of green manuring from the passage above. (1)

2.6.2 Explain an advantage of using leguminous plants/crops. (2)

2.6.3 Give TWO benefits of green manuring that are not mentioned in the passage above. (2)

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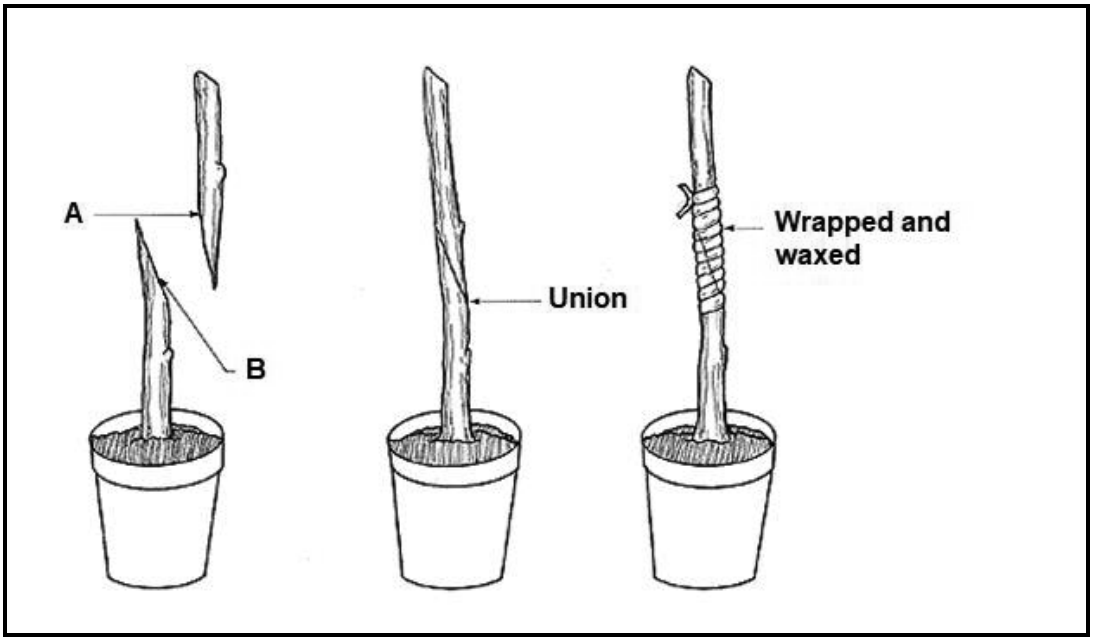
QUESTION 3: PLANT REPRODUCTION AND PROTECTION

Start this question on a NEW page.

3.1 The diagrams below show a method of artificial plant propagation.



3.1.1 Identify the type of plant propagation illustrated above. (1)

3.1.2 Provide labels for **A** and **B** in the diagram above. (2)

3.1.3 Give TWO advantages of the plant propagation method in QUESTION 3.1.1 above. (2)

3.1.4 List TWO examples of fruit trees propagated in South Africa using the method above. (2)

3.2

In some cases, blossom drop in plants is normal. For instance, male flowers naturally drop from vegetable plants after a few days. Many vegetables, like squash, begin producing male flowers as much as two weeks before the first female flower bloom. That being said, healthy blossoms can suddenly drop from plants due to inadequate pollination, environmental factors, low soil fertility and thrips.

3.2.1 Name the phenomenon described in the passage above. (1)

3.2.2 From the passage above, deduce a biological cause of the phenomenon. (1)

3.2.3 State TWO climatic factors that can lead to the phenomenon in QUESTION 3.2.1. (2)

3.2.4 For each climatic factor given in QUESTION 3.2.3, suggest an appropriate method farmer can use to protect their crops. (2)

3.3 Match plant propagation methods in the pane below with the appropriate plant in QUESTIONS 3.3.1–3.3.5.

bulbs; stem tubers; cuttings; stolons and rhizomes; runners

3.3.1 Roses (1)

3.3.2 Onions (1)

3.3.3 Potatoes (1)

3.3.4 Ginger (1)

3.3.5 Sweet potatoes (1)

3.4 Read the passage below and answer the questions which follow.

Approximately 99% of soya and 84% of maize grown in this country is GMO. This means that these food crops have had their natural DNA or their genes altered with DNA molecules from a different source. This combining of DNA sets leads to the creation of a new variety of plant or organism, designed to withstand herbicides that contain the active ingredient glyphosate – a product that kills all plants that are not genetically modified.

