



# basic education

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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P2**

**NOVEMBER 2012**

**MARKS: 150**

**TIME: 2½ hours**

**This question paper consists of 17 pages and an answer sheet.**

**INSTRUCTIONS AND INFORMATION**

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
4. Start EACH question from SECTION B on a NEW page.
5. Read the questions carefully and make sure that you answer what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Write your centre number and examination number on the ANSWER SHEET. Place the ANSWER SHEET for SECTION A (QUESTION 1) in the front of your ANSWER BOOK.
8. Non-programmable calculators may be used.
9. 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 make a cross (X) 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.

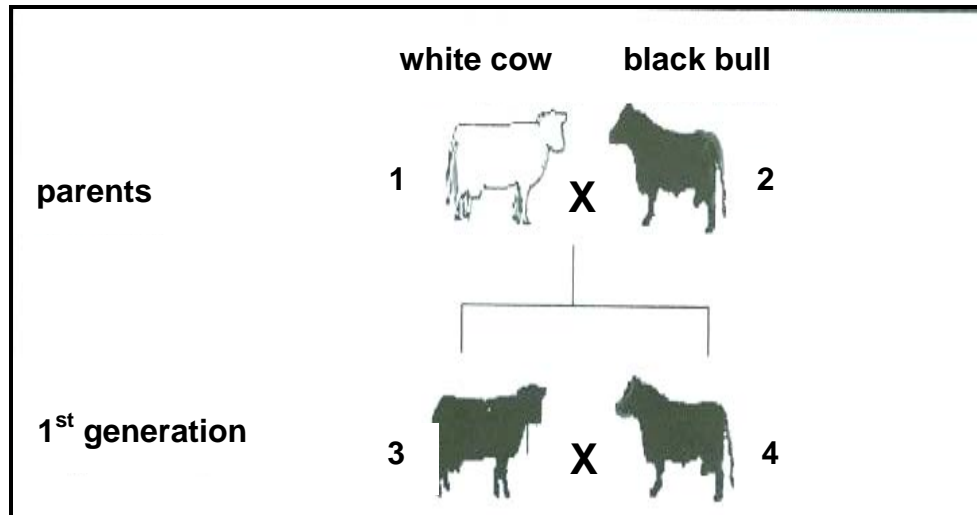
EXAMPLE:

1.1.11	<input checked="" type="checkbox"/> A	B	C	D
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- 1.1.1 ... is the formation of prices of products and services in the market by the spontaneous operation of price-forming factors.
- A Price elasticity
  - B Demand
  - C Supply
  - D Price determination
- 1.1.2 A process whereby agricultural products are changed into more useful tailor-made forms to meet consumer requirements, for example raw cotton into thread and cotton wool:
- A Packaging
  - B Processing
  - C Standardisation
  - D Grading
- 1.1.3 Uncontrollable conditions such as drought, hail and pests that can have huge negative effects on the quantity of products that is actually produced compared to that which was predicted:
- A Large volume in relation to value
  - B Seasonal fluctuation in production
  - C Competition
  - D Storage
- 1.1.4 Producers that form a formal group to market their products and who are paid the average price obtained for any specific year are following ...
- A a niche marketing approach.
  - B a free marketing system.
  - C farm gate marketing.
  - D a pool system.

- 1.1.5 A farm financial planning aspect which is necessary to ensure that money required to keep the production process going is available at all times is called ...
- A income tax.
  - B insurance.
  - C cash flow.
  - D state duty.
- 1.1.6 An enterprise expense that constitutes that portion of the total cost which remains unchanged for a specific production enterprise regardless of whether more or less is produced:
- A Demand costs
  - B Fixed costs
  - C Supply costs
  - D Variable costs
- 1.1.7 The farm management principle which involves the checking and verification of the results of decision making is known as ...
- A motivation.
  - B coordination.
  - C organisation.
  - D control.
- 1.1.8 An action to address the problem of under-capitalisation of a farm:
- A Working longer hours
  - B Paying higher wages
  - C Hiring farm machinery
  - D Increasing the number of labourers

- 1.1.9 The following crossing between a recessive white cow (aa) and a dominant black bull (AA) resulted in only black offspring in the F<sub>1</sub> generation. In the F<sub>2</sub> generation, when inbreeding is practised, it will result in ... offspring.



