

ASSESSMENT & EXAMINATIONS

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NSC 2015 CHIEF MARKER'S REPORT

SUBJECT	AGRICULTURAL SCIENCES
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PAPER	ONE
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DATE OF EXAMINATION:	20 NOVEMBER 2015	DURATION:	2Hour 30 min
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This report is aimed at providing valuable feedback to schools, subject advisors, teachers and learners about common errors committed by candidates in the answering of questions, to assist teachers and subject advisors to identify areas that need to be given special attention in the teaching and learning of the subject in 2015.

Your responses will be based on two parts:

Section 1: General overview of Learner performance in the question paper as a whole

Section 2: Comment on candidates' performance on individual questions (Detailed explanations must be provided **per question** as follows: (You may include sub questions where necessary))

- (a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?
- (b) Why the question was poorly answered?
- (c) Provide suggestion for improvement in relation to teaching and learning
- (d) Describe any other specific observations relating to responses of learners
- (e) Any other comments useful to teachers, subject advisors, teacher development

SECTION 1:

(General overview of Learner Performance in the question paper as a whole)

Generally the performance in this paper is better compared to previous years. Learner performance in general has improved this year because there is an increase in the number of candidates that have performed at level 3 and above.

- The quality of passes has also improved as there is a gradual shift of levels towards level 7.
- Even though the performance in Section A is improving, it is not happening at a satisfactory rate because the majority of the learners are still scoring less than 15 marks out of the possible 45.
- A lot of valuable marks were lost in section A by the majority of the learners.
- Learners who have done very well in section A usually perform better in section B and achieve very good levels.
- A much more improved performance in Section A will see a permanent disappearance of the level 1 passes in Agricultural Sciences.
- Learners performed relatively better in Question 3 than in Question 2.
- Performance of candidates in Question 4 was the poorest.

- Calculations are still a challenge to most learners although all learners are doing either mathematics or mathematical literacy in schools.
- They do not follow the fundamentals of simple mathematics, for example, writing the correct formula, correct substitution of values in a formula and then the simplification of the substituted values to arrive to the correct answer.
- Some are struggling with the simple conversion of units (tons into kg).
- Poor language skills are also a major reason for underachievement for most learners as this adversely affects their ability to interpret questions and to frame the appropriate responses to questions.
- The poor quality of responses even in low order questions suggests that some of these learners were not adequately prepared for this examination.

SECTION 2:

Comment on candidates' performance in individual questions

(It is expected that a comment will be provided for each question on a separate sheet).

QUESTION 1

- (a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?**

Section A as prescribed in the CAPS policy for assessment was well structured to the level of a Grade 12 candidate and content covered in the question paper.

- Highest score recorded is 45 marks and the lowest is 2marks.
- In question 1.1 and 1.2, the learners did not follow instructions to write the correct letter and they were even shown an example to follow.
- The majority of the learners used the multiple choice chart in the answer book and crossed the letters instead of writing them in the answer book as per the instructions.
- The problem, however, was mainly in Question 1.2 where the options, 'both A and B' and 'none' were not accommodated by the chart.
- As a result those who used the chart to answer Question 1.2 did not know how to present 'both A and B' and for 'none' as answers in the chart and therefore lost 4 marks.

(b) **Why was this question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.**

1.1 Multiple choice question:

- The performance of learners in this sub-question ranged from 0 marks to 20 marks.
- Sub-question 1.1.3 and 1.1.6 are multiple choice questions where learners were expected to select the correct combination and most candidates could not select the best combination.
- Sub-question 1.1.5 required a clear understanding of the concept: flight zone. Learners' responses were a clear indication of their lack of understanding of the concept and as a result the question was poorly answered.
- Sub-question 1.1.9 required the learners to identify the correct order of the zygote's development. Many learners did not know the correct order and they were guessing wrongly.

