Province of the
EASTERN CAPE
EDUCATION

# NATIONAL SENIOR CERTIFICATE

## GRADE 11

## NOVEMBER 2013

# AGRICULTURAL SCIENCES P2

**MARKS:** **150**

**TIME:** **2½ hours**

This question paper consists of 15 pages, including an answer sheet.

## INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions from BOTH SECTIONS A and B.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. Place your ANSWER SHEET for SECTION A (QUESTION 1) within your ANSWER BOOK.
4. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
5. Start each question from SECTION B on a NEW page.
6. Read the questions carefully and make sure you answer what is asked.
7. Number the answers correctly according to the numbering system used in this question paper.
8. DO NOT SPLIT the answers to the questions.
9. Write neatly and legibly.

## SECTION A

## QUESTION 1: MULTIPLE-CHOICE QUESTIONS

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and make a cross (X) over the appropriate letter in the block (A–D) next to the question number (1.1.1–1.1.10) on the attached ANSWER SHEET. NO MARKS WILL BE ALLOCATED IF MORE THAN ONE CROSS (X) APPEARS FOR AN ANSWER.

Example:

1.1.11

| A | B | C | D |
|---|---|---|---|

1.1.1 An organic fertiliser in which plants are ploughed back into the soil:

A Crop rotation
B Green manure
C Guano
D Compost (2)

1.1.2

**FIGURE 1.1.2**

The interaction between the bird and the flower in the picture below results in ...

A self-pollination.
B cross pollination.
C flower formation.
D nesting behaviour. (2)

1.1.3 Grade 11 learners in a science class allowed water to pass through a semi-permeable membrane from a region of high concentration to a region of lower concentration. The process is best described as …

A diffusion.
B transpiration.
C plasmolysis.
D osmosis. (2)

1.1.4 If you were given marine and fresh water animals for breeding purposes, in which of the following fields would you operate?

A Hydroponic
B Greenhouse
C Aquaculture
D Recirculation (2)

1.1.5 Which of the following could be described as a multiple fruit?

A Strawberry
B Peach
C Apricot
D Apple (2)

1.1.6 The diagram below is an example of a drainage system lay-out:

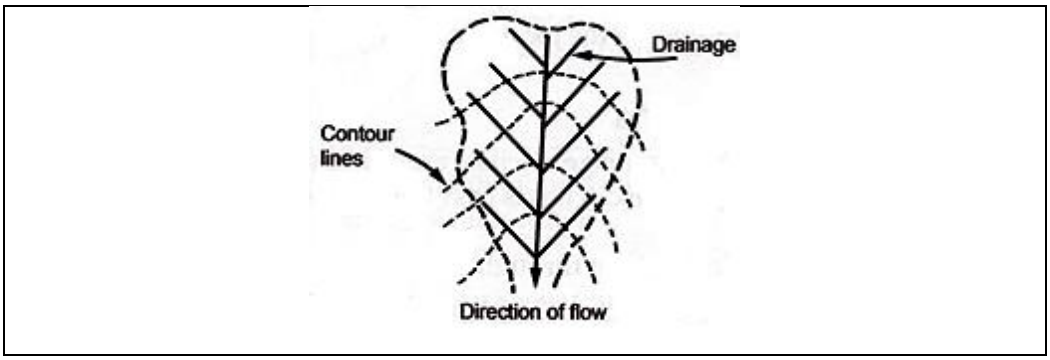



**FIGURE 1.1.6**

Which of the following descriptions best fit the diagram above?

A The grid system
B The herringbone system
C The natural system
D None of the above (2)

1.1.7 … is the process whereby small incisions are made in the coat of seeds in order to hasten germination.

