



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

AGRICULTURAL SCIENCES

EXAMINATION GUIDELINES

GRADE 12

2009

This guideline consists of 20 pages.

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INTRODUCTION

This examination assessment guideline consists of the following two parts:

Part 1

- Outlines the scope and depth of what is to be assessed with regards to content topics.

Part 2

- Provides the outline and format of the examination question papers, the weighting of questions in terms of ability levels, LOs and ASs together with knowledge areas for both paper one and paper two.
- Included in this part is a list of commonly used action verbs that might be used in the setting of these question papers.
- Furthermore it clearly spells out the skills that should be assessed to demonstrate the achievement of particular assessment standards.

PART 1**UNPACKING OF THE GRADE 12 CONTENT****Animal Sciences: Paper 1****Animal Nutrition**

CONTENT	SUGGESTED CONTENT SEQUENCE
<p>The Alimentary canals of farm animals: General structures</p> <p>Digestion and absorption of feeds in farm animals</p>	<p>Alimentary canals</p> <ul style="list-style-type: none"> <input type="checkbox"/> The digestive systems of farm animals: <ul style="list-style-type: none"> • Ruminants e.g. cattle <ul style="list-style-type: none"> ○ The external structure of the alimentary canal (functions and adaptations) ○ The internal structure of the rumen, reticulum, omasum, abomasums and small intestine(functions and adaptations) • Non-ruminants e.g. pigs and the fowl <ul style="list-style-type: none"> ○ The external structure of the stomach ○ The internal structure of the stomach(functions and adaptations) <p>Digestion in the non-ruminant (pig and fowl)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The intake of feed; digestion in the mouth, stomach, small intestine and the large intestine; functions of the accessory glands and enzymes <p>Digestion in ruminants (cattle)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The intake of feed; route of feed, rumination <input type="checkbox"/> Digestion and absorption in the rumen (digestion of cellulose); functions, requirements and importance of microbes in the rumen

CONTENT	SUGGESTED CONTENT SEQUENCE
Components of a feed	<ul style="list-style-type: none"> <input type="checkbox"/> The composition and functions of nutrient components of a feed: <ul style="list-style-type: none"> • Carbohydrates (crude fibre and cellulose) • Proteins • Fats and oils (ether extract) • Water <input type="checkbox"/> Functions and deficiency symptoms of the following nutrient components: <ul style="list-style-type: none"> • Vitamins: A, B₁, B₂, B₁₂, D, E and K • Minerals: Ca, P, Mg, Fe, Co, Cu, S, Na, Zn and I
Digestibility of feeds	<p>Digestibility of feeds</p> <ul style="list-style-type: none"> <input type="checkbox"/> The concept of digestibility <input type="checkbox"/> Factors and processes that affect the digestibility of a feed <input type="checkbox"/> The coefficient of digestibility for a feed (calculation and interpretation)
Biological value of feeds	<p>Biological value of proteins</p> <ul style="list-style-type: none"> <input type="checkbox"/> The concept of essential amino acids and non essential amino acids (evaluation of feed protein in terms of biological value)
Energy value of feeds	<p>Energy value of feeds</p> <ul style="list-style-type: none"> <input type="checkbox"/> The energy value measured for feeds: <ul style="list-style-type: none"> • gross energy • digestible energy • metabolic energy • nett energy <p>Nutritive ratio/ value</p> <ul style="list-style-type: none"> <input type="checkbox"/> The concept nutritive ratio (calculation and interpretation)

CONTENT	SUGGESTED CONTENT SEQUENCE
<p>Supplements</p> <p>Types of feeds</p> <p>Planning a feeding programme</p>	<p>Supplements to rations</p> <ul style="list-style-type: none"> <input type="checkbox"/> The methods of supplements to rations (Minerals, vitamins, non-protein nitrogen, growth stimulants and synthetic amino acids) <p>Types of feeds</p> <ul style="list-style-type: none"> <input type="checkbox"/> Classification of different feeds <ul style="list-style-type: none"> • Roughages (concept, characteristics, different types, functions and examples) • Concentrates (concept, characteristics, different types, functions and examples) <input type="checkbox"/> Subdivision of feeds into protein and carbohydrate-rich types (examples) <input type="checkbox"/> Schematic representation of different types of feeds <input type="checkbox"/> Importance of the different types of feeds <input type="checkbox"/> The suitability for growth, fattening, production and energy purposes <input type="checkbox"/> The interaction between feeding facilities and environmental factors <p>Planning a feeding programme</p> <ul style="list-style-type: none"> <input type="checkbox"/> Planning a feeding programme (maintenance and production ration). <input type="checkbox"/> Pearson square method and fodder flow programme by referring to nutritive requirements (calculate the quantities of two feeds that must be mixed in a ration to get the required DP value)

