Province of the
EASTERN CAPE
EDUCATION

EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE
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2022 NSC CHIEF MARKER'S REPORT

SUBJECT:	**AGRICULTURAL SCIENCES**
PAPER:	**1**
DURATION OF PAPER:	**3 HRS**
DATES OF MARKING:	**8TH Dec 2022 – 22 Dec 2022**

SECTION 1: (General overview of Learner Performance in the question paper as a whole)

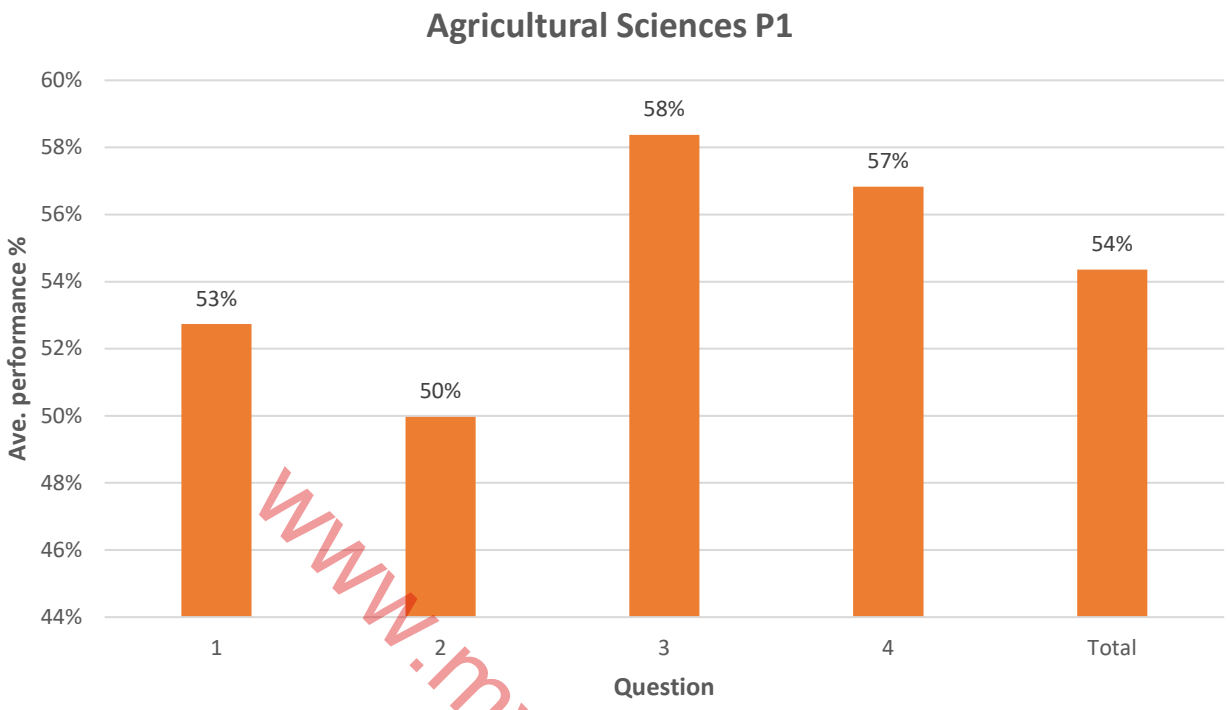
***Average mark from the sample of 100 for the whole paper*:**		**81 out of 150 marks**	
TOPIC OR ASPECT TESTED	**LOWEST MARK**	**HIGHEST MARK**	**AVERAGE % FROM SAMPLE**
• Animal Nutrition • Animal Production Protection and Control • Animal Reproduction	**08**	**141**	**54,0%**

- Statistical analysis derived from Rasch for Agricultural Sciences P1 in the Eastern Cape indicates that performance in the paper will improve this year compared to 2021.
- Candidates' average performance has improved from 52% in 20201 to 54% in 2022, which is an improvement of 2%.
- The slight increase in the performance as compared to 2021might be attributed to the fact that there were no disruptions this year due to COVID 19 pandemic and more time was dedicated to teaching and learning. Educators had all the time to complete the syllabus earlier to accommodate revision.
- The numbers of levels 1 and 2 are declining leading to an upward inclination towards levels 3, 4 and 5.
- The number of candidates scoring at levels 6 and 7 is predicted to increase substantially and this could be attributed to the fact that more time was dedicated to teaching and learning this year at the expense of the SBA Assessment tasks and formal examination and therefore schools were able to complete the syllabus earlier to accommodate extra time for their revision plans.