- A all black  
 B three black and one white  
 C 50% black  
 D 75% white
- 1.1.10 The sudden appearance of a red calf in a herd of pure-bred black Drakensberg cattle, is due to ...

- A atavism.  
 B variation.  
 C hybridism.  
 D a nutritional deficiency.

(10 x 2) (20)

- 1.2 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–J) next to the question number (1.2.1–1.2.5) on the attached ANSWER SHEET, for example 1.2.6 K.

COLUMN A		COLUMN B	
1.2.1	Add to the marketing costs of agricultural products	A	Skills Development Act, 1998
1.2.2	Medium-term capital item	B	Labour Relations Act, 1995
1.2.3	Promulgated to provide for the training needs of farm workers as well	C	homozygous
1.2.4	An individual with two different alleles of the same gene	D	heterozygous
1.2.5	The use of livestock for breeding based on the quality of the animal's ancestors	E	producers
		F	intermediaries
		G	land
		H	machinery
		I	mass selection
		J	pedigree selection

( 5 x 2)

(10)

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

- 1.3.1 More production enterprises are included in a farming operation to improve sales and seasonal volumes
- 1.3.2 The provision of standard specifications which will give uniformity to a group of products regarding factors such as quality, size, mass, colour and moisture
- 1.3.3 A mechanism used by a farmer to provide financial protection against unforeseen events such as flooding, fires, et cetera
- 1.3.4 When one gene completely overshadows the effect of the other gene in connection with a heredity factor
- 1.3.5 The spontaneous changes in the DNA structure that may be forced by exposure to certain chemicals or radiation resulting in new unique individuals

(5 x 2)

(10)

- 1.4 Change the UNDERLINED WORD(S) in each of the following statements to make them TRUE. Write the appropriate word(s) next to the question number (1.4.1–1.4.5) on the attached ANSWER SHEET.
- 1.4.1 In a cooperative marketing system, producers are encouraged to produce the highest quality products because their products compete with other producers with similar products.
- 1.4.2 Supply and demand are the two factors that are used when establishing the value of an agricultural product.
- 1.4.3 Casual labourers are employed on the farm on a long-term basis and enjoy benefits like adequate housing and medical aid.
- 1.4.4 Epistasis is a large group of genes that each add to the value of certain phenotypic characteristics.
- 1.4.5 Spontaneous variation is a complete range of variations of the characteristics from one extreme to another. (5 x 1) (5)
- TOTAL SECTION A: 45**

**SECTION B**

Start this question on a NEW page.