Animal Sciences: Paper 1

Animal Production

CONTENT	ELABORATION/SUGGESTED SEQUENCE
ANIMAL PRODUCTION	Animal Production <ul style="list-style-type: none"> <input type="checkbox"/> Indigenous knowledge systems in the agricultural context
Increasing production	Increasing production <ul style="list-style-type: none"> <input type="checkbox"/> Intensive and extensive production <input type="checkbox"/> Feeding, Reproduction and Care of animals
Shelter	Optimising production <ul style="list-style-type: none"> <input type="checkbox"/> Concepts on precision farming and Agricultural technology <input type="checkbox"/> Factors necessary to optimise the production process e.g. nutrition, health, management, reproduction, breeding and selection as well as environmental factors Shelter/protection <ul style="list-style-type: none"> <input type="checkbox"/> The Importance or reasons for shelter to increase production <input type="checkbox"/> Different structures used for sheltering livestock
Handling of farm animals	Handling of farm animals <ul style="list-style-type: none"> <input type="checkbox"/> Reasons why the handling of farm animals is important to effective management <input type="checkbox"/> The effect of incorrect handling of farm animals (harm and effect) <input type="checkbox"/> The impact of legislation about moving animals and requirements for transporting farm animals <input type="checkbox"/> Different techniques of handling animals
Behaviour of farm animals	Behaviour of farm animals <ul style="list-style-type: none"> <input type="checkbox"/> Factors which determine the behaviour of animals (examples where possible) <input type="checkbox"/> Different forms of animal behaviour

Animal Sciences: Paper 1

Animal Reproduction , Production, and Control

CONTENT	ELABORATION/SUGGESTED SEQUENCE
<p>ANIMAL REPRODUCTION</p> <p>Reproductive organs (male and female)</p> <p>Artificial insemination</p> <p>Pregnancy and birth</p>	<p>Reproductive organs of cattle</p> <ul style="list-style-type: none"> <input type="checkbox"/> The (primary and secondary) male reproductive organs: the structure, sperm formation and factors that cause infertility <input type="checkbox"/> The (primary and secondary) female reproductive organs: the structure, functions, oestrus cycle; artificial control and synchronising of heat; ovulation, mating, fertilisation and factors that cause infertility <input type="checkbox"/> The role of female hormones in the following processes: <ul style="list-style-type: none"> • Oestrus cycle (changes in hormonal levels) • Pregnancy • Lactation • Parturition <p>Artificial insemination</p> <ul style="list-style-type: none"> <input type="checkbox"/> The collection, dilution, storage, thawing of semen, time of insemination and technique <input type="checkbox"/> The importance of Artificial Insemination <p>Embryo development</p> <ul style="list-style-type: none"> <input type="checkbox"/> The process of gestation/ pregnancy under the following headings: <ul style="list-style-type: none"> • Ovum period • Embryonic period • Foetal period • Problems during pregnancy <input type="checkbox"/> The process of embryo transfer <p>Parturition (birth)</p> <ul style="list-style-type: none"> <input type="checkbox"/> The stages of normal parturition <input type="checkbox"/> Indigenous knowledge systems that a farmer can implement to overcome some of the birth problems his/her cattle might encounter

CONTENT	ELABORATION/SUGGESTED SEQUENCE
<p>Milk production</p> <p>Diseases and Pests</p>	<p>The process of lactation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Milk production: <ul style="list-style-type: none"> • Milk-releasing reflex • Lactation curve • Drying up and resting the cow • Interaction between body mass, milk production and feed intake <p>Diseases/Animal Health</p> <ul style="list-style-type: none"> <input type="checkbox"/> Animal health with reference to: <ul style="list-style-type: none"> • Signs of health • Testing animal health • Prevention and control of disease • Treating sick animals <input type="checkbox"/> Animal diseases: <ul style="list-style-type: none"> • Viral • Fungal • Protozoan • Bacterial • Metabolic disturbances <input type="checkbox"/> Host/pathogens, symptoms and treatment <p>Pests/parasites</p> <ul style="list-style-type: none"> <input type="checkbox"/> Animal parasites with reference to: <ul style="list-style-type: none"> • External parasites (Life cycle, economic importance, prevention and control) <ul style="list-style-type: none"> ○ 1, 2 and 3 hosts tick ○ Flies (Nose worm fly and blow fly) • Internal parasites (Life cycle, economic importance, prevention and control) <ul style="list-style-type: none"> ○ Flukes ○ Tapeworms and ○ Roundworms <input type="checkbox"/> Principles of good animal health <input type="checkbox"/> Indigenous medicines for the effective treatment of internal parasites <input type="checkbox"/> The role of the Government in the control and prevention of diseases and pests