3.4.1 Write down the words represented by the acronym GMO. (1)

3.4.2 Give ONE advantage of GMO technology that is mentioned in the passage above. (1)

3.4.3 Give TWO other methods of plant improvement apart from the one in the passage above. (2)

3.5 Read the passage below and answer the questions which follow.

A plant disease is an impairment of the normal state of a plant that interrupts or modifies its vital functions. All species of plants, wild and cultivated alike, are subject to disease.

3.5.1 Mention TWO environmental conditions that result in rapid multiplication of plant pathogens. (2)

3.5.2 Name TWO micro-organisms that cause plant diseases. (2)

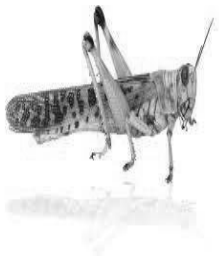
3.5.3 Describe TWO measures farmers can take to prevent the spread of plant diseases. (2)

3.6 The pictures **A**, **B** and **C** below are of common insects found on farms.

A

B

C



3.6.1 Match the insects **A**, **B** and **C** above with the statements below:

(a) Sap sucking (1)

(b) Chewing (1)

(c) Biological control (1)

3.6.2 Give TWO advantages of using the pest control method in QUESTION 3.6.1 (c). (2)

3.6.3 Suggest TWO non-chemical methods farmers can use to control insect pests. (2)

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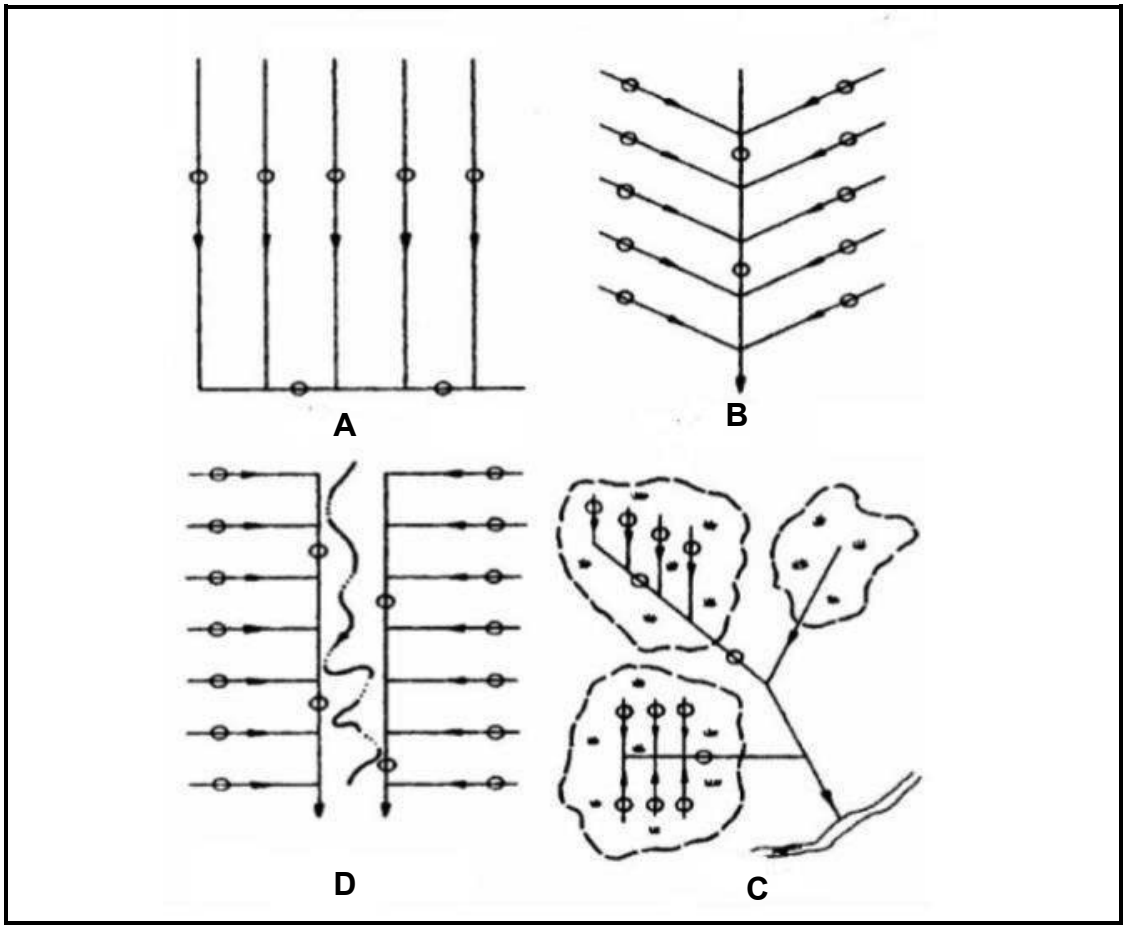
QUESTION 4: OPTIMAL RESOURCE UTILISATION