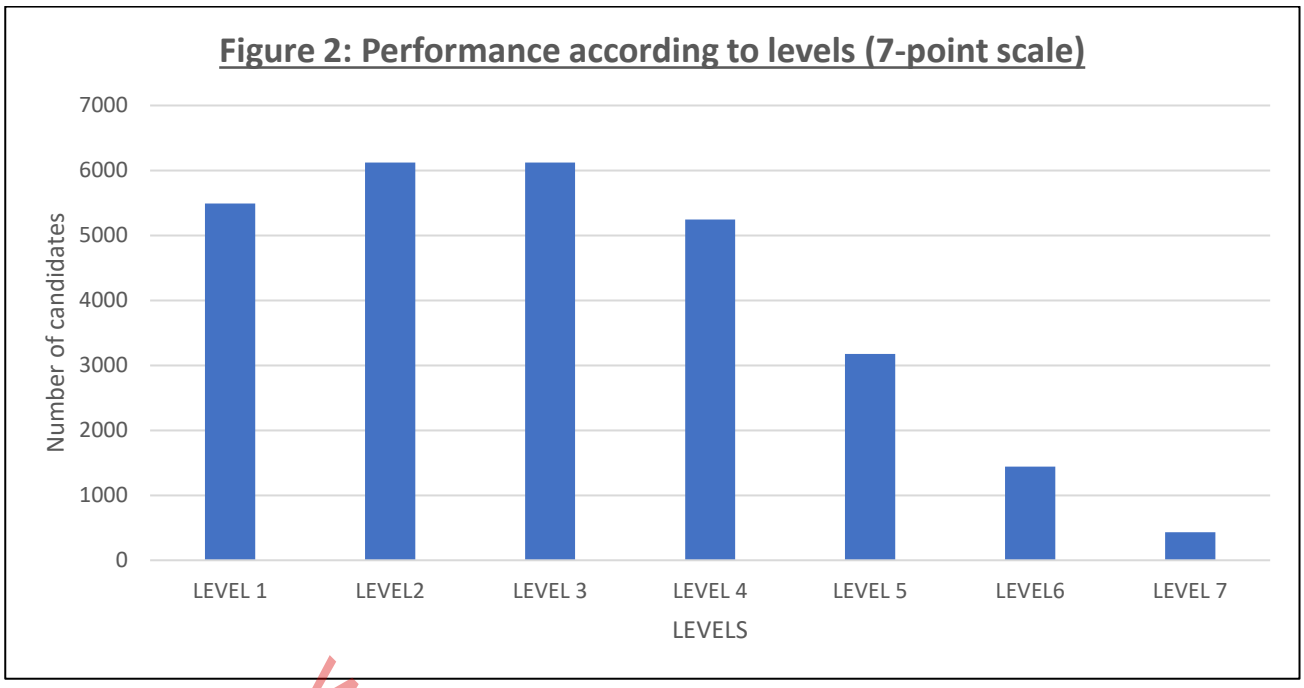
- The question where candidates performed best is question 3 (58%), followed by question 4 (57%), then question1(53%) and lastly question 2 (50%). Question 2 showed an improvement of 9% compared to 2021where it was 41%
- There is an improvement in all the questions as compared to 2020 and 2021.

The bar graph below shows general overview of learner performance per question as represented in the rasch analysis (sample of 100 scripts).

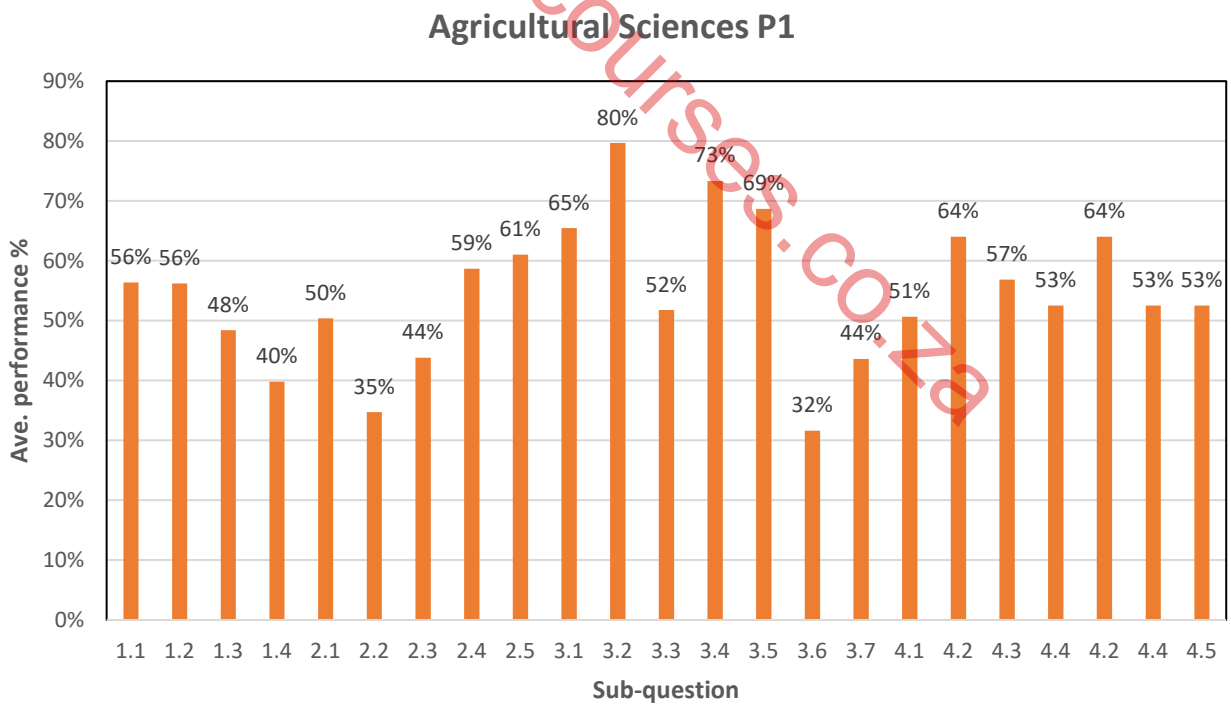
Figure 1: Average performance (%) per question and overall average performance (%)



QUESTION	KNOWLEDGE (CONTENT) AREA ASSESSED FOR EACH QUESTION
QUESTION 1	Animal Nutrition, Animal Production, Protection & Control and Animal Reproduction (Multiple Choice questions; Column A & B; Terminology and Term replacement)
QUESTION 2	Animal Nutrition
QUESTION 3	Animal Production, Protection & Control
QUESTION 4	Animal Reproduction



A substantial number of candidates performed at level 2, 3 and 1, but the number of those wh performed above level 4, 5, 6 and 7 has slightly improved compared to 2021.



SECTION 2: Comment on candidates' performance in individual questions

QUESTION 1

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

Average mark from the sample of 100 for question 1:		23 out of 45 marks	
TOPIC OR ASPECT TESTED	**LOWEST MARK**	**HIGHEST MARK**	**AVERAGE % FROM SAMPLE**
• Animal Nutrition • Animal Production Protection and Control • Animal Reproduction	**06**	**43**	**54.3%**

The 2022 cohort of grade 12 candidates performed fairly well in question 1 with an average mark of 24 out of 45 (53%). The average % of sub-questions is as follows: Question 1.1 (56%) showing a slight decline from 2021, followed by 1.4 at 50%, then 1.2 (48%) and lastly 1.3 at (40%). Question 1.3 was the least performed at an average of 40%. The highest mark scored in this question was 43 marks with the lowest being 06. Many candidates seemed to be better prepared this year in questions 1,2 and1.4 than in the previous years.