Agricultural Management and Agricultural Genetics: Paper 2

Production factors and Management

CONTENT	ELABORATION/SUGGESTED SEQUENCE
<p>PRODUCTION FACTORS Land (soil)</p>	<p>Land ownership</p> <ul style="list-style-type: none"> <input type="checkbox"/> Land as a factor of production <input type="checkbox"/> Land ownership with reference to: <ul style="list-style-type: none"> • Private tenure • Renting land • Communal tenure (link to indigenous practices) <p>Land reform</p> <ul style="list-style-type: none"> <input type="checkbox"/> Land reform with reference to: <ul style="list-style-type: none"> • Land reform, restitution and redistribution legislation • Black Economic Empowerment (Agri -BEE) <ul style="list-style-type: none"> ○ aims and targets <p>Management of land</p> <ul style="list-style-type: none"> <input type="checkbox"/> Management of land with reference to: <ul style="list-style-type: none"> • Factors affecting land management practices • Natural resource legislation <input type="checkbox"/> Land degradation (effect, causes and examples)

Agricultural Management and Agricultural Genetics: Paper 2

Basic Agricultural genetics

CONTENT	ELABORATION/SUGGESTED SEQUENCE
<p>BASIC AGRICULTURAL GENETICS Heredity, selection and breeding</p> <p>Variation</p> <p>Mendel's laws</p> <p>Mechanisms</p> <p>Breeding and selection in plants and animals</p>	<p>Genetic concepts</p> <ul style="list-style-type: none"> <input type="checkbox"/> Terminology: <ul style="list-style-type: none"> • Genes (DNA) • Alleles • Haploid and diploid cells/ chromosomes <input type="checkbox"/> Variation (diagrams and tables) <ul style="list-style-type: none"> • Causes (External and internal) • Importance • Mutations • Multiple alleles • Epistasis • Polygenes <p><input type="checkbox"/> Mendel's monohybrid cross with and without dominance (F1 and F2 generations)</p> <p><input type="checkbox"/> Genes, dominant, recessive, homologous, heterozygous, genotype and phenotype</p> <p><input type="checkbox"/> Mendel's dihybrid cross (F1 and F2 generations)</p> <p><input type="checkbox"/> Mendel's Laws of segregation and independent recombination of characteristics (quantitative and qualitative characteristics in plant and animal production)</p> <p><input type="checkbox"/> Punnett square, genetic diagrams, schematic representations and illustrations</p> <p><input type="checkbox"/> Inheritance that leads to different phenotypes (also include incomplete dominance and co-dominance)</p> <p><input type="checkbox"/> The mechanism of heredity (DNA, chromosome and genes)</p> <p>Selection</p> <ul style="list-style-type: none"> <input type="checkbox"/> Selection principles with reference to: <ul style="list-style-type: none"> • Principles of selection • Heritability • Biometrics

PART 2**THE OUTLINE AND FORMAT OF THE QUESTION PAPERS
EXTERNAL EXAMINATIONS IN GRADE 12****PAPER 1
DURATION: 2½ HOURS**

SECTION A	SECTION B	TOTAL MARKS
QUESTION 1	QUESTIONS 2-4	
45	105 35 MARKS / QUESTION	150

CONTENT

Animal sciences	<p>Nutrition:</p> <ul style="list-style-type: none"> • Alimentary canal and digestion; • Components and digestibility of feed; • Biological value of feed; • Energy value of feed; • Types of feed; • Supplements; • planning a feeding programme (Pearson square, principles of a fodder flow programme) <p>Production:</p> <ul style="list-style-type: none"> • increasing production; • shelter; • handling of farm animals; • behaviour of farm animals <p>Reproduction:</p> <ul style="list-style-type: none"> • reproductive organs (male and female); • parturition; • artificial insemination; • embryo; • milk production <p>Protection and control:</p> <ul style="list-style-type: none"> • diseases (viral, fungal, metabolic, bacterial, protozoa); • pests.
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PAPER 1- OUTLINE/FORMAT**SECTION: A**

QUESTION 1			
1.1	Multiple choice questions	10 x 2	(20)
1.2	Match type/columns	5 x 2	(10)
1.3	Terminology	5 x 2	(10)
1.4	Term replacement	5 x 1	(5)
			[45]

