



# basic education

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

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P2  
NOVEMBER 2016  
MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 11 pages**

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

1.1	1.1.1	A ✓✓		
	1.1.2	D ✓✓		
	1.1.3	B ✓✓		
	1.1.4	D ✓✓		
	1.1.5	B ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	C ✓✓		
	1.1.9	A ✓✓		
	1.1.10	C ✓✓		(10 x 2) (20)
1.2	1.2.1	E ✓✓		
	1.2.2	G ✓✓		
	1.2.3	J ✓✓		
	1.2.4	B ✓✓		
	1.2.5	C ✓✓		(5 x 2) (10)
1.3	1.3.1	Elasticity ✓✓		
	1.3.2	Cash flow ✓✓		
	1.3.3	Breeding value ✓✓		
	1.3.4	Epistasis ✓✓		
	1.3.5	Inbreeding depression ✓✓		(5 x 2) (10)
1.4	1.4.1	Processing ✓		
	1.4.2	Productivity ✓		
	1.4.3	Lipofection ✓		
	1.4.4	Co-dominance ✓		
	1.4.5	Selection ✓		(5 x 1) (5)
<b>TOTAL SECTION A:</b>			<b>45</b>	

**SECTION B****QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING****2.1 Scenario on marketing****2.1.1 Identification of the marketing functions**

- (a) Transportation ✓ (1)  
(b) Storage ✓ (1)

**2.1.2 Economic term for each of the following statements**

- (a) Packaging ✓ (1)  
(b) Cold storage/refrigeration ✓ (1)  
(c) Processing/value adding ✓ (1)

**2.1.3 TWO advantages of processing agricultural products**

- Prevents spoilage/perishability/increases shelf-life of products ✓
- The product is available throughout the year ✓
- Improves food safety by heating to sufficient temperatures ✓
- Easy to transport ✓
- Easy storage ✓
- Adds value to farm products/increases the value of products/  
higher income for the farmer ✓
- It provides job opportunities ✓
- Reduces wastage of excess produce ✓
- It is a way of overcoming over-supply of products ✓
- It allows for easier packing and handling of products/  
simplification of products ✓ (Any 2) (2)

**2.2 Case study on production of peppers****2.2.1 Farmer who marketed with success**

Farmer B ✓ (1)

**2.2.2 Reason**

- Farmer B sold the produce for a higher price/R8/kg ✓
- The farmer identified/researched consumer needs and therefore  
sold the produce at a profit ✓
- Farmer worked the costs and is selling at a profit ✓
- Secured future contracts ✓
- No use of a middle man ✓
- Packaging according to consumer needs/preference ✓ (Any 1) (1)

**2.2.3 TWO aspects to develop marketing strategy**

- Product ✓
- Consumer preference/demand ✓
- Promotion ✓
- Pricing ✓
- Placement/distribution ✓ (Any 2) (2)

- 2.2.4 **Marketing strategy used by Farmer B**
- Research ✓
  - Marketing mix ✓
- (Any 1) (1)
- 2.2.5 **TWO benefits of the marketing strategy to the farmer**
- Sales/market/price are guaranteed ✓
  - No middleman/intermediary ✓
  - Secured a contract for the next season ✓
  - Promotion of products ✓
- (Any 2) (2)
- 2.3 **Price experiment of oranges**
- 2.3.1 **Hypothesis**
- The price of oranges will influence ✓ the demand thereof ✓
- OR**
- A fall in the price of oranges ✓ will lead to a high demand/profit ✓
- OR**
- An increase in the price of oranges ✓ will lead to a lower demand/profit/high loss ✓
- OR**
- Sales of oranges will decrease ✓ with a price increase ✓
  - Sales of oranges will increase ✓ with a price decrease ✓
- (2)
- 2.3.2 **Factor that influenced the demand**
- Price ✓
- (1)
- 2.3.3 **Explanation of the factor influencing demand**
- A fall in price of oranges ✓ leads to an increase in demand ✓
- OR**
- A rise in price of oranges ✓ leads to a decline/decrease in demand ✓
- (2)
- 2.3.4 **Impact of a higher price on profit margins**  
The increase in price ✓ leads to decrease in profit ✓
- (2)
- 2.4 **Analysing the advert**
- 2.4.1 **The type of labelling**  
Eco/green labelling ✓
- (1)
- 2.4.2 **TWO reasons for the labelling**
- Packed in recyclable material/biodegradable ✓
  - Organically produced ✓
- (2)
- 2.4.3 **Justification for environmental friendliness**
- Packaging on recyclable bags/materials ✓
  - Organically produced ✓
- (Any 1) (1)
- 2.4.4 **Marketing approach to promote the product**  
Sustainable agricultural marketing/green/eco friendly marketing ✓
- (1)