1.2 Matching Columns:

- The performance of learners in this sub-question ranged from 0 marks to 10 marks.
- Capable learners were able to earn full marks and part marks of up to 6/10 were achieved by many learners.
- The instruction to this question required learners to either indicate A only, B only, both A and B and None: many candidates are now familiar with the instruction and they responded correctly, nevertheless there are still learners who fail to answer as per the instruction for example they wrote A or B or BOTH instead of A ONLY or B ONLY or BOTH A and B.
- Failure to follow instructions will result to the unnecessary loss of valuable marks.
- Question 1.2.2 was a higher order question. Learners should have known that fishmeal is a protein rich concentrate of animal origin and therefore can never have a 4% DP but could have 80% TDN. Note: Protein rich concentrates contain more than 12% of digestible protein (DP).
- Many learners are not familiar with the concept 'repeat-breeder syndrome' and yet they opted for the correct option which is B only,

1.3. One word question:

Learners did not respond well in this question.

- Sub-question 1.3.1 was well known but some learners wrote bile duct, gall bladder instead of Bile.
- Sub-question 1.3.3: surprisingly, many learners seem not to know what a **Vector** is. Instead of vector they wrote pathogens, or gave examples of pathogens.
- Sub-question 1.3.5: many learners lost marks for writing **importance** (wrong spelling that means something else) instead of impotence, and some gave responses such as lack of libido, infertility and sterility.

1.4. Replacement question:

- Poorly performed question.
- The majority of learners scored only 2 marks from Q1.4.1 and 1.4.2.
- Very few learners managed to collect all the marks.

- 1.4.1 Learners did not understand the main concept needed i.e. “Fodder flow”, and many learners gave “Fodder programme” as the main answer which was not correct.
- The key verb in this concept is ‘flow’, which under-scores the necessity of meeting all your animals’ daily fodder requirements throughout the year.

(d) Describe any other specific observations relating to responses of learners

- Learners who ticked more than one answer for a question in 1.1 lost marks.
- Some learners guessed responses and wrote the incorrect concept first followed by the correct one as a result they lose marks because only the first concept is considered for example: 1.3.4 spermatogenesis or oogenesis.
- Oogenesis is the correct answer but the learners lost marks because of writing spermatogenesis first which is wrong.

e) Any other comments useful to teachers, subject advisors, teacher development etc.

- Examination guidelines must be used in conjunction with the CAPS and learners must have access to the copies so that they are familiar with the format, questioning style, use of key verbs and the content to be assessed.
- Assessment tasks developed at school level should incorporate a variety of questions based on the cognitive levels as prescribed in the assessment policy.
- Cluster common examinations can assist to ensure that the required quality assessment standard is met by all schools.
- Teachers must ensure that other concepts not tested in this question be given the same emphasis in class.

QUESTION 2 ANIMAL NUTRITION

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

- The performance was fair in this question where most learners obtained more than 50% of the total marks in the question.
- The highest score obtained in this question is 33.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

2.1 Diagram of a digestive system

- 2.1.1 Learners were asked to identify and write the **type** of animal that has the stomach shown in the diagram but instead they wrote the **name** of the animal, i.e. they wrote ‘pig’ instead of writing *non-ruminants* or *monogastrics*.
- Some were not sure what the difference between a ruminant and a non-ruminant is.
- 2.1.2 Many learners wrote single or one stomach instead of simple stomach in their attempts to motivate why they say the stomach shown is a non-ruminant. What most learners do not know is that all animals have only one stomach, but the

difference between the stomach of a ruminant and a non-ruminant is that a ruminant has a complex/compartimentalized or a four chambered stomach while a non-ruminant has a simple or single chambered stomach or true stomach.

- 2.1.4 It was encouraging that most learners were able to state the reasons why non-ruminants cannot be fed roughages, although only the stronger learners earned full marks for this sub-question.

2.2 Water, vitamins and minerals

2.2.1 Water functions

- In this sub-question learners were instructed to give the functions of water in relation to animal nutrition.
- Most learners did not realise that they should write only the functions of water that have to do with animal nutrition and therefore gave the functions of water in general.
- Responses such as 'water regulates the body temperature, water gives form by supplying turgor pressure to body cells, were not accepted.

2.2.2 Mineral or vitamin deficiency

- The question required learners to indicate the mineral/vitamin responsible for the different deficiency symptoms in animals.
- It was disappointing that most learners could not score full marks in this question because it was not difficult.