Start this question on a NEW page.

4.1



4.1.1 Identify the drainage layouts **A** and **B**. (2)

4.1.2 Give a letter from the diagram in QUESTION 4.1 for the drainage layout which can be used in the following cases:

(a) Where a piece of land has a clear depression down the middle (1)

(b) Where there are wet patches on the land (1)

(c) On level ground where the land has a slight fall to one side (1)

4.1.3 Mention TWO factors farmers should consider when installing pipe drainage systems. (2)

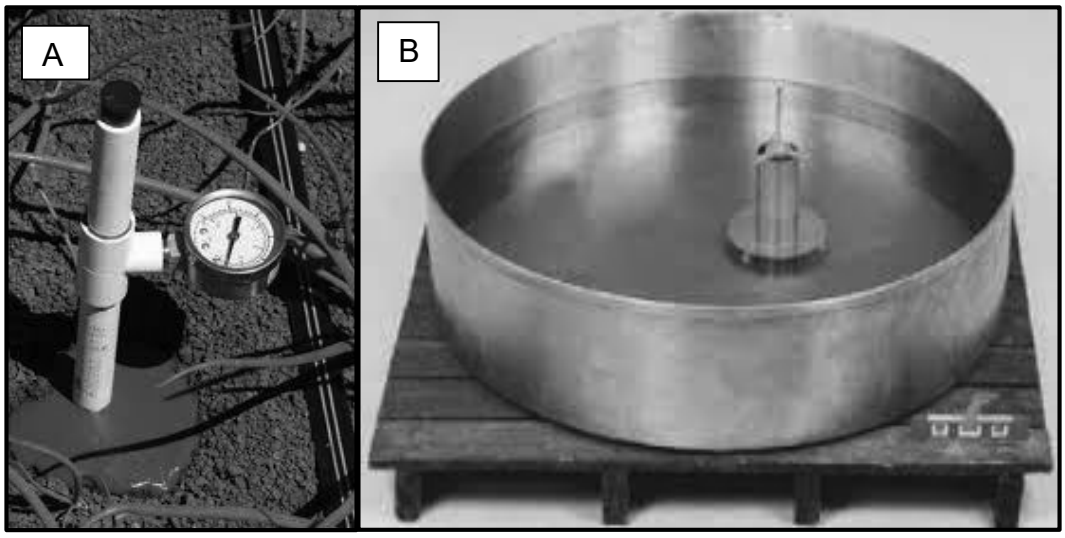
4.2 Cultivation, also known as tilling, is the act of digging into or cutting up an existing soil bed to better prepare it for planting.