**2.5 SWOT Analysis****2.5.1 Linking statements with SWOT analysis**

- **A** - Strength ✓ (1)
- **B** - Opportunity ✓ (1)
- **C** - Weakness ✓ (1)
- **E** - Threat ✓ (1)

**2.5.2 How strengths/opportunities can improve the farming enterprise**

- The farmer can take an advantage of a land with access to irrigation/assistance of extension officer/financial assistance from Land bank (strength) ✓
- Demand for baby carrot (opportunity) ✓ (2)

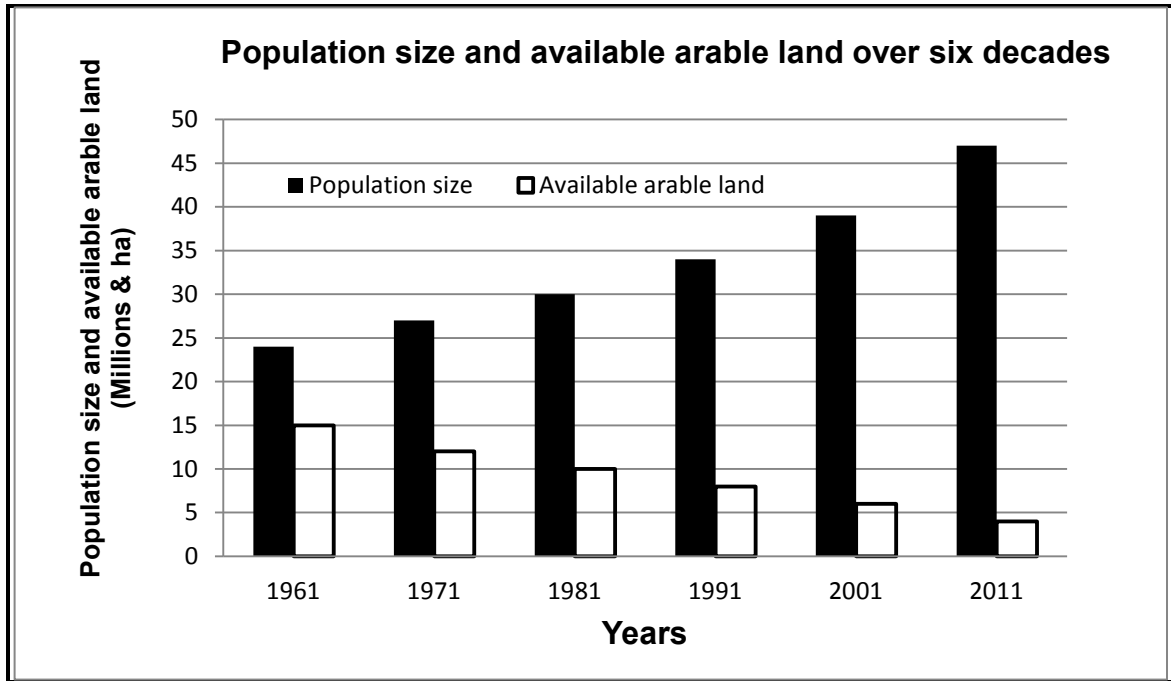
**2.6 THREE personal characteristics of a successful entrepreneur**