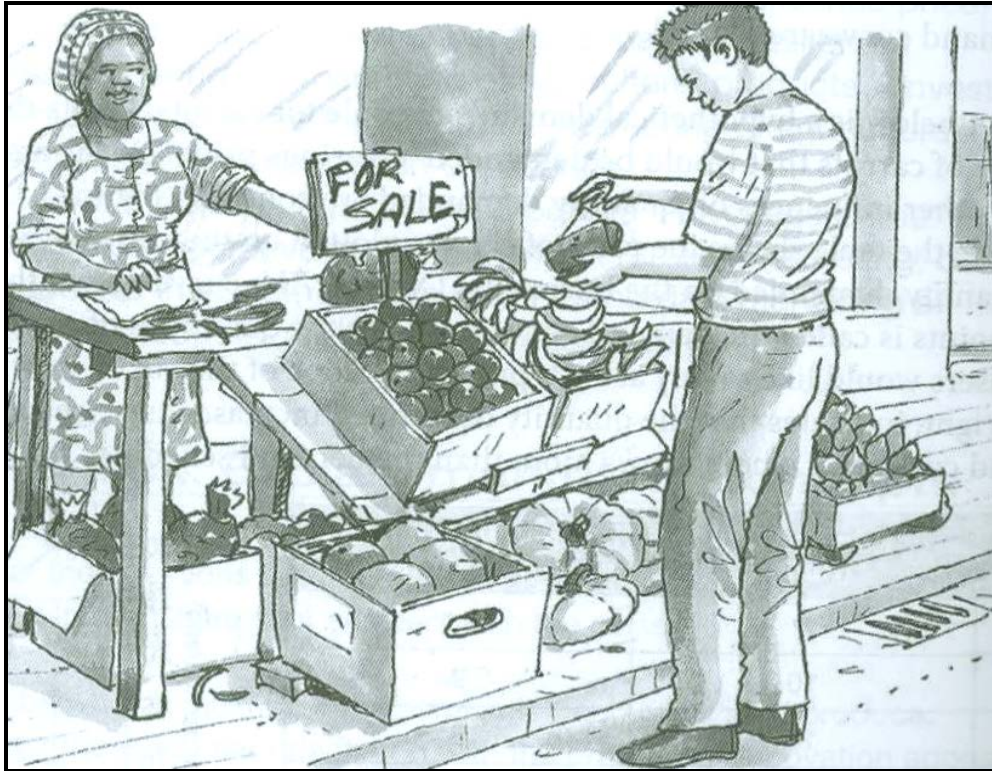
**QUESTION 2: AGRICULTURAL MANAGEMENT**

- 2.1 

Farmers who intend running successful poultry farming businesses, should first conduct a market survey to ensure that all their produce will be sold. The production should also be monitored daily to enable them to see clearly whether they are achieving their objectives or not.
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- 2.1.1 Name FOUR important marketing elements that a farmer needs to combine to develop a marketing strategy. (4)
- 2.1.2 Identify FOUR agricultural management concepts that could be linked to aspects mentioned in the passage above. (4)
- 2.1.3 Indicate THREE characteristics of a successful entrepreneur that could be gathered from the data supplied above. (3)
- 2.2 A business plan is a plan of action that an entrepreneur has for the business.
- 2.2.1 Before you start a business there are usually three questions that you have to ask yourself to decide whether your business idea is feasible or not.  
Write down TWO such questions to support this statement. (2)
- 2.2.2 List the FOUR main items that should be included in a good business plan. (4)
- 2.2.3 Briefly discuss the main reason for including a business plan when applying for a loan at a financial institution. (2)

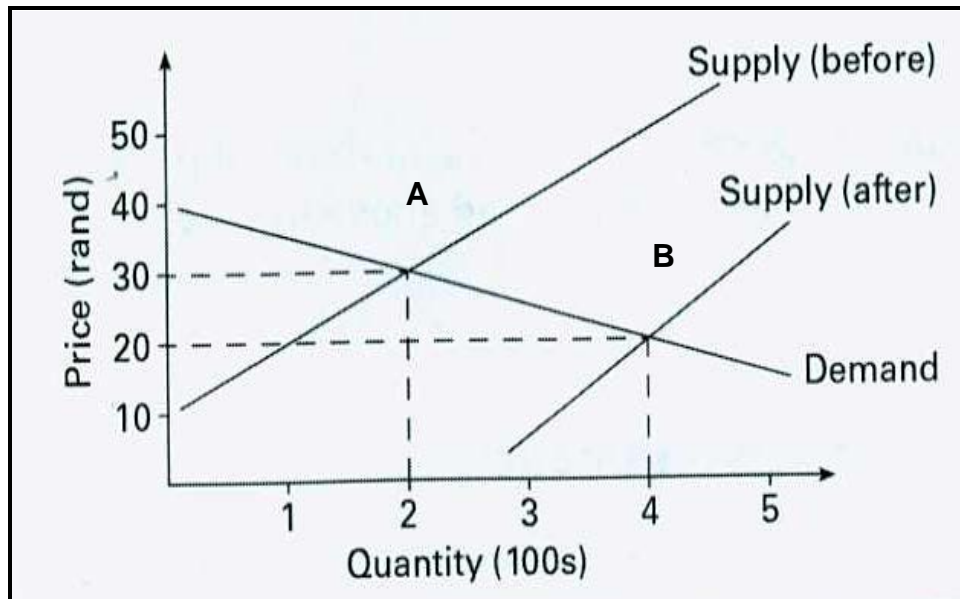


2.3 The picture below shows a street vendor selling agricultural products.



- 2.3.1 Identify the marketing system illustrated in the picture above. Motivate your answer. (2)
- 2.3.2 The marketing system above is exposed to some risks. State TWO possible risks of this type of marketing system. (2)
- 2.3.3 State the THREE main disadvantages of the marketing system above. (3)

- 2.4 The graph below shows the changes in the price as the equilibrium of supply changes.