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

QUESTIONS 1.1 (Multiple choice – 20 marks)

- Performance in this question showed a decline of 4% as compared to 2021. The average is 56% in 2022 and 60% in 2021.
- The candidates' responses displayed that there is still a challenge in mastering subject concepts as question 1 is based on concepts.
- Poor performance in 1.1.10 clearly indicates that there is a challenge on the roles of hormones in the reproductive systems. Most candidates opted for D (oestrogen and progesterone) instead of C (oxytocin and oestrogen as hormones responsible for contraction of the uterine muscles.
- Most of the questions in 1.1 (1.1.1, 1.1.2, 1.1.5, 1.1.61.1.8, 1.1.9) were easy but 45% of the candidates failed to provide correct answers.
- In question1.1.4 candidates seemed not to understand questions that require them to know the sequence of the processes. The term reinsalivation seemed to have created a problem for candidates to understand the sequence.
- In 1.1.9 choosing a primary sex organ amongst the organs listed seem to be a great challenge which shows that they are unable to differentiate between primary and secondary sex organs.

QUESTIONS 1.2 (Column A and B – 10 marks)

- Generally, the question was well answered by candidates.
- Question 1.2.4 was the most difficult to get, they wrote A instead of NONE. This is due to the fact that, in some areas a Vaseline is used as an ointment to eradicate ticks , hence they opted for A.

QUESTIONS 1.3 (Terminology – 10 marks)

- Question 1.3 was fairly answered as most candidates got 6/10 and above.
- In question1.3.1 majority of learners wrote active instead of passive. They failed to differentiate between "along" and "against" the concentration gradient.
- In question 1.3.3 candidates misunderstood the question confusing it with the hormone that stimulates milk release, they wrote Oxytocin instead of Adrenalin. They overlooked the word "inhibit" in this question.
- Question1.3.5 seemed to be confusing to the candidates because most of them wrote cervix instead of vagina while others gave artificial vigina as an answer which is totally different from the vigina.

QUESTIONS 1.4 (Term replacement – 5 marks)

- Question 1.4 was not well answered as one would expect because only 40% learners managed to get all the answers.
- In question 1.4.1 most candidates were providing an opposite of the word **proper** which was to be replaced. Answer like improper was sponsored by the majority of candidates. This indicates that, there is a mis-conception that replacing the underlined word simple means giving the opposite word.
- In question1.4.2 candidates were unable to understand that the question was asking for a castration tool that caused bleeding. Most of the candidates were providing answers like Burddizo, thus, overlooking the bleeding in the question.
- In question1.4.3 candidates were confusing germ layers with membrane layers. Instead of Ectoderm, they were giving chorion or Amnion.

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

(a) Concepts should form part of daily assessment and Assessment of these could be made interesting and motivating for candidates through the introduction of speed tests on crossword puzzles, matching items, one word answers and multiple choice items.

(b) Both subject advisors and teachers should compile a document that explains the common action words and the expected responses.

(c) Provinces, together with teachers, need to prepare revision packs of all the topics which must be continuously used as informal tasks, in class revision sessions and as mock examinations, addressing the understanding of concepts

(d) Development of interesting games like word puzzles, identification cards and PowerPoint presentations for the teaching of key concepts and improving the spelling should be considered.

(e) The use of electronic technology, such as smart boards and the internet, could be utilised to improve the candidates' reading abilities.

(f) Teachers should train candidates on how to identify the main phrases in the question in order to relate with the content learnt in order to respond accordingly.

(g) Teachers should form a cohesive unit in their clusters for support to address challenging topics.

(h) Examples of salivary glands with their location and functions need re-emphasis.

(i) Both teachers and learners should make a glossary of terms for each topic to be taught and issue it well in advance in order for candidates to know which terms need to be mastered.

(d) Describe any other specific observations relating to responses of candidates and comments that are useful to teachers, subject advisors, teacher development etc.

(a) Some candidates continue to leave blank spaces in question 1 multiple choice question which doesn't make sense. If they don't know the correct answer, they are free to guess.

(b) Candidate's responses to instructions especially sub-question 1.2 still pose a challenge in the examination of this subject. The policy requires candidates to WRITE, A only, B Only, Both A and B or None however there are some who still write A, B and Both, without indicating ONLY.

(c) Candidates continue to commit spelling errors in subject concepts resulting in the loss of marks if the incorrect spelling has another meaning

(e) Describe any other specific observations relating to responses of candidates and comments that are useful to teachers, subject advisors, teacher development etc.

(a) All educators should be empowered on the English Across the Curriculum (EAC) program in order to integrate the English skills in the teaching, learning and assessment of Agricultural Sciences.

(b) Teachers MUST use the CAPS Document and the current examination guidelines when teaching and assessing formally and informally.

(c) Teachers in collaboration with subject advisors should develop concept bank from different references per topic to exercise candidates on the language of the subject.

(d) It is evident from the performance of candidates that some schools are still teaching using only one textbook available in schools which is not acceptable. Schools should have all prescribed textbooks for teachers and make notes thereafter to supplement the missing content from the candidates prescribed textbook.

(e) Development of common assessment tasks that are up to the standard of national papers for practice is recommended.

(f) Concepts should be taught in the way they are assessed and the scientific approach must be used when teaching the subject and this must be emphasized in order to develop scientific skills to our candidates.

QUESTION 2

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

Average mark from the sample of 100 for question 2		18 out of 35 marks	
TOPIC OR ASPECT TESTED	**LOWEST MARK**	**HIGHEST MARK**	**AVERAGE % FROM SAMPLE**
• Animal Nutrition	**01**	**32**	**51,4%**

Question 2 on animal nutrition is a challenge for many candidates as it is the less performed question even though there is an improvement as compared to 2021 where the average mark was 14 out of 35 with an average of 41% and in 2022 the average mark is 18 with an average % of 51.4. There was an improved performance in questions 2.5 with (65%), followed by 2.4 (61%), 2.3 (59%), 2.4 (44%) and lastly 2.1 (35%) There is also an improvement in calculations in question 2.4.1 and 2.5.3. The highest mark scored in this question was 32 marks with the lowest being 01.