A Imbibition
B Scarification
C Layering
D Hybridisation (2)

1.1.8 Plants keep their shape because of water in their cells. This is called …

A turgor pressure.
B concentration gradient.
C osmotic gradient.
D respiration pool. (2)

1.1.9 The practice of replanting the same crop species in the same field, with no change to a different crop, year after year is described as …

A crop rotation.
B minimum tillage.
C monoculture.
D organic cropping. (2)

1.1.10 Learners observed that the colour of their lettuce in the school garden was changing from green to purple. This could be attributed to a deficiency of …

A nitrogen.
B zinc.
C potash.
D phosphorus. (2)

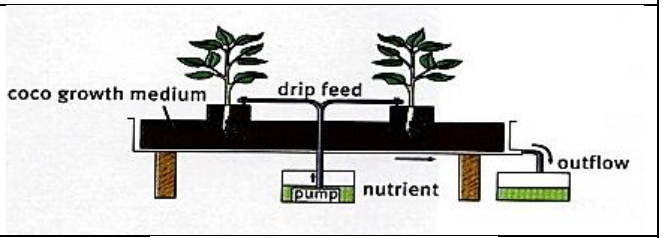
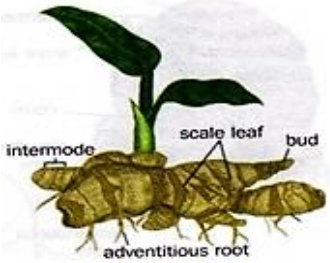
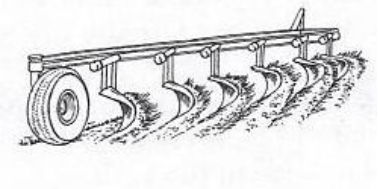
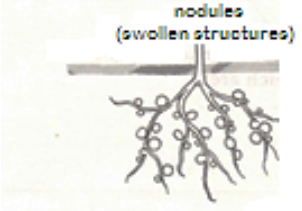
1.2 In the table below, a picture/diagram and two answers are given. Decide whether the picture/diagram in COLUMN B relates to **A ONLY**, **B ONLY**, **BOTH A and B** or **NONE** of the answers in COLUMN A. Choose the correct answer and make a cross (X) in the appropriate block next to the question number (1.2.1–1.2.5) on the attached ANSWER SHEET.

EXAMPLE:

| COLUMN A | COLUMN B |
|---|---|
| A: filament<br>B: anther | Stamen |

ANSWER:

| ONLY A | ONLY B | A and B | NONE |
|---|---|---|---|
| A | B | C | D |

| | COLUMN A | COLUMN B |
|---|---|---|
| 1.2.1 | A: Fermentation process<br>B: Hydroponics |  |
| 1.2.2 | A: Rhizome<br>B: Sucker |  |
| 1.2.3 | A: Irrigation line<br>B: Ploughing disc |  |
| 1.2.4 | A: Chewing pest<br>B: Creeping pest | (enlarged)<br>  |
| 1.2.5 | A: Calcium fixation<br>B: Phosphorus fixation |  |

(5 x 2) (10)

1.3 Give ONE WORD/TERM for each of the following descriptions. Write only the term/word next to the question number (1.3.1–1.3.5) on the attached ANSWER SHEET.

1.3.1 An instrument used to measure the force with which water is held in the soil by the soil particles (2)

1.3.2 The process of improving cultivars by choosing the best plants from which to collect seed (2)

1.3.3 Removing the lumps from tilled soil to make it loose and fine (2)

1.3.4 The use of mechanical or other means to supply water to crops (2)

1.3.5 The vascular tissue in plants that conducts sugars and other metabolic products downward from the leaves (2)

1.4 Change the UNDERLINED WORD/S in the following statements to make them TRUE. Write only the appropriate word(s) next to the question number (1.4.1–1.4.5) on the attached ANSWER SHEET.

1.4.1 Ammonification is the conversion of ammonia or other nitrogen compound into nitrites or nitrates. (1)

1.4.2 Xerophytes are plants that are unwanted in cultivated lands or grazing fields. (1)

1.4.3 Foliar application of fertiliser is the uniform spreading of fertiliser over the area to be planted. (1)

1.4.4 Micro irrigation is one of the oldest methods in irrigation which allows water to cover the entire planted area. (1)

1.4.5 Selection refers to a situation where organisms are separated from others until it is known that there is no danger of spreading disease. (1)