- 2.4.1 Indicate the equilibrium price when the quantity supplied was 400. (1)
- 2.4.2 In summer the supply of fruit increases because most fruit are seasonal. Motivate the statement by referring to the data supplied above. (3)
- 2.4.3 Briefly explain the inelasticity of the supply of agricultural products in the short term. (2)
- 2.4.4 Discuss how processing can stabilise the income of a farmer. (3)
- [35]**

Start this question on a NEW page.

### QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

3.1

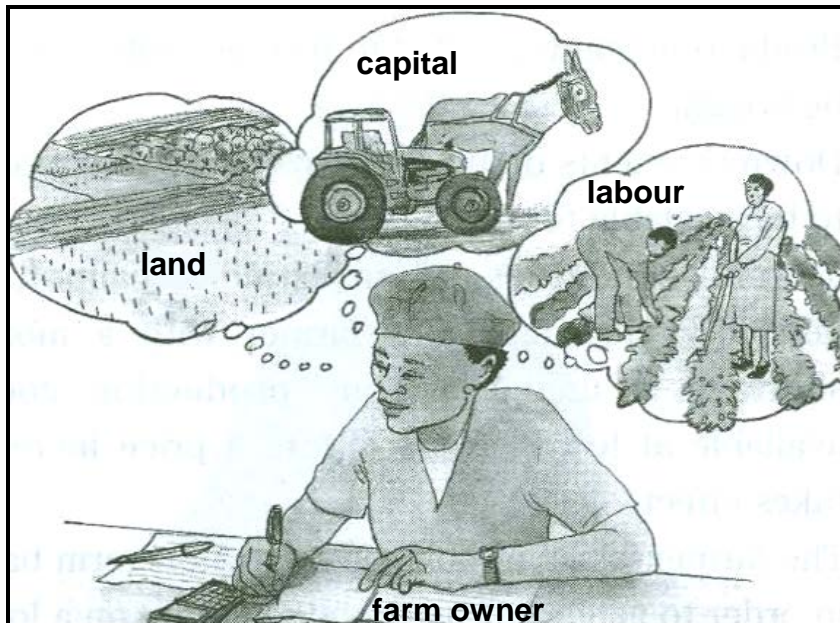
Judas is a grain farmer who secured 40 ha of commercial land through a lease arrangement with the local tribe authority. After matric Judas joined his father on a small community plot where they produced vegetables. Because they did not have a decent market to sell their produce, Judas took a break and enrolled in a panel-beating course. He then landed a job in the motor industry.

In 2004 he resigned from the motor industry and used his savings to buy a tractor and a planter. Instead of borrowing money from the bank, he raised money by hiring out his equipment to other small-scale farmers in the village. He grows sunflower on his land. He rests his soil for several months after harvesting.

[Adapted from *Farmer's Weekly*, 29 April 2011]

- 3.1.1 Identify THREE production factors in the case study. (3)
- 3.1.2 Tabulate the THREE forms of assets in the case study and group them according to their lifespan as short-term, medium-term and long-term assets. (3)
- 3.1.3 Use the case study above and deduce a problem related to capital from the data and show how the problem was avoided by the farmer. (2)
- 3.1.4 Indicate TWO ways that Judas used to create capital for his farming enterprise. (2)