2.3 Calculation

2.3.1 Coefficient of digestibility:

- Many learners scored almost 2 marks out of 5 marks in this calculation while some managed to earn full marks.
- Writing the formula is still a problem to some learners.
They write 'feed intake – feed excreted instead of Dry Matter feed intake-Dry Matter feed excreted, leaving out the DM and X100 which are central to the definition of the concept..
- The simplification of the moisture content in feed and determining the dry matter of feed was done very well by most learners.
- Identification of the key values in this case, dry matter value of the manure (12kg) which was given in the question could not be identified by most learners, they further simplified it as if it contained moisture content, and as a result they lost marks for the answer.
- Substitution of values was also a challenge as many of the learners were subtracting the manure from the feed intake without removing the moisture content.
- Other learners lost marks in the answer by indicating the answer as kg instead of as a percentage. Some forgot to write percentage and lost one mark.

2.3.2 Processes to improve digestibility of feeds

- It was encouraging that many learners earned full marks in this question, although they were mainly mentioning the mechanical processes.
- Some learners were confused because they wrote factors

2.4 Pearson square

2.4.1 Balancing the ration

- Many learners calculated the Pearson square correctly but lost marks by indicating parts of the balancing ratio as percentage.
- Some learners did not work out the parts diagonally and they were marked wrong.

2.4.2 Percentage of maize

- Learners failed to show all the steps when calculating the percentage of maize for example the first step: addition of the parts ($27+8 = 35$).
- Some learners calculated the percentage for both feeds which indicated that they did not understand which feed is maize or oilcake.

2.5 Feed and supplement supply

- Poor performance in this question was due to lack of analytical skills by the learners.
- The stronger learners earned the full 8 marks in this sub-question.
- The incorrect answers from these learners reflected their inability to read and interpret the information in the chart.

This was evidenced by the unfitting responses that they provided in Questions 2.5.1, 2.5.2 and 2.5.3.

- In sub-question 2.5.3 most learners could not give sensible and valid reasons for introducing a concentrate in October and November.
They failed to put into use their knowledge of concentrate feeds and their functions.

2.5.4 Calculation of the fodder

- It was disappointing that some of the learners could not convert tons into kilograms in sub-question 2.5.4 (a).
- They were asked to express 3.4 tons in kilograms.
They should have multiplied 3.4 by 1000 (1 ton = 1000 kg) to get 3400kg.
- Sub-question 2.5.4 (b) was a higher order question that only the gifted learners managed to figure it out.
Most learners missed the trick by multiplying by 30 days instead of multiplying by 31 days of January.
- That means that the 50 sheep will have feed/food for 30 days and will be without feed on the 31st day of January.

(c) Provide suggestions for improvement in relation to Teaching and Learning

- It is important to note that 30 days in this calculation would have been used as an average if the question required a calculation of fodder per month.
Teachers should note that when a question instruction specifies the name of the month, learners should apply their knowledge of how many days are there in a particular month.
- Teachers must emphasize understanding of the correct formula and units when calculating digestibility co-efficient
- Learners should be taught how to write the formulas. Meaningful understanding of the formulas is very important in order to correlate data provided in the question for correct substitution of values.
- Teachers need to emphasize that the formula for the digestibility co-efficient and the ensuing calculation steps must always be multiplied by 100 if the final answer is to be expressed as a percentage.
- Continuous Assessment of learners on all types of calculations in all terms will help to