- Leadership ✓
  - Motivation ✓
  - Self confidence ✓
  - Commitment ✓
  - Hard working/energetic ✓
  - Perseverance ✓
  - Market driven ✓
  - Innovative/creativity ✓
  - Positive attitude ✓
  - Risk taking ✓
  - Dynamic/flexibility ✓
  - Success driven ✓
  - Responsibility ✓
  - Communication ✓
  - Visionary/goal orientated ✓
- (Any 3) (3)  
**[35]**

**QUESTION 3: PRODUCTION FACTORS**

**3.1 Land as a production factor**

**3.1.1 Bar graph on population size and area of land over time**



**Criteria/rubric/marketing guidelines**

- Correct heading ✓
- Y-axis: Correctly calibrated and labelled (population size and available arable land) ✓
- X-axis: Correctly calibrated and labelled (years) ✓
- Correct units (millions and hectares) ✓
- Bar graph ✓
- All criteria presented correctly ✓ (6)

**3.1.2 The economic characteristic of land**

Land for agricultural purposes is limited/limitedness ✓ (1)

**3.1.3 The impact of the limitedness of land on production**

Increasing population is putting more pressure on the limited land ✓  
resulting in a decrease in production ✓

**OR**

The higher the population size ✓

The lesser the arable land/production ✓

**OR**

The lower the population size ✓ the more the arable land/production ✓

**OR**

The more the arable land ✓ the more the production ✓

**OR**

The lower the arable land ✓ the less the production ✓ (2)

- 3.1.4 **TWO measures to improve productivity of land**
- Development of disease-resistant cultivars and breeds ✓
  - Knowledge on the wise use of fertilisers/pesticides ✓
  - Appropriate use of land/better care of agricultural land ✓
  - Adapting to/use of scientific methods/use of technology to improve yields ✓
  - Increased knowledge on agricultural education/precision farming ✓
  - Consolidation of uneconomic units ✓
  - Mechanisation ✓
  - Diversification ✓
  - Adapting to appropriate policies/legislation ✓
  - Water provision/management ✓
- (Any 2) (2)
- 3.2 **Labour contract**
- 3.2.1 **Employee with unfair conditions of service**  
Employee B ✓ (1)
- 3.2.2 **Justification**
- Long working hours/12 hours of work per day ✓
  - Insufficient payment for work on Sunday/public holiday/R200 per day instead of R240 ✓
  - Leave days not according to stipulation of legislation/10 days leave in 3 years ✓
- (Any 2) (2)
- 3.2.3 **TWO labour legislation that could be used by employee**
- Labour Relations Act ✓
  - Basic Conditions of Employment Act ✓
- (2)
- 3.3 **Methods to increase labour productivity**
- 3.3.1 Physical planning of infrastructure/physical farm planning ✓ (1)
- 3.3.2 Training/skills development ✓ (1)
- 3.3.3 Adequate living/environmental conditions ✓ (1)
- 3.3.4 Mechanisation ✓ (1)

**3.4 Cash flow budget statement****3.4.1 Mini cash flow budget**

<b>Costs incurred</b>	<b>Amount</b>
Wages	R4 000
Chicken feed	R7 000
Electricity	R2 500
Other costs	R1 500
<b>Total costs</b>	<b>R15 000 ✓</b>
<b>Income</b>	
Eggs/broilers sold/week	<b>R10 000/R60 000 ✓</b>
<b>Net cash/week</b>	<b>– R5 000/R45 000 ✓</b>

(4)

**3.4.2 Net cash income for the month**

- Egg income per week + broiler income per month – costs per month
- $R10\ 000 \times 4) \checkmark + R50\ 000 = R90\ 000 - (R15\ 000 \times 4) \checkmark$   
 $= R30\ 000 \checkmark$

(3)

**3.4.3 Business net worth based on the weekly cash flow**

- Business cash flow per week is negative/positive  
(– R5000/R45 000) ✓
- Cash flow cannot be used to determine the net worth or income of a business/cash flow maybe restricted at a particular time even when business is profitable ✓

(2)

**3.5 Problem associated with capital**

3.5.1 Over- capitalisation ✓

(1)

3.5.2 Risk factor/uncertainty ✓

(1)

3.5.3 Scarcity of capital/interest rates ✓

(1)