3.2 The illustration below shows a farm owner busy with management tasks.



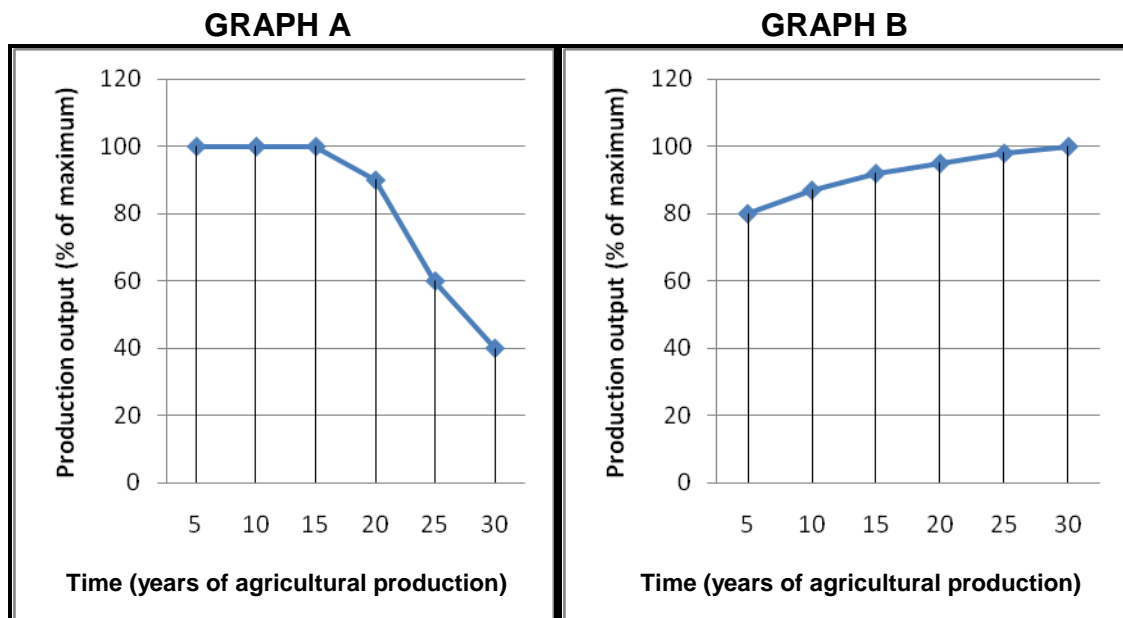
- 3.2.1 Identify a production factor that is represented by the farm owner in the illustration above. Motivate your answer. (2)
- 3.2.2 State TWO ways to improve the productivity of land as a production factor. (2)
- 3.2.3 Explain how efficient planning by a farm manager can improve the working conditions of farm labourers with reference to the following: (2)
- (a) Day-to-day planning (2)
- (b) Efficient mechanisation (2)
- 3.2.4 Suggest TWO strategies that a farm manager can apply to ensure that his farm labourers become aware of the impact of HIV/Aids on their health. (2)

3.3 The table below shows the financial data of an agricultural production enterprise. The financial data is from January to April 2009.

ASSETS	VALUE (R)	LIABILITIES	VALUE (R)
Current assets	95 000	Current liabilities	33 600
Medium-term assets	58 000	Medium-term liabilities	15 000
Long-term assets	34 300	Long-term liabilities	48 000
<b>TOTAL ASSETS</b>	<b>187 300</b>	<b>TOTAL LIABILITIES</b>	<b>96 600</b>
<b>NET VALUE</b>			

- 3.3.1 Identify the type of financial statement given above. (1)
- 3.3.2 Explain the main purpose of the type of financial statement mentioned in QUESTION 3.3.1. (2)
- 3.3.3 Define the term *net value*. (2)
- 3.3.4 Calculate the net value from the data in the table above. (2)
- 3.3.5 If a farmer needs to expand a production unit, the farmer needs a loan or a grant. Distinguish between a *loan* and a *grant*. (4)

3.4 The graphs (GRAPH A and GRAPH B) below show two farms in the same farming district that have been managed differently over a period of 30 years. The farm CONCORDIA has been overgrazed for many years and erosion is visible, while the farm POLANI has never been stocked above the grazing capacity for that stock-producing area.



- 3.4.1 Name the farm that is represented by GRAPH B. Give a reason to support your answer. (2)
- 3.4.2 Indicate TWO possible causes of the decrease in production output in GRAPH A by referring to the data above. (2)

[35]

Start this question on a NEW page.