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

Question 2.1 (The parts of the stomach in a ruminant animal – 8 marks)

- **Question 2.1.1(Naming of farm animal – 1 mark).** Question was well answered by candidates, even though some candidates wrote Ruminant (class) instead of name of an animal with stomach parts in the pictures. They are unable to differentiate between naming and classification of farm animals. Learners need to be drilled on the concepts of naming and classification.
- **Question 2.1.2 (Letter of the stomach parts -2 marks**) Question was also well answered by the majority of candidates. Even the weaker learners managed to get 1 out of 2 marks.
- **Question 2.1.3 (Adaptation feature of a rumen – 2 marks**) Candidates failed to see that the question was looking for the adaptation feature and its role. They only gave adaptation feature and failed to indicate the role of the adaptation feature. Presence of micro- organisms was the only response given and not stating the role of synthesis of vitamins. As a result, they got 1 mark but few managed to get 2 marks.
- **Question 2.1.4 (Feed flow after regurgitation – 3 marks)** Question was poorly answered by candidates although they know the sequence of food in animal. They were getting 1 out of 3 marks. Educators must emphasise that "only the fine food that goes to the Omasum and Abomasum and the coarse food goes back to Rumen, Reticulum and Omasum" after regurgitation. The way the question was phrased was a bit confusing to the candidates. Examiners must also remember to put the word "letter" in capital letters or in bold letters so as to alert candidates, this resulted to some candidates writing statements.

Question 2.2 (Nutrient deficiencies – 7 marks)

- **Question 2.2.1(Mineral deficient from the symptoms – 2marks)** Candidates failed to see that the question was asking mineral deficient in C and D respectively and as a result they gave one mineral for both C and D. Less than 50% manage to get both minerals. Some wrote Ion instead of Iron resulting from incorrect spelling which has a different meaning.
- **Question 2.2.2 (Name of the deficiency symptom – 2 marks**) It was fairly answered, though some candidates gave a description of a symptom instead of writing the symptom.
- **Question 2.2.3 (Classification of vitamin -1 mark)**The question was poorly answered by the majority of candidates even the best performers had a challenge with the question and less than 30% of candidates who manage to get correct answer. The common answer given was, Vitamin A instead of classifying vitamin A .This shows that candidates still struggle to respond to verbs like classify and name.
- **Question 2.2.4 (Supplementing the vitamin – 2 marks)** it was fairly answered, though some candidates mentioned the methods of supplementing minerals which are not relevant to vitamins. Answers sponsored include mineral lick, silage and cafeteria style methods. Other common responses' were drinking through and drenching gun which is equipment and not the method.

- **Question 2.3 (Digestibility coefficiency trial – 6 marks)**

- **Question 2.3.1(type of farm animal used in a trial – 1 mark)** It was well answered, though some still write name of an animal while others give name and the type which is an indication that they are unable to differentiate between naming and classification of farm animals. More than 70% of candidates managed to get a mark.
- **Question 2.3.2(Reason for the name of an animal -1 mark)** Question was not well answered as one would expect. It was very clear that candidates were not able to utilise the data provided to give a reason for the name of an animal in question 2.3.1. Some candidates were writing 13kg was digested instead of 13% and some were writing 2% was digested instead of 2kg was digested, as so some were writing that 13% excreted instead of 13kg.
- **Question 2.3.3 (Factors influencing digestibility – 2 marks)** Question was well answered, at least more than 70% of candidates managed to get 2 full marks.
- **Question 2.3.4 (Methods of improving digestibility – 2 marks)** Question was fairly answered, approximately 50% of candidates managed to get 1 out of 2 marks. Many candidates wrote soaking, roasting etc which are not applicable to improving wheat straw. They also listed all methods of improving digestibility instead of narrowing them into specific feed used in a trial (WHEAT STRAW). This means that the candidates were unable to link factors to a wheat straw.

- **Question 2.4 Nutritive ratio – 6 marks**

- **Question 2.4.1(Calculation of NR -4 marks)** It was well answered. The majority of candidates managed to get 3 out of 4 marks. Although some candidates were losing marks unnecessarily, because they do not show the step that calculate TDN. They came up with 75% without showing how they reached to 75% and this has resulted in the loss of 1 mark. Some candidates lost a mark for the formula because they could not give the correct formula which is in the form of ratio e.g

$$NR = 1 : \frac{\%TDN - \%DP}{\%DP}$$

  Some candidates wrote the correct formula but the following step did not correspond with the formula used. This is also an indication that some learners did not use calculators. As a result, in spite of the fact that all the steps were correct they gave wrong answers.
- **Question 2.4.2 (Suitability of the feed based on NR – 1 mark)** Question was well answered by almost 90% of candidates .. Few learners just wrote suitable instead of indicating what the feed is suitable for.
- **Question 2.4.3 (Reason for the suitability – 1 mark)** It was fairly answered, though some did not give the reason but indicated what the feed is suitable for. Others referred to the ratio as less than 1: 5 instead of less than 1:6 which is used as a bench mark.

- **Question 2.5 Energy flow -8 marks**

- **Question 2.5.1 (Naming energy – 1 mark)** It was well answered by the majority of candidates.
- **Question 2.5.2 (Function of net energy – 1 mark)** Majority of candidates answered correctly.
- **Question 2.5.3 (Calculation of energy and energy lost – 4 marks)** It was well answered. This showed that candidates we able to utilise the data provided.
- **Question 2.5.4 (Aims of calculating energy value – 2 marks)** It was fairly answered by the majority of candidates though few confused the aims of calculating energy value with the importance of a fodder flow. Responses given include, to meet animals requirement throughout the year which talks to a fodder flow.

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

(a) Teachers still have the responsibility to deal with the cognitive biases towards calculations as some candidates like to switch off when it comes to working with numbers.