prepare learners for the final examination readiness.	
(d) Describe any other specific observations relating to responses of learners	
<ul style="list-style-type: none"> Learners do not strictly adhere to action verbs describing the requirements of the question. Many learners take it as a norm that when calculating digestibility co-efficient the moisture content must be subtracted and yet this is not always the case. Some learners could not write the correct formula for the digestibility co-efficiency, they were also not expressing the feed intake and manure as dry matter. They lost marks for the formular. 	
e) Any other comments useful to teachers, subject advisors, teacher development etc.	
<ul style="list-style-type: none"> Assessment tasks at school level must be developed and weighed according to cognitive levels prescribed in the CAPS policy document for Agricultural Sciences. Strict adherence to the responses in the marking guidelines as per action verbs within the questions when marking learners is very important for final examination readiness. Teachers must assess learners in different forms of calculations : <ul style="list-style-type: none"> - Digestibility co-efficient - Pearson Square Method - Nutritive Ratio emphasising on specific differences in data given in a question. - fodder flow requirement Teachers are advised to promote reading and analysis of texts, charts, graphs and tables. They should discourage memorising facts without understanding 	
QUESTION 3 ANIMAL PRODUCTION, PROTECTION AND CONTROL	
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?	
This question was answered relatively well. Marks scored ranged between 3 and 30.	
(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.	
<p>3.1.</p> <p>3.1.1 Production systems:</p> <ul style="list-style-type: none"> Learners were to identify the two types of production systems generally practiced in South Africa. More than 75% of the learners scored full marks BUT there were some who wrongly identified the system extensive as intensive and vice versa. Some wrote external and internal instead of extensive and intensive. Many learners identified the two systems as Subsistence and Commercial which clearly indicates that they do not know the difference between the production systems and the farming systems. <p>3.1.2 Comparison of the two systems</p> <ul style="list-style-type: none"> This question belongs to the EASY HIGHER ORDER level whereby learners were to 	

differentiate between Extensive and Intensive production systems using the headings (Environmental control, Productivity and Human input).

- Learners who understood the instructions managed to score between 4 and 6(max) marks.

(a)Environmental control:

- This heading gave the majority of the learners a rough time as they were unable to articulate the comparison.
- They could not relate shelter with the environmental control.
- They were relating the environment with space and free movement, for example, they wrote -large area, free movement for Extensive and– small area, restricted movement for Intensive.
- They were expected to write that *there is environmental control in the intensive system and that it is minimal or less in the extensive system.*

(b)Productivity

- Most learners (more than 50%) were able to make the comparison in terms of the productive levels of the two systems.
- They were expected to indicate that *the extensive system produces a lower yield per unit of land than the intensive which produces a much higher yield per unit of land.*

(c)Human input:

- Many learners had a misconception that the intensive system requires less labour force than the extensive system because of their use of machinery to mechanise agricultural work.
- Some were giving their comparison from the angle of the quality instead of the quantity of the labourers used by each system. For example, for Extensive they wrote (unskilled and inexpensive) and for Intensive they wrote (skilled and expensive).
- They were expected to indicate that *the intensive system requires more human input than the extensive system per unit of land.*

3.1.3 Reasons for keeping cattle in the facility

- Almost 90% of learners did not find this question too challenging and the fact that the marking guideline was exhaustive in providing the alternative responses was an added advantage.

3.2.1 Ways of heat loss

- More than 40% of the learners were able to identify the ways of heat loss in Pictures A (*radiation/evaporation/perspiration/sweating*)
- Only a few were not able to identify the heat loss in Picture C(*excretion,defecation, faeces, manure,dung*).
- The manure shown on the ground assisted the learners.
- Those who managed to correctly identify picture B as *conduction* were very few (less than 10%).

3.2.2 Other ways of heat loss

- The question asked for the other ways of heat loss other than those shown in the diagram.
- Learners gave the same responses expected in Question 3.2.1.

3.2.3 Signs of heat stress

- This was a fair question and most learners scored 2 marks.
- Most wrote 'restlessness, loss of appetite, sweating and loss of weight'.
- Incorrect responses that many learners wrote, amongst others, were 'tiredness, lying down, walk slowly' and some learners wrote the signs of parturition.

3.2.4 Management practices

- 90% of the learners scored full 2 marks for writing provision of shelter/shade and access to drinking water.

3.3 Line Graph

- Learners have indicated a significant understanding of how to draw a graph, although some still forget to write the *heading* indicating the two variables.
- Some learners lost 1 mark for not indicating *units* in the labels of axes for example: average pulse rate with the units of *–per minute*.
- Some were challenged by the two comparable variables on the same axes as a result they drew them on separate graphs.
- Some of them failed to satisfy the requirements to be awarded a mark for accuracy (i.e. correct values, scale, plotting/both graphs must be correct).