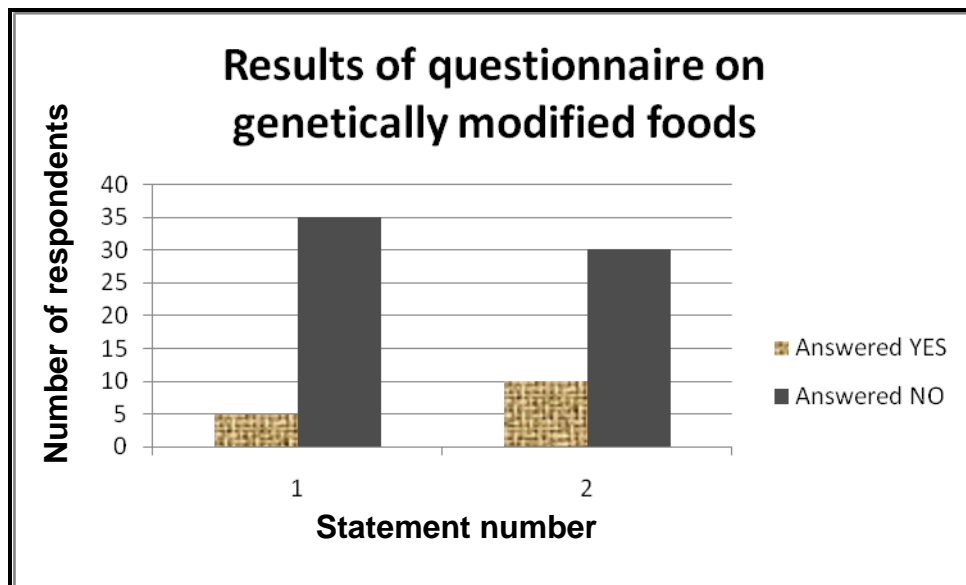
#### QUESTION 4: BASIC AGRICULTURAL GENETICS

- 4.1 A group of Grade 12 learners carried out a survey on genetically modified (GM) foods by distributing a questionnaire to 60 people. They wanted to investigate the value of GM foods compared to the value of normal foods and create awareness of any dangers of GM foods.

The survey only focused on two statements, which were formulated as follows:

1. The genetic make-up of all GM foods does not contain genetic material of any other organisms.
2. GM foods do not affect the health of people consuming these foods at all.

The results from the survey are shown in the bar graph below.



- 4.1.1 From the data above, calculate, as a percentage, the response rate of people who participated in the survey (respondents) compared to the number of people who received a questionnaire. (2)
- 4.1.2 From the survey above, deduce a statement that was mainly aimed at each of the following aspects:
- (a) The dangers of GM foods (1)
  - (b) Knowledge of GM foods (1)
- 4.1.3 Refer to the graph above and summarise the results of the survey conducted on genetically modified foods. (2)
- 4.1.4 State TWO potential benefits of genetic modification for food production. (2)