**TOTAL SECTION A: 45**

## SECTION B

## QUESTION 2: PLANT STUDIES

**START THIS QUESTION ON A NEW PAGE.**

2.1 The illustration below indicates a very important process in plant studies.

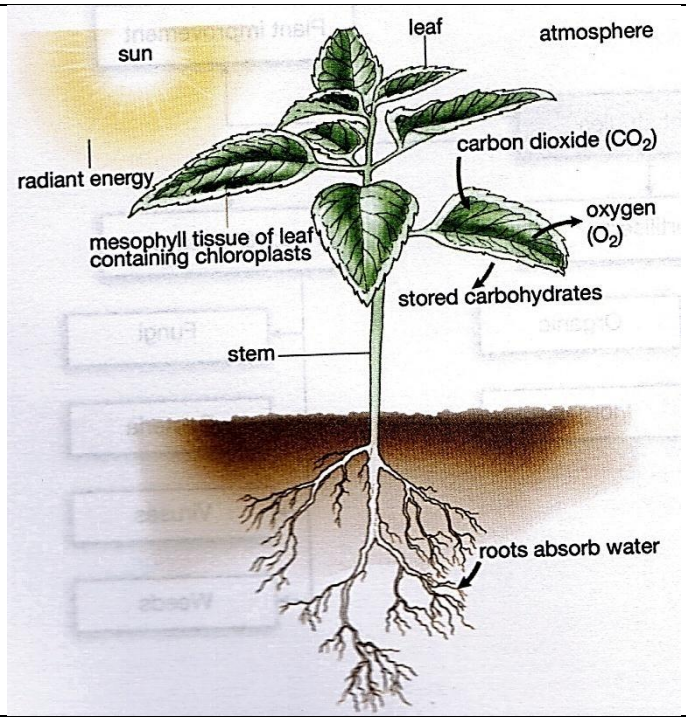



**FIGURE 2.1**

2.1.1 Critically examine the process in the illustration and tabulate TWO differences between the process above and respiration in plants. (4)

2.1.2 Suggest THREE factors that could increase the rate of the process illustrated in QUESTION 2.1 above (FIGURE 2.1). (3)

2.1.3 State THREE adaptations of plants to reduce the transpiration rate. (3)

2.1.4 Give the importance of the process illustrated in QUESTION 2.1 to all living organisms (THREE reasons). (3)

2.2 Mineral nutrients are very essential for the growth and development of crops. However, there are several factors that affect the availability of nutrients or mineral elements to plants.

2.2.1 Indicate FOUR factors that affect the availability of mineral nutrients to plants. (4)

2.2.2 State TWO methods that could be used to determine the nutritional status of soil. (2)

2.3 The picture below is a bag of mixed fertiliser sold to Grade 11 learners in a school. The figures on the label [6:1:5 ; (22) and 10 kg] of the fertiliser are clearly visible. Use these figures to answer the questions that follow.


**FIGURE 2.3**

2.3.1 Indicate what is represented by the figure **22** on the fertiliser mixture bag. (1)

2.3.2 Calculate the percentage of potassium in the mixture. Show all calculation. Work out the answer to two decimals. (4)

2.4 Organic matter in the soil are all the substances that once lived, but have died and can decompose or rot in the soil. Many farmers believe that it is the most important fraction of the soil because it has both physical and chemical effects on the soil.