(b) Calculations form an integral part of animal nutrition. Teachers should therefore integrate calculations into the informal and formal assessment tasks. They should emphasise the use of correct formulae that will help candidates to develop their ability to make accurate calculations and encourage learners to show how the calculation has been worked out and not only give an answer without showing how they reached to an answer. Teachers should further inculcate in candidates an understanding that Agricultural Sciences is a science subject and that all formulae should therefore be scientifically presented.

(c) It is advised that different diagrams of alimentary canals should be taught simultaneously. A variety of textbooks and other resources should be used in this regard.

(d) Pictures and posters that display the internal structures of the complex stomach could be of assistance to candidates in understanding the parts and their functions better.

(e) Carefully planned practical investigations and questionnaires will assist candidates to develop an in-depth understanding of the subject content.

(f) Explanation of concepts to candidates for better understanding and the implication of the results after calculation, is important

(g) Giving learners exercises on different scenarios as well as probing questions that demand higher thinking skills is imperative in making them aware of the importance of following instructions.

(h) Teachers are encouraged to give regular informal assessments on calculations and units of measurement in order to continue the good work

(d) Describe any other specific observations relating to responses of candidates and comments that are useful to teachers, subject advisors, teacher development etc.

(a) Teachers are advised to promote reading and analysis of text and should discourage memorising without understanding the concepts.

(b) Teachers should focus on all aspects of the content that are listed in the CAPS document and Examination Guidelines. Remember there might be topics that have not been covered in recent question papers, but they still remain important content topics to be taught.

(e) Describe any other specific observations relating to responses of candidates and comments that are useful to teachers, subject advisors, teacher development etc.

(a) Teachers should guide the candidates on how to process data in all forms (tables and graphs, calculations etc.) especially fodder flow programme

(b) Candidates should be able to link the data given to the content that they have been taught in class even before they work on the questions that are put before them.

(c) Candidates have a tendency of memorizing instead of reading with understanding hence they fail to apply the knowledge they have learnt. Teachers need to place more emphasis on making the candidates understand the concepts instead of just memorizing them by assessing them the way national papers are structured.

QUESTION 3

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

Average mark from the sample of 100 for question 3			**21 out of 35 marks**
TOPIC OR ASPECT TESTED	**LOWEST MARK**	**HIGHEST MARK**	**AVERAGE % FROM SAMPLE**
• Animal Production, Protection and Control	**04**	**34**	**58,0%**

There is a decrease of 1% in the performance in question 3 as compared to 2021 which was (59%) and in 2022 is (58%) The performance in the sub-questions in an ascending order is: question 3.5 (32%), 3.6 (4.4%), 3.2 (52%), 3.4 (69%), 3.3 (73%) and 3.1 (80%). This shows that 3.1 and 3.3 were the best performed sub-questions and 3.5 the worst. The highest mark scored in this question is 35 marks with the lowest being 04.

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

- **Question 3.1 Growth rates and temperature changes – 9 marks**
- **Question 3.1.1 (Farm animal that needs housing facilities – 1 mark)** Almost 90% of the Candidates managed to identify from the table an animal that needs a housing facilities. Few learners could not identify the animal which shows that they could not interpret the data well.
- **Question 3.1.2 (Reason to support the choice of an animal in 3.1.1 -2 marks)** The majority of candidates managed to refer to both growth rate and temperature to justify the choice of an animal and some only gave high or low growth rate without referring to the influence of temperature on growth rate.
- **Question 3.1.3 (Line graph -6 marks)** More than 60% were able to get 3 out of 6 marks and many scored full marks, however the following are still a challenge in drawing a graph:
  - Type of the graph
  - Writing both units
  - Incorrect placement of variables
  - Incorrect calibration e.g. taking figures for temperature as they are in the question paper
- **Question 3.2 Equipments - 3 marks**
- **Question 3.2.1(List of equipment – 3 mark)** The question was well answered by most candidates.
- **Question 3.3 Intensive production systems – 4 marks)**
- **Question 3.3.1 (Types of intensive chicken production system – 2 marks)** The question was fairly answered, though candidates could have performed better if the pictures we completely clear. The quality of the pictures disadvantaged the candidates as some identified both pictures as g free range

- **Question 3.3.2 (Factors increasing production - 2 marks)** The question was well answered, although some candidates did not realise that the question excludes nutrition and as a result, they lost a mark for writing nutrition as an answer.
- **Question 3.4 Handling of farm animals – 3 marks**
- **Question 3.4.1to 3.4.3 (Handling of chickens, sheep and pigs) – 3 marks)** Candidates showed a lack of understanding in handling different animals. In 3.4.1 some referred to sheep and in 3.4.2 some gave cattle as an answer. This is an indication that they are unaware of the different techniques utilised to handle different animals.
- **Question 3.5 Parasite infestation – 6 marks)**
- **Question 3.5.1 (Season with highest infestation – 1 mark)** All candidates scored a full mark for the question.
- **Question 3.5.2 (Reason for an increase – 1 mark)** it was well answered, as candidates were able to associate summer to conditions that will favour higher parasite infestation
- **Question 3.5.3 (Economic impacts -2 marks**) it was well answered, as most candidates managed to separate the economic impacts from the general impacts of parasites. Some mistakenly linked the impacts of parasites to the labourer instead of a farmer. This is shown by responses like, loss of jobs ,etc.
- **Question 3.5.4 (Good herd management – 2 marks**) it was fairly answered, especially by the candidates that were able to express themselves.
- **Question 3.6 Life cycle of parasites – 5 marks**
- **Question 3.6.1 (Classification of a parasite – 1 mark)** it was poorly answered as some candidates gave a name of a parasite instead of a class to which the parasite belongs This is an indication that, they cannot differentiate between a class and a name.
- **Question 3.6.2 (Name of parasites – 2 marks)** It was fairly answered as candidates managed to name the parasites especially tape worm. The only challenge was in naming of a liver fluke which they incorrectly referred to it as a round worm. They lacked an understanding that, a liver fluke cycle is identified by the presence of a snail which is its intermediate host.
- **Question 3.6.3 (Biological control measures – 2 marks)** The question was a challenge to all candidates including the top achievers. They mentioned the general measures of controlling parasites for example, veld burning and rotational grazing; this shows that, they cannot make a difference between control measures talking to biological and physical.
- **Question 3.7 Diseases – 5 marks**