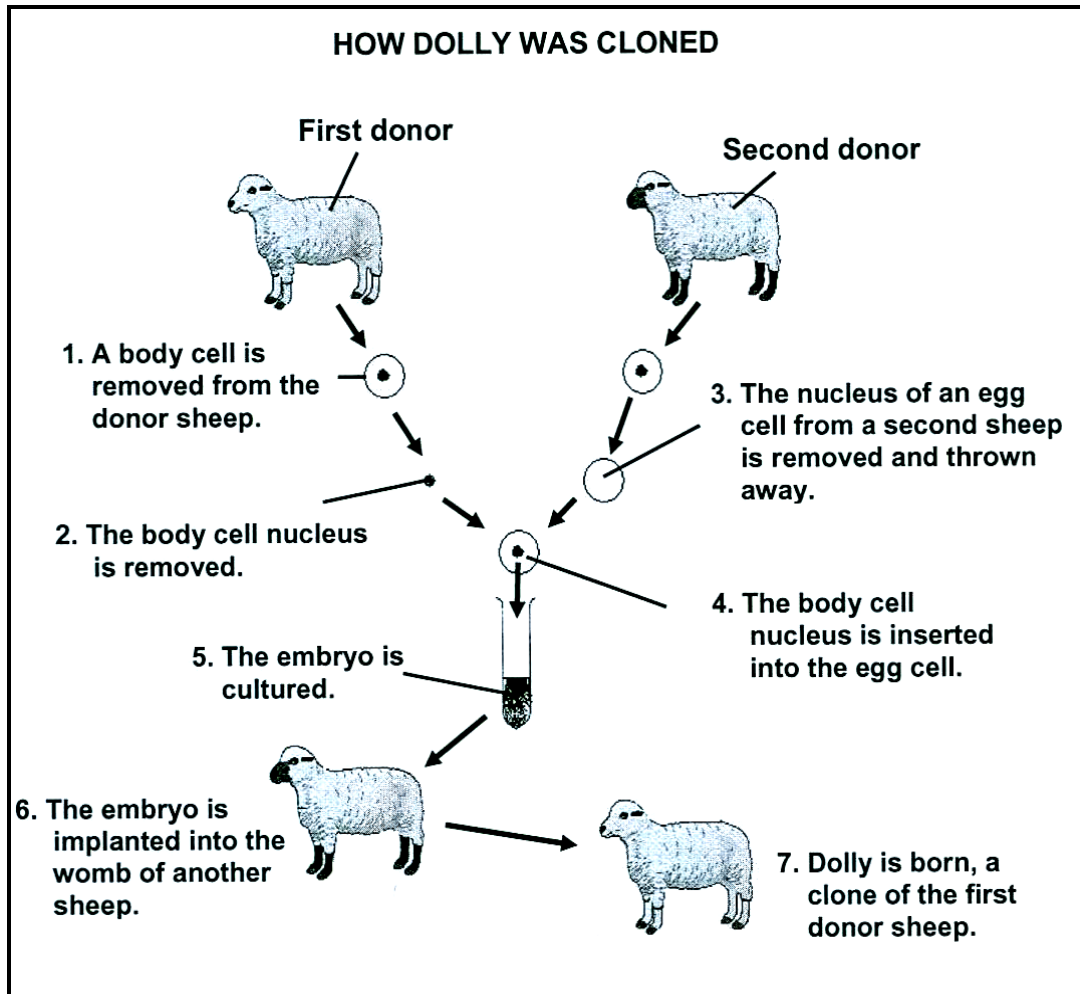
- 4.2 The table below shows the results obtained by crossing a pure-bred black-furred goat with a brown-furred goat. The allele for black fur (B) is dominant over the allele for brown fur (b). The offspring of the parents (F<sub>1</sub> generation) were used as parents (consisting of 4 breeding pairs) for the F<sub>2</sub> generation.

	NUMBER OF BLACK GOATS	NUMBER OF BROWN GOATS
<b>Parents</b>	1	1
<b>F<sub>1</sub> generation</b>	8	0
<b>F<sub>2</sub> generation</b>		
Offspring of 1 <sup>st</sup> breeding pair	8	0
Offspring of 2 <sup>nd</sup> breeding pair	7	1
Offspring of 3 <sup>rd</sup> breeding pair	5	3
Offspring of 4 <sup>th</sup> breeding pair	4	4

- 4.2.1 From the data above, determine the phenotypic ratio of the goats with black fur and the goats with brown fur in the F<sub>2</sub> generation. (2)
- 4.2.2 Draw a Punnet square to show the genotypic ratio of the offspring (F<sub>2</sub>-generation) by using the genotypes of the F<sub>1</sub>-generation parents. (3)
- 4.2.3 Determine the phenotypic ratio of the offspring (F<sub>2</sub> generation) mentioned in QUESTION 4.2.2. (2)
- 4.3 Variation is important to farmers because it is the foundation of natural breeding programmes. A farmer would prefer to have animals that are ideally suited to the specific agricultural production environment. Sheep kept in the harsh semi-desert area of the Karoo have been selected by nature through droughts and other harsh environmental factors. Only the more adapted animals and their offspring manage to survive.
- 4.3.1 Identify the process of selection referred to in the passage above. (1)
- 4.3.2 Name the TWO most important uses of variation in breeding. (2)
- 4.3.3 Describe how the heritability of characteristics will influence the success of a breeding programme. (2)
- 4.3.4 An index value gives the average for a characteristic calculated as a value of 100. Briefly explain how a farmer should use such an index value to select animals for the herd. (2)