2.4.1 Identify THREE physical effects of organic matter on a garden bed. (3)

2.4.2 State THREE factors that influence the composition of farm manure. (3)

2.5 The illustration below shows the parts of a flower.

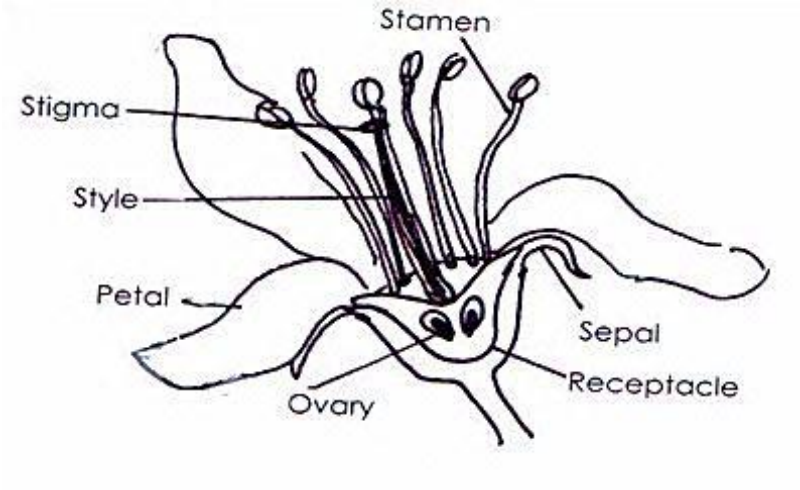



**FIGURE 2.5**

2.5.1 Identify the part that will develop into a fruit. (1)

2.5.2 Indicate the part that receives pollen during fertilisation. (1)

2.5.3 Suggest the term for the part that consists of the stigma, style and ovary. (1)

2.5.4 State TWO important roles of petals in the sexual reproduction of plants. (2)

**[35]**

## QUESTION 3: OPTIMAL RESOURCE UTILISATION

**START THIS QUESTION ON A NEW PAGE.**

3.1 Soil cultivation is any practice which is designed to re-arrange the soil condition prior to establishing crops. Farmers determine the type of cultivation needed by examining the soil or by sending soil samples for analysis in order to obtain the specific composition of the soil.

3.1.1 Indicate THREE aims of soil cultivation. (3)

3.1.2 Differentiate between primary and secondary soil cultivation. (2)

3.2 One of the basic requirements of plants for growth is soil water. Plants take nutrients from the soil through water medium. It is ideal for farmers to have proper planning of irrigation scheduling in their farm annual programmes.

3.2.1 Explain the concept *irrigation scheduling*. (2)

3.2.2 Justify the underlined sentence in the text in QUESTION 3.2 by providing THREE reasons. (3)

3.2.3 Identify THREE advantages of micro-irrigation (micro-jet and drip methods). (3)

3.2.4 Indicate TWO factors that have an influence on the water quality for irrigation. (2)

3.2.5 Mention the instrument that can be used to measure the rate of water loss in soil. (1)

3.2.6 Show the formula which is used to calculate evapo-transpiration. (2)

3.3 Hydroponic production systems and open field systems both aim to produce crops and plants. However, there are some differences between them.

3.3.1 Tabulate differences between hydroponic systems and open field systems. Write TWO points under each system in the table. (4)

3.3.2 Suggest TWO materials that can be used as a growth medium in a hydroponic system. (2)

3.4 The picture below indicates a type of farming practised in an experimental school.

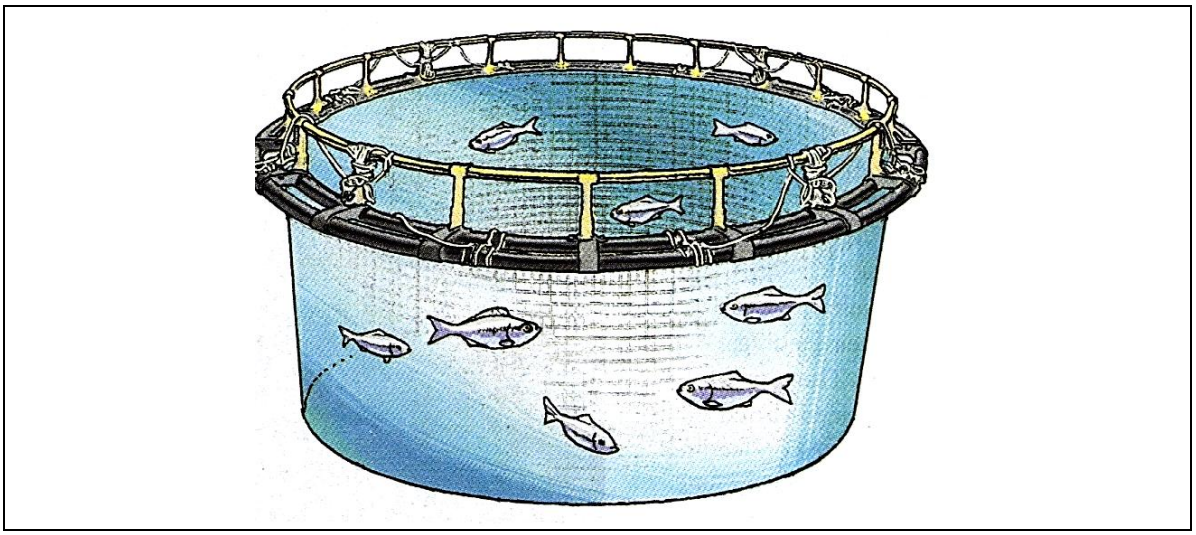


**FIGURE 3.4**

3.4.1 Identify the type of farming indicated in the picture above. (1)

3.4.2 Describe THREE basic requirements that the above farming system should meet to achieve high yield. (3)

3.4.3 Mention TWO factors that play a role in determining the fish species suitable for commercial farming. (2)

3.5 3.5.1 Define the term *drainage*. (2)