- **Question 3.7.1(Name of a diseases – 2 marks)** Performance was fair in this question even though some candidates wrote F.M.D/ RVF (viral diseases) despite the fact that 3.7.2 gives them a clue that a disease in animal 1 is a bacterial disease. This is an indication that there is still a challenge in linking a disease with a specific pathogen.
- **Questions 3.7.2 and 3.7.3 (Animal with bacterial and with non-infectious disease – 2 marks)** Few candidates lost 2 marks in these questions for indicating names of animals like COW/SHEEP instead of referring to the data provided which shows animal 1 and animal 2.
- **Question 3.7.4 (Vector transmitting red water – 1 mark)** There is still a challenge with vectors as some candidates refer to ticks not knowing that some diseases are tick specific when it comes to transmission. Some candidates sponsored responses like, Bont tick/ Mosquitos instead of Blue Tick.

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

(a) When addressing the topic on diseases, It is advisable that educators should make a summary in the form of a table where they list diseases, the pathogens causing specific disease, key symptoms talking to the specific disease and vectors transmitting those diseases.

(b) Emphasis should be done on classification and naming of parasites so that learners can understand the difference between them.

(c) Teachers should access on internet, periodicals and magazines the tools, apparatus and equipment used in animal production and project them for the candidates to be able to identify the name of the tool, its management practise (use) and the reason for its use.

(d) Candidates should be exposed to different facilities for handling farm animals through excursions, videos, prepared lessons on PowerPoint slides with pictures and visits to animal handling programs organised by extension officers in the Department of Agriculture.

(e) The performance of candidates in data handling questions requires teachers to teach candidates how to analyse and identify responses from tables and graphs.

(f) Teachers should seek assistance from other educators in his/her school or other schools for topics where the teachers feel uncomfortable, because it is evident that most teachers do not cover the animal health topic thoroughly for candidates to understand the concepts involved.

(d) Describe any other specific observations relating to responses of candidates and comments that are useful to teachers, subject advisors, teacher development etc.

(a) Candidates do not read the entire question, and this leads to them losing out on many marks.

(b) It is evident from the scripts marked that teachers do 'spot teaching' emphasizing content familiar to them and examination and not teaching content prescribes in CAPS.

(e) Describe any other specific observations relating to responses of candidates and comments that are useful to teachers, subject advisors, teacher development etc.

Teachers must cover the whole content prescribed by the policy, and they need to extend knowledge in the subject by continuously improving their studies. They need to read beyond the learner text books so that they are able to impart more information during their lessons.

QUESTION 4

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

Average mark from the sample of 100 for question 4			**20 out of 35 marks**
TOPIC OR ASPECT TESTED	**LOWEST MARK**	**HIGHEST MARK**	**AVERAGE % FROM SAMPLE**
• Animal Reproduction	**02**	**35**	**58,0%**

The overall performance of candidates in this question is 58% showing an improvement of 1% from 2021which was (57%). All sub-questions are above 50% on average. Question 4.1 and 4.4 are at 64%, followed by 4.2 at 57% and lastly 4.3 and 4,5 at 53% each. This shows an improvement compared 2021. The highest mark in this question is 35 with the lowest being 02.

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

- **Question 4.1 to Accessory sex glands in bulls – 3 marks)**

- **Question 4.1.1 to 4.1.3 (Matching of accessory sex glands – 3 marks)**
- Performance was not good as one would expect. It became clear that the candidates do not know the location of these gland and their functions. This is because they failed to link the accessory glands provided with statements talking to their location and functions. Educators must use diagrams and charts so as to avoid confusion about the three accessory glands. They must also note the similarities with regard to the functions performed by the fluids secreted by different accessory glands. Approximately 40% of candidates managed to score full marks.

- **Question 4.2 (Pictures on reproductive system and a gamete – 10 marks)**
- **Question 4.2.1 (Parts from the reproductive system and a gamete- 4 marks)** Question was answered fairly. The problem was, some candidates described the processes asked (ovulation and fertilisation) instead of giving the name of the process as per the question. Majority of candidates labelled part 1 in picture B as Mitochondria instead of mid-piece and a few wrote neck. This is an indication that they cannot separate the mid piece from the mitochondrion. The label was pointing to the outside which is the mid - piece and not inside where mitochondrion is found. The neck is far away from where the arrow was pointing, this means they are not sure of the labels.
- **Question 4.2.2 (Hormone responsible for ovulation – 1 mark)**

It was well answered, though others we mentioned Oestrogen instead of LH. This shows that they are not aware that oestrogen is not directly responsible for ovulation, rather, it stimulates the secretion of LH which causes tearing of graafian follicle, thus, causing ovulation.

- **Question 4.2.3 (Function of ovary – 1 mark)**

It was fairly answered, though some candidates confused production of ovum with the release of the ovum.

- **Question 4.2.4 (Function of amniotic fluid – 1 mark)**

The question was well answered by almost all the candidates.