3.4 Vaccination Plan

- Questions based on diseases have always posed challenges to the majority of the learners.
- It was evident from the learners' responses that this mountain is slightly becoming a small hill and that something is being done to defeat the big goliath of animal diseases
- In question 3.4.1: More than 60% of the learners scored between 3 and 7 marks.
- Number A, C and G in the table were the most problematic.
- Poor performance in question 3.4.2 suggests that learners do not know what a vector is.

3.5 Control of parasites

- 3.5.1: Surprisingly there were learners who wrote dipping as a remedy for internal parasites such as roundworms and tapeworms.
- In 3.5.2 and 3.5.3 learners suggested dosing as the most appropriate method used to administer remedies to control external parasites.

(c) Provide suggestions for improvement in relation to Teaching and Learning

- Use of tables to provide learners with precise differentiation of the characteristics of intensive and extensive production systems.
- Teachers must emphasize on different intensive systems for different animal production units for example, free range/ Backyard system for Poultry and Feedlot for Pigs and Cattle.
- Teachers must exercise learners on different scenarios of intensive and extensive production systems with special emphasis on analysis of the scenario and application of learned knowledge through questions at different cognitive levels.
- Learners must be taught to respond to instructions such as: SUPPORT/ JUSTIFY/MOTIVATE YOUR ANSWER BY REFERING TO THE DATA /TABLE.

(d) Describe any other specific observations relating to responses of learners

- Language barrier to assist in analysis of questions became a problematic issue observed in this question for example use of concepts or phrases like environmental control, per acute illness etc.
- Learners do not read the entire question before attempting it.

e) Any other comments useful to teachers, subject advisors, teacher development etc.

- Teachers should emphasise to learners the important aspects to note when interacting with a data table or scenario for example:
- Learners must be trained on noting a question that requires an answer from the analysis of the picture as well as when to use insight to answer the question
- Assessment tasks for example assignments should form part of non-formal assessment to encourage learners to interact with a variety of information pertaining to agricultural practise within their environment.
- Use of agricultural periodicals and magazines for learners to read in order to broaden their knowledge spectrum on the applicability of agricultural content.
- Teachers and learners to embark on agricultural excursions for exposure to development and management of various forms of agricultural enterprises. It is highly recommended that learners be furnished with worksheets to record their observations for their presentations during feedback in the classroom.

QUESTION 4 ANIMAL REPRODUCTION, PROTECTION AND CONTROL

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

- Even though Question 4 was not that difficult. Learner performance was average.
- Highest mark obtained was 29 and the minimum of 1.
- Learners poorly performed in sub-question 4.3 and in 4.5 learners performed better.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

4.1 Embryo development

4.1.1 Stages of parturition as in pictures A and B

- Learners were asked to name the stages of parturition shown on the two diagrams.
- More than 70% of the learners did not score a mark on this question 4.1.1
- Learners did not understand the similarity between parturition and birth, as a result they wrote birth as a stage of parturition.
- Instead of writing the stage name, majority of learners described the phase.

4.1.2 Incorrect posture of a calf and a reason

- More than 80% of the learners were able to identify the incorrect positioning of the calf in picture B, learners wrote a variety of responses to explain what they could observe from the picture.
- 4.1.3 This question was well answered except for number (c) where the learners could not correlate the statement to the correct picture.

4.1.4 behavioural changes

- Learners could not differentiate between behavioural signs and physiological changes during the preparatory stage of parturition.

4.2 Graph that represents hormones in the oestrus cycle of a cow

4.2.1 oestrus cycle definition

- Learner responses indicated inability to differentiate between oestrus and oestrus cycle this led to learners losing the two marks.

4.2.2 Range of days in which progesterone level is high

- Learners indicated only a day during which progesterone level is the highest; while the question requested identification of the days and as a result they lost the mark.
- They were expected to mention a range of days between days 9 to 16.