3.5.2 Identify the THREE types of soil drainage systems. (3)

**[35]**

## QUESTION 4

**START THIS QUESTION ON A NEW PAGE.**

4.1 The table below shows the nitrogen taken up by four crops on a plot.

| Crop | Nitrogen taken |
|---|---|
| Maize | 15 units |
| Yams | 35 units |
| Potatoes | 30 units |
| Peanut | 5 units |

4.1.1 Translate the information in the table into a bar graph and clearly show ALL necessary attributes of the bar graph. (4)

4.1.2 Determine the amount by which the nitrogen-intake by yams is greater than the nitrogen-intake by peanuts. Show all calculations. (2)

4.2 Observe the diagram below critically and answer the questions based on it.

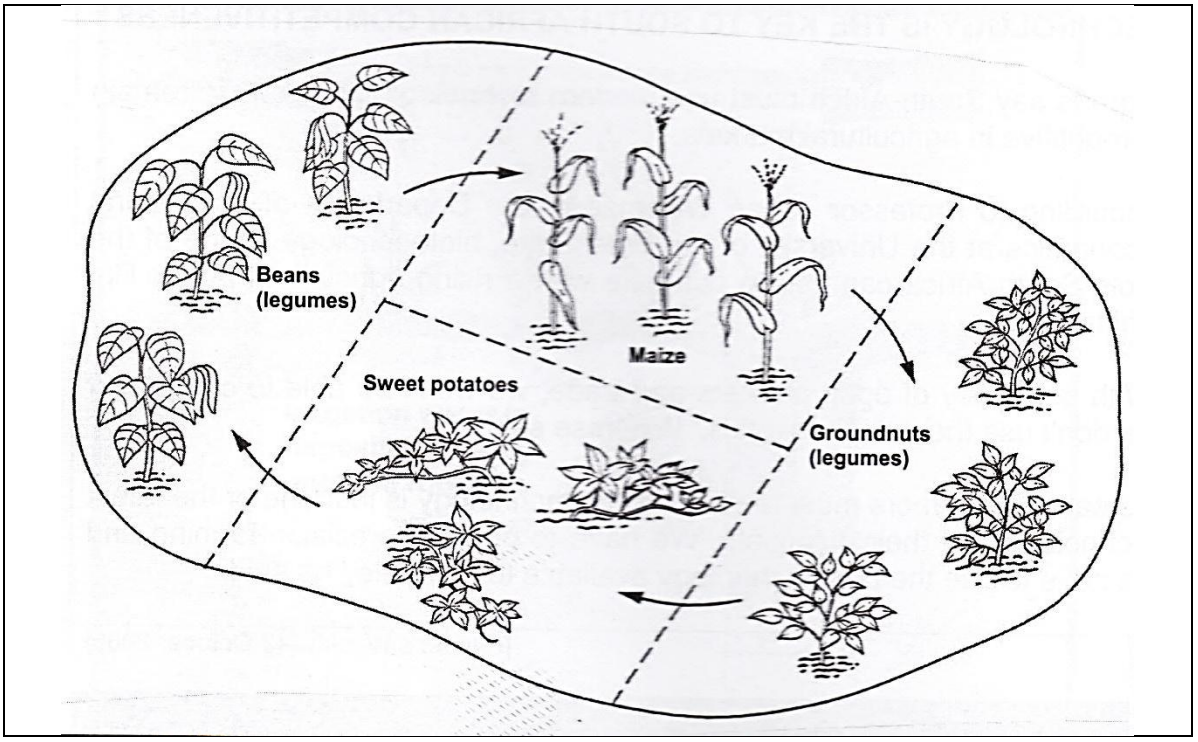



**FIGURE 4.2**

4.2.1 Deduce the type of farming system illustrated in the diagram above. (1)

4.2.2 Suggest ONE basic reason for the inclusion of beans in the cropping system above. (2)

4.2.3 State FOUR factors to consider when planning a crop rotation programme. (4)

4.3 The use of gene mutations by plant breeders to improve plant production is fast gaining popularity in developing countries.