- **Question 4.2.5 (Description of how acrosomes enables sperm penetration – 2 mark)** Majority of candidates got 1 mark because they only mentioned the presence of an enzyme without explaining how an enzyme assist the sperm to penetrate
- **Question 4.2.6 (Spermatogenesis – 1 mark)** The question was well answered. The only challenge was the incorrect spelling of the term asked.
- **Question 4.3 (Artificial Insemination – 7 marks)**
- **Question 4.3.1(Phase of the oestrus cycle – 1 mark)** Question was well answered though some candidates were explaining the oestrus stage and yet the question was looking for the name of the stage and not the explanation.
- **Question 4.3.2 (Methods to detect heat – 2 marks)** Well answered question as most candidates were able to mention the methods to detect heat. Some gave use thermometer as the answer since the question was talking to heat detection.
- **Question 4.3.3 (Characteristics of good quality semen – 2 marks)** Some candidates incorrectly sponsored yellowish as the answer and they lost a mark as yellowish and milky are not the same colour
- **Question 4.3.4 (Disadvantages of AI – 2 marks)** Majority of candidates were able to score marks in this question, though some were referring to the animal instead of the process, for example, cow may be old, other were giving advantages. This shows that , they did not read the question.
- **Question 4.4 (Graph on reproductive processes -7 marks)**
- **Question 4.4.1(Identification of a curve -1 mark)** Question was fairly answered by most candidates but some wrote milk production and lost a mark because the curve showing milk production is a lactation curve so candidates cannot differentiate milk production from a lactation curve.
- **Question 4.4.2 (reproductive processes from the graph -2 marks)** Candidates were able to identify pregnancy in A but failed to see the stage of pregnancy in B which is foetus and some extracted the information as it is in the graph, thus, describing what occurs during foetus stage.
- **Question 4.4.3 (Month when pregnancy ends – 1 mark)** The question was a data response question where candidates were expected to make use of the data provided to answer the question as a result, they could not answer what was asked, some referred to 12 months instead of month 12. They did not realise that 12 months and month 12 is not the same thing. Others were giving 9 months which is the normal duration of pregnancy and yet in the graph gestation ends in month 12.
- **Question 4.4.4 (Causes of abortion- 2 marks)** Candidates confused causes of abortion with pregnancy problems , hence the gave responses like , maceration , mummification etc.
- **Question 4.4.5 (Reason for dry period – 1 mark)** Question was well answered by candidates but some were talking of production of fresh milk as a reason for drying off period without relating it to the preparation of the next lactation.

- **Question 4.5 (Techniques in reproduction – 8 marks)**

- **Question 4.5.1 (Names of the reproductive techniques – 3 marks)** Candidates displayed a mis-understanding between the techniques and the processes within the techniques. They confused ET as a technique with Embryo flushing which is the process within the technique and also nuclear transfer/cloning with Enucleation which is a process performed during cloning. Some candidates are still writing synchronisation without oestrus, resulting in the loss of a mark because synchronisation alone is too general. This is of a great concern because this was addressed in the previous reports.
- **Question 4.5.2 (Hormones used in synchronisation – 2 marks)** Majority of candidates scored full marks in this question but some are giving a device(CIDR) which is used to release a hormone instead of giving the hormone as the question requires.
- **Question 4.5.3 (Female hormones involved during ET – 2 marks)** Well answered by majority of candidates but others are not aware that a donor and superior or inferior/recipient is the same thing. They lost a mark because they were writing donor and superior as separate answers.

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

(a) Learners should be drilled and assessed regularly on interpretation of the data presented in the form of graphs, pictures and diagrams, because in 4.4, answers were available in the graph but leaners failed to interprete and come up with correct answers.

(b) Standardised formal tasks should be prepared in order to raise the level of questioning and to train candidates to be ready in answering questions such as those in question 4 that need reasoning and application.

(c) Animal reproduction section should be taught using diagrams and charts or the slides from ASAAE for enrichment and enhancement.

(d) Subject terminology is of utmost importance and needs to be taught, assessed and revised topic by topic.

(e) Learners must be prepared on how to learn the different reproductive processes following the correct sequential order.

(f) When presenting, teachers should not separate oestrus cycle with hormonal control and hormonal levels and they must always use graphics and diagrams to enhance learning.

(g) In the teaching of the reproductive processes, candidates should be taught that anything that is visible is what can be seen in a real-life situation. Teachers are therefore encouraged to make arrangements with institutions where these processes are practised so that candidates can observe them.

(h) In presenting the oestrus cycle, synchronization of oestrus cycle, artificial insemination, stages of pregnancy, embryo transfer, parturition and other reproductive processes, teachers should use flow diagrams, projections and schematic representations to identify key characteristics, hormones and processes as indicated in 2017.

(i) Teachers must assist their learners on how to differentiate between two types of multiple births (twins).

(j) Candidates must be drilled through assessment tasks to adhere to instructions.

(e) Describe any other specific observations relating to responses of candidates and comments that are useful to teachers, subject advisors, teacher development etc.

(a) Lack of interpretation skill when it comes to graphs.

(b) Lack of using scientific language especially with regard to subject terminology, for example, synchronization instead of oestrus synchronization

(c) Lack of understanding of processes, terms and concepts involved in reproduction such ET; AI; cloning; ovulation etc.

(d) Lack of understanding words that have the same meaning such as donor/superior or inferior/recipient/surrogate

(e) Differentiation between causes of abortion and problems of pregnancy

(f) Lack of knowledge when question hormones and devices used to apply hormone(question 4.5.2 where they gave a device CIDR instead of a hormone applied)

(g) Understanding what the question requires, for example, giving a description instead of a term

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2022

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages.

* A G R S E 1 *

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK.
3. Start EACH question on a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. You may use a non-programmable calculator.
6. Show ALL calculations, including formulae, where applicable.
7. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 B.

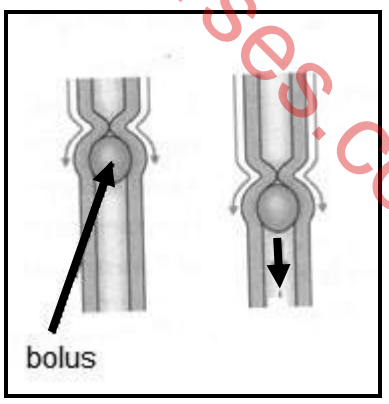
1.1.1 The compartment of the fowl's stomach that corresponds with the true stomach of a ruminant farm animal:

A Ventriculus
B Caecum
C Proventriculus
D Crop

1.1.2 ONE of the following statements applies to a ration that has 10 parts of maize meal and three parts of fishmeal:

A Has a higher percentage of fish meal than maize meal
B Has a higher percentage of maize meal than fish meal
C Has equal percentages of maize meal and fish meal
D Has 10% maize meal and 70% fish meal

1.1.3 The diagram below shows the process where each of the following occurs:



(i) The muscles above the bolus contract to push the food downwards.
(ii) The muscles below the bolus relax to move the food upwards.
(iii) The muscles constantly contract and relax to move the food down the oesophagus.
(iv) The muscles below the bolus relax to move the food downwards.