4.2.4 Reason for the increased progesterone levels on days 2 and 3

- Learners gave the function of progesterone instead of the reason for the increase of progesterone levels.
- Expected responses were – Fertilisation has taken place OR corpus luteum has been formed

4.2.5 Influence of oestrogen on LH (Luteinising hormone)

- Learners completely did not understand the influence of oestrogen on LH.
- From the graph the relationship was visible, that when oestrogen levels increased, the LH levels also increased.
- Also one of the functions of oestrogen is to stimulate the release of LH by the pituitary gland.

4.2.6 The structure where prolactin is produced

- This question was well answered.
- Learners wrote Pituitary gland or Hypophysis or Master Gland and were awarded a mark.
- Some learners wrote mammary gland and they were marked wrongly.

4.3 Detection of oestrus

- Most of the learners were completely caught off-guard by this question and scored no mark.

4.4 Diagrams that represents a reproductive process

- Learners were able to identify the reproductive process of cloning although in the subsequent question 4.4.2 they could not write a complete definition of the process.
- There is a clear indication that learners are unable to differentiate between cloning and embryo transfer.
- Question 4.4.3 was well answered by most learners, but some analysed the stage as the fusion of the nuclei.
- Question 4.4.4 learners attempted this question very well although some could not explicitly indicate the aim of increasing the quality of production impacted by genetic characteristics; instead they wrote increased production which could be the result of other production factors.

4.5 Diagram on oogenesis

This was supposed to be one of the easier questions in the paper and was generally well answered. However many unprepared learners did not answer certain parts of it well.

(c) Provide suggestions for improvement in relation to Teaching and Learning

- Teachers should utilise a variety of diagrams, charts and slides from different sources to give a visual emphasis and provide clearer understanding of the diagram.
- It is advisable to teachers that when dealing with concepts, they must be analysed to

<p>provide meaningful understanding (conceptualisation) and identification of main phrases to differentiate them when writing examinations.</p> <ul style="list-style-type: none"> • Drill learners on the aspects that they must indicate when drawing a graph : <ul style="list-style-type: none"> ○ Correct heading indicating all variables ○ Labelling of axes ○ Indicating units on axes if applicable ○ Drawing the correct scale ○ The type of the graph (line, bar, histogram, pie chart) ○ Accuracy in plotting the data on the graph (these are soft points a learner must score in any graph before the correct plotting is considered)
<p>(d) Describe any other specific observations relating to responses of learners.</p> <ul style="list-style-type: none"> • Some learners drew the axes of the graph on portrait setup of the page but plotted the graph on a landscape page setup. • Lack of scientific language when expressing a concept.
<p>e) Any other comments useful to teachers, subject advisors, teacher development etc.</p> <ul style="list-style-type: none"> • Learners must be taught to draw the graph on one form of page setup, that is, either the LANDSCAPE OR PORTRAIT NOT BOTH. It is recommended that learners be taught to draw graphs on the same axes unless otherwise stated. • Development of charts by learners and their availability in the classrooms for continuous revision. <ul style="list-style-type: none"> ○ Digestive systems of the three categories of farm animals. ○ Feeds flow chart – concentrates and roughages. ○ Energy flow charts – GE-DE-ME-NE ○ Reproductive systems of farm animals. ○ Sketches of reproductive structures – ovary indicating growth of the follicles; spermatogenesis; oogenesis; positions during dystocia ○ Mating, artificial insemination, embryo transfer. ○ Mammary gland and lactation curve. ○ Equipment / tools used in handling animals ○ Equipment / tools used in various procedures / operations (e.g. branding, castration, dehorning, etc.) on animals. ○ Animal diseases and the life-cycle of parasites. ○ Types of graphs – line, bar, histogram and pie. • Cluster content workshops to develop teaching strategies on how to approach and assess topics such as types of farming systems their advantages and disadvantages using case studies and scenarios which address important aspects of these systems. • Collaboration with local extension officers from DARD is recommended for classroom demonstration or local community presentations on disease outbreaks, their control and prevention. • Exposure of learners to local subsistence farming systems in order to broaden their knowledge of basic agricultural practise.

SIGNATURE OF CHIEF MARKER: _____