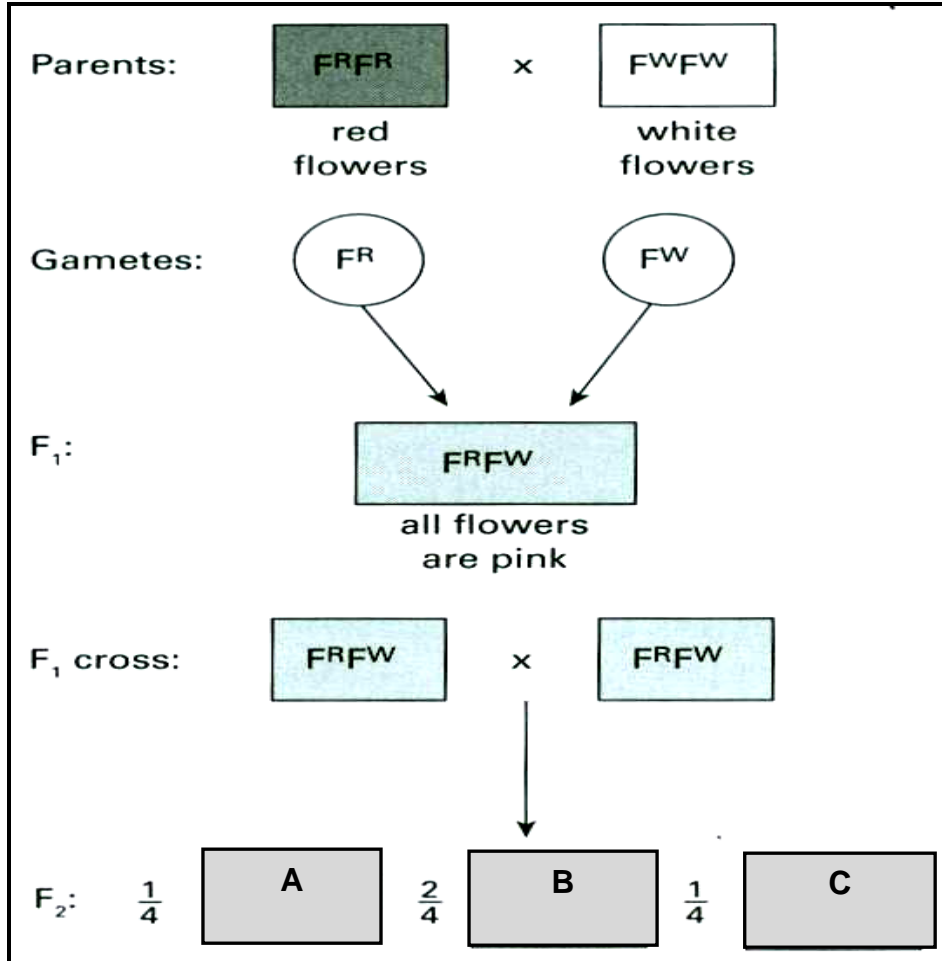
4.4 The diagram below shows the cloning of a sheep named Dolly.



- 4.4.1 Give the reason for removing the nucleus from the egg cell of the second donor before the sheep could be cloned. (2)
- 4.4.2 The step marked **5** in the diagram above states that 'the embryo is cultured'. Indicate the process of cell division through which the embryo develops. (1)
- 4.4.3 Explain why it is impossible for Dolly to have any characteristics of the second donor sheep. (2)
- 4.4.4 Briefly discuss TWO advantages of cloning for the agricultural livestock industry. (2)



4.5 When snapdragon plants with red flowers ( $F^R F^R$ ) are crossed with snapdragon plants with white flowers ( $F^W F^W$ ), the  $F_1$  generation is heterozygous ( $F^R F^W$ ) and all have pink flowers. It appears that neither the red nor the white allele is dominant.



4.5.1 Identify the type of dominance illustrated in the diagram above. (1)

4.5.2 Complete the diagram by inserting the labels of the genotypes represented by **A**, **B** and **C**. (3)

4.5.3 Determine the phenotypic ratio for the  $F_2$  generation. (2)  
[35]

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

**ANSWER SHEET**

**CENTRE NUMBER:**

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**EXAMINATION NUMBER:**

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**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**

1.2.1	
1.2.2	
1.2.3	
1.2.4	
1.2.5	

(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)

**TOTAL SECTION A: 45**