4.2.1 Give ONE example of a primary tillage implement. (1)

4.2.2 State the main aim of secondary soil cultivation. (1)

4.2.3 Differentiate between *primary* and *secondary soil cultivation*. (2)

4.3 The instruments below are used by farmers for irrigation scheduling.



4.3.1 Identify instruments **A** and **B** above. (2)

4.3.2 Give TWO advantages of irrigation scheduling. (2)

4.3.3 Recommend TWO sources of water farmers can use for irrigating their crops. (2)

4.4 Read the passage below and answer the questions which follow.

A farmer uses technology that enables him to move from blanket fertilisation to applying only the fertiliser required for a specific area. It also allows farmers to compare harvest information and identify poor spots in lands. The farmer uses GPS, which enables self-steering of tractors and harvesters, differential fertilisation and the monitoring of production while crops are being harvested. This allows the farmer to see exactly how much has been harvested from specific areas in the land.

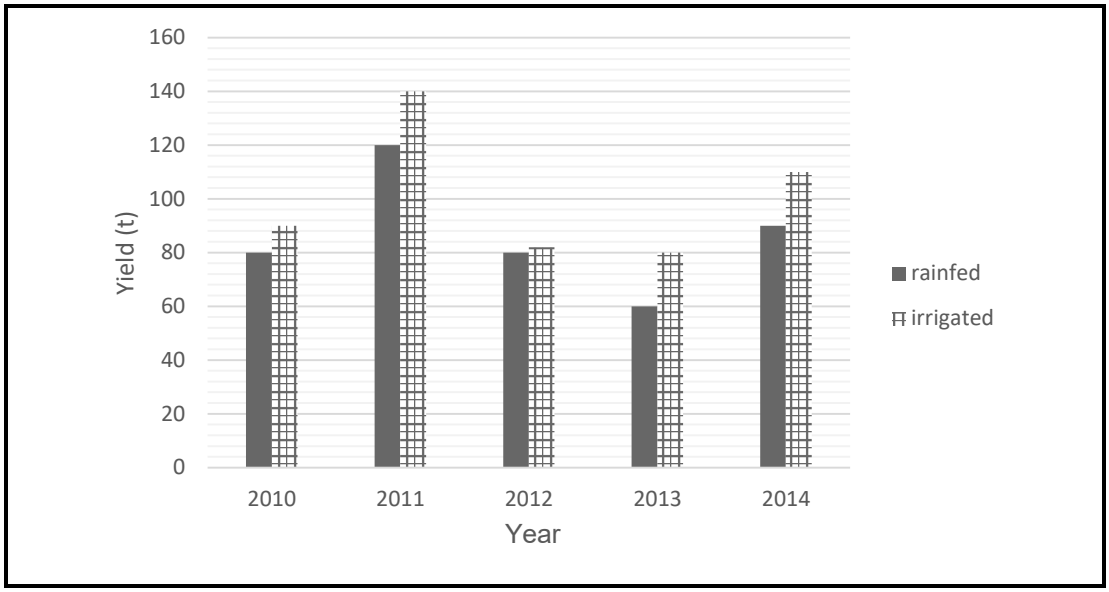
4.4.1 Identify the farming system described in the scenario above. (1)

4.4.2 Identify a piece of equipment which plays a central role in the farming system in the scenario above. (1)

4.4.3 From the scenario, deduce TWO advantages of the system. (2)

4.4.4 Recommend TWO other pieces of equipment not mentioned in the scenario the farmer can use for successful implementation of the farming system. (2)

4.5 The graph below shows the response of a farmer's crops to two watering regimes: some fields were irrigated while others were watered by the rains.



4.5.1 Translate the information on the graph above into a table. (6)

4.5.2 Name the water delivery method which results in higher yields. (1)

4.5.3 Justify your answer to QUESTION 4.5.2 above. (1)

4.5.4 Predict what could have caused the results obtained in 2012. (2)

4.5.5 Suggest TWO challenges that limit the widespread adoption of irrigation as opposed to relying on rainfall. (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150