SECTION: B**QUESTION 2****ANIMAL NUTRITION**

- Alimentary canal and digestion;
- Components and digestibility of feed;
- Biological value of feed;
- Energy value of feed;
- Supplements
- Types of feed;
- planning a feeding programme (Pearson square, principles of fodder flow programme)

[35]**QUESTION 3****ANIMAL PRODUCTION**

- Increasing production (nutritional, reproduction, protection, management aspects that influence animal production);
- shelter;
- handling of farm animals;
- behaviour of farm animals

[35]**QUESTION 4****ANIMAL REPRODUCTION, PROTECTION AND CONTROL**

- reproductive organs (male and female);
- parturition;
- artificial insemination;
- embryo;
- milk production.
- diseases (viral, fungal, metabolic, bacterial, protozoa);
- pests.

[35]**GRAND TOTAL: 150**

PAPER 2
DURATION: 2½ HOURS

SECTION A	SECTION B	TOTAL MARKS
QUESTION 1	QUESTIONS 2-4	
45	105 35 MARKS / QUESTION	150

CONTENT

Agricultural management	<p>Marketing:</p> <ul style="list-style-type: none"> • Price determination; • The market • Methods of marketing; <p>Entrepreneurship: business planning; Production factors and management;</p> <ul style="list-style-type: none"> • Land (Soil) • Labour • Capital • The management process
Basic agricultural genetics	<p>Heredity, selection, variation and breeding</p> <ul style="list-style-type: none"> • Mechanisms; • Monohybridism and dihybridism • Mendel's law; • Segregation and recombination of characteristics. <p>Plants and animals. Growth and genetic manipulation: genetically modified crops and their purpose</p>

PAPER 2: OUTLINE/FORMAT**SECTION: A****QUESTION 1**

1.1	Multiple choice questions	10 x 2	(20)
1.2	Match type/columns	5 x 2	(10)
1.3	Terminology	5 x 2	(10)
1.4	Term replacement	5 x 1	(5)
			[45]

SECTION: B**QUESTION 2****AGRICULTURAL MANAGEMENT**

- Price determination
- The market
- Methods of marketing
- Entrepreneurship: business planning

[35]**QUESTION 3****PRODUCTION FACTORS AND MANAGEMENT**

- Land (Soil)
- Labour
- Capital
- The management process

[35]**QUESTION 4****BASIC AGRICULTURAL GENETICS**

- Heredity, selection, variation and breeding
- Mechanisms
- Monohybridism and dihybridism
- Mendel's law
- Segregation and recombination of characteristics
- Plants and animals
- Growth and genetic manipulation: genetically modified crops and their purpose

[35]**GRAND TOTAL: 150**

COGNITIVE LEVELS, CONTEXT WORDS AND KEY VERBS:**PAPER 1 AND PAPER 2**

COGNITIVE LEVEL WEIGHTING %	CONTEXT WORDS	KEY VERBS
A 30%	<i>Knowledge</i>	Name, Mention, Give, Indicate, Provide, Arrange, Define, Label, List, Outline, Locate, Recognise, Select, State and Supply
B 20%	<i>Comprehend (understand)</i>	Describe, Identify, Restate, Review, Summarize, Classify, Compare, Define, Distinguish, Interpret, Match and Select
B 30%	<i>Application</i>	Apply, Calculate, Draw, Explain, Identify, Illustrate, Prepare, Operate, Practice, Solve, Draw (Sketch), Modify, Adapt, Compute, Discover, Survey, Gather, Prepare, Use and Show
C 20%	<i>Analysis</i>	Analysis, Categorize, Compare, Distinguish, Discuss, Examine, Investigate, Test, Deduce, Differentiate, Relate, Classify, Contrast, Explain, Generalize, Predict and Solve
	<i>Synthesis</i>	Arrange, Compose, Formulate, Organise, Plan, Assemble, Construct, Combine, Create, Depict, Design, Develop, Incorporate, Integrate, Invent, Predict, Produce and Structure
	<i>Evaluations</i>	Appraise, Assess, Comment on, Critically analyse, Evaluate, Conclude, Interrogate, Judge, Predict, Compare, Score, Justify, Critique and Recommend

SKILLS MEASURED IN THE PAPERS:**Paper 1 and Paper 2**

- Interpretation of Graphs
- Interpretation and changing of data (Tables / Diagrams / Flow charts / Pictures)
- Calculations
- Evaluation of Data
- Plotting of data
- Making drawings
- Planning and designing experiments
- Identifying labels /Labeling/
- Organizing / Recording reorganizing data
 - Tables or Data Ability to follow instructions Interpreting Flow charts