4.3.1 State THREE advantages of gene mutations in plants in South Africa. (3)

4.3.2 Explain THREE disadvantages of Genetically Modified (GM) crops. (3)

4.4 The following pictures illustrate methods used in plant propagation.

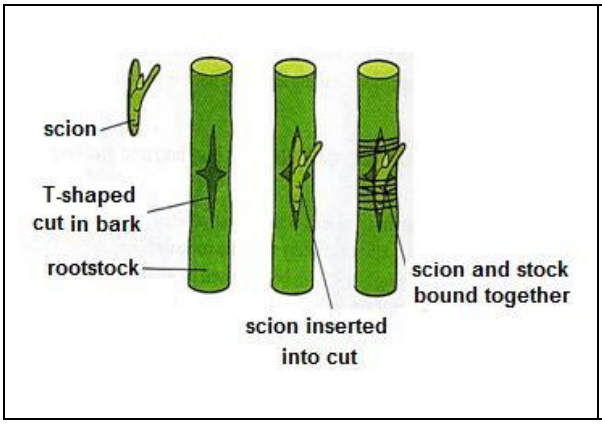



**FIGURE 4.4A**

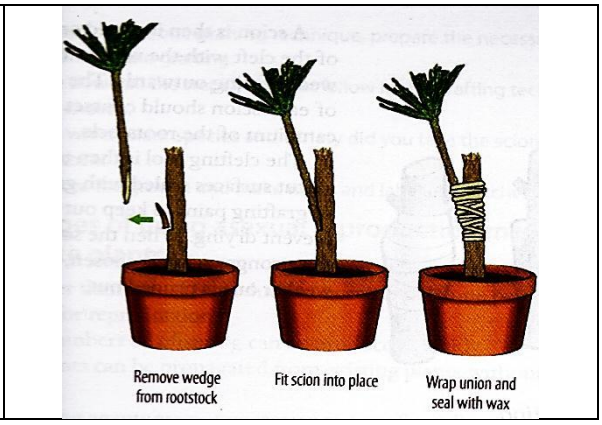



**FIGURE 4.4B**

4.4.1 Identify the TWO propagation methods in FIGURE 4.4A and FIGURE 4.4B. (2)

4.4.2 Indicate FOUR advantages of using the propagation methods in both FIGURE 4.4A and FIGURE 4.4B. (4)

4.5 A plant disease is an impairment of the normal state of a plant that interrupts or modifies its vital functions.

4.5.1 State FOUR types of damage caused by plant pests on crops. (4)

4.5.2 Give THREE roles played by the government of South Africa in plant protection. (3)

4.5.3 Indicate THREE principles or steps to be followed in determining IPM (Integrated Pest Management). (3)

**[35]**

**TOTAL SECTION B: 105**
**GRAND TOTAL: 150**

## ANSWER SHEET

**NAME AND SURNAME:** _____

## SECTION A

### QUESTION 1.1

| | | | | |
|---|---|---|---|---|
| 1.1.1 | A | B | C | D |
| 1.1.2 | A | B | C | D |
| 1.1.3 | A | B | C | D |
| 1.1.4 | A | B | C | D |
| 1.1.5 | A | B | C | D |
| 1.1.6 | A | B | C | D |
| 1.1.7 | A | B | C | D |
| 1.1.8 | A | B | C | D |
| 1.1.9 | A | B | C | D |
| 1.1.10 | A | B | C | D |

(10 x 2) (20)

### QUESTION 1.2

| | A only | B only | A and B | None |
|---|---|---|---|---|
| 1.2.1 | A | B | C | D |
| 1.2.2 | A | B | C | D |
| 1.2.3 | A | B | C | D |
| 1.2.4 | A | B | C | D |
| 1.2.5 | A | B | C | D |

(5 x 2) (10)

### QUESTION 1.3

1.3.1 _____

1.3.2 _____

1.3.3 _____

1.3.4 _____

1.3.5 _____

(5 x 2) (10)

### QUESTION 1.4

1.4.1 _____

1.4.2 _____

1.4.3 _____

1.4.4 _____

1.4.5 _____

(5 x 1) (5)

**45**