3.5.4 Depreciation ✓

(1)

**3.6 Management principle**

3.6.1 Planning/decision making ✓

(1)

3.6.2 Control ✓

(1)

**[35]**



**QUESTION 4: BASIC AGRICULTURAL GENETICS****4.1 Crossing of a black-faced ram and white-faced ewe**

- 4.1.1 **Genotype of parent B**  
bb ✓ (1)
- 4.1.2 **Indication whether parents are homozygous or heterozygous**  
Homozygous ✓ (1)
- 4.1.3 **Reason**  
Parents have same alleles for a gene/pure bred ✓ (1)
- 4.1.4 **Identification of the phenotype in the F<sub>2</sub> generation**
- F: black-faced ✓ (1)
  - G: black-faced ✓ (1)
  - H: white-faced ✓ (1)
- 4.1.5 **Indication of the genotypic and phenotypic ratio in F<sub>2</sub> generation**
- Genotypic ratio 1:2:1 ✓ (1)
  - Phenotypic ratio 3:1/3 black:1 white ✓ (1)

**4.2 Estimated breeding values**

- 4.2.1 **Characteristic to select for in Bonsmara and Boer goat**  
**Bonsmara** - Meat tenderness ✓  
**Boer Goat** - Post weaning weight ✓ (2)
- 4.2.2 **Justification**  
The heritability of both characteristics is greater than 50%/  
controlled more by genes ✓✓ (2)
- 4.2.3 **TWO reasons for not selecting for birth, fleece and lean meat**
- Heritability is less than 50% ✓
  - Characteristics will be more influenced by the environment/  
less controlled by genes ✓ (2)

**4.3 Indication of the environmental factors causing variation**

- 4.3.1 Light intensity/temperature/climate ✓ (1)
- 4.3.2 Feeding/nutrition ✓ (1)
- 4.3.3 Topography/relief/terrain ✓ (1)
- 4.3.4 Climate/low temperature ✓ (1)

**4.4 Polygenic inheritance****4.4.1 Production of leghorn with BbGgkk genes**

- B = 5 eggs ✓
- G = 5 eggs ✓
- $5 + 5 + 60 = 70$  eggs ✓ (3)

**4.4.2 Genotypes resulting in 90 eggs**

BBGGKK ✓ (1)

**4.4.3 Type of inheritance**

Polygenic/quantitative ✓ (1)

**4.5 Breeding heifers****4.5.1 Appropriate term for the phenomena represented by the data** (1)

Continuous variation/normal distribution/biometrics ✓

**4.5.2 Number of heifers if 12% is selected**

- Total :  $10+15+20+30+40+60+75+65+45+35+15+10+5 = 425$  ✓
- $12\% (0,12) \times 425$  ✓
- = 51 heifers ✓ (3)

**4.5.3 Mass of the average animals**

Average mass = 140 kg ✓ (1)

**4.5.4 Farmer's intention**

(a) **Heifers with highest live mass**  
Selection for breeding purposes ✓ (1)

(b) **Heifers with lowest live mass**  
Cull/slaughter/sell ✓ (1)

**4.6 Techniques to genetically modify tomatoes****4.6.1 Technique**

Genetic modification/engineering/manipulation/micro-injection ✓ (1)

**4.6.2 TWO advantages of GM/micro-injection to the farmer**

- Better yield/harvesting ✓
- Increased shelf life/storage ✓
- Improved quality/increased nutritional value/value adding ✓
- Increased resistance to diseases/insects/pests ✓
- Resistance to harsh conditions/drought ✓ (Any 2) (2)

4.6.3 **TWO socio-economic effects of food from genetically modified plants to the farmer**

- Small scale and poor farmers cannot afford GM crops/GM crops are expensive ✓
- A farmer is not allowed to re-use seeds from GM crops ✓
- The farmer may not use some seeds as they are sterile ✓
- Some consumers will not buy from the farmer due to ethical concerns ✓
- It encourages monopoly which does not allow small companies to develop/favours the producers and encourages exploitation of emerging farmers ✓

(Any 2)

(2)  
**[35]**

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