Choose the CORRECT combination:

A (i), (iii) and (iv)
B (ii), (iii) and (iv)
C (i), (ii) and (iv)
D (i), (ii) and (iii)

1.1.4 The following is the CORRECT sequence of the process of rumination:

A Re-swallowing → chewing → regurgitation → swallowing
B Regurgitation → ingestion → swallowing → chewing
C Ingestion → regurgitation → swallowing → re-swallowing
D Regurgitation → reinsalivation → re-chewing → re-swallowing

1.1.5 A facility used to restrain cattle during dehorning:

A Handling pen
B Holding shed
C Crush
D Weighbridge

1.1.6 The following is a sign of stress in cattle:

A Snout rubbing
B Pawing
C Belly nibbling
D Cannibalism

1.1.7 Diseases that are caused by mineral deficiencies:

A Infectious
B Contagious
C Notifiable
D Non-infectious

1.1.8 Parasites, especially in sheep, that are responsible for the irritation of the sinuses, causing sneezing and a discharge of a yellowish mucus:

A Nasal worms
B Blowflies
C Ticks
D Roundworms

1.1.9 The primary sex organ of a bull:

A Scrotum
B Testis
C Penis
D Urethra

1.1.10 … are female sex hormones responsible for the contraction of the uterine muscles.

A FSH and LH
B Oxytocin and FSH
C Oxytocin and oestrogen
D Oestrogen and progesterone (10 x 2) (20)

1.2 Indicate whether each of the descriptions in COLUMN B applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN A. Write **A only**, **B only**, **both A and B** or **none** next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 B only.

COLUMN A			COLUMN B
1.2.1	A:	Rectum	The enlarged first part of the large intestine in pigs where absorption of water occurs
	B:	Caecum	
1.2.2	A:	Pearson square	Method of balancing the rations to determine the required protein value in a feed mixture
	B:	Feed square	
1.2.3	A:	Large-scale production system	A farming system that produces food, mainly to feed the family
	B:	Modern farming system	
1.2.4	A:	Ointments	Chemicals that kill ticks and mites
	B:	Anthelmintics	
1.2.5	A:	Artificial vagina	Apparatus used in the process of collecting semen from a bull
	B:	Electro-ejaculator	

(5 x 2) (10)

1.3 Give ONE word/term for EACH of the following descriptions. Write only the word/term next to the question numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

1.3.1 The absorption of volatile fatty acids along the concentration gradient through the rumen wall

1.3.2 A preventative measure whereby farm animals with a contagious disease are kept away from healthy animals

1.3.3 The hormone which inhibits milk ejection when a cow is in a scary and unusual situation

1.3.4 A milky, sticky, creamy and opaque liquid released through the penis during ejaculation

1.3.5 A thin-walled elastic tube that extends from the urethral opening to the vulva (5 x 2) (10)

1.4 Change the UNDERLINED WORD(S) in EACH of the following statements to make them TRUE. Write only the answer next to the question numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

1.4.1 Proper protein supplies the required amount and proportion of all amino acids.

1.4.2 An elastrator is a castration tool used in farm animals and causes bleeding.

1.4.3 The allantois is the outer germ layer from which the external organs, mainly the skin, hooves and hair, develop.

1.4.4 Artificial insemination takes place when the bull is allowed to mount and service a cow.

1.4.5 Meiosis is the division of diploid spermatogonium to become larger.

(5 x 1) (5)

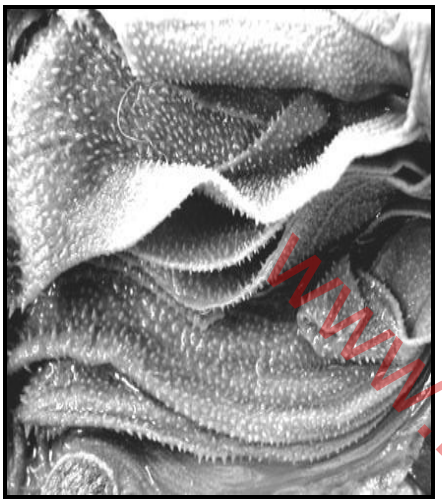
TOTAL SECTION A: 45

SECTION B

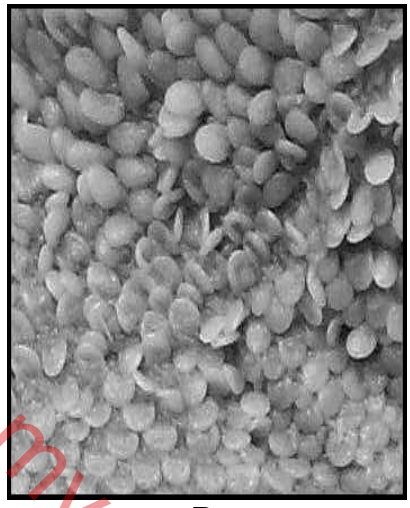
QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

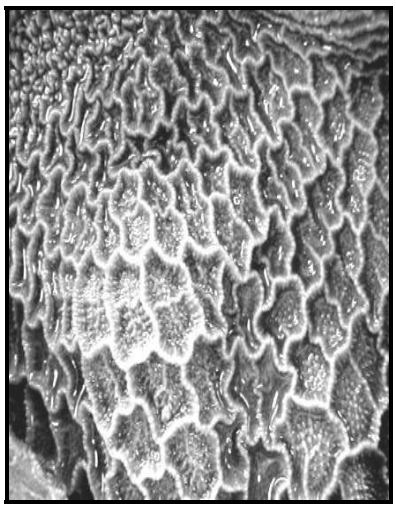
2.1 The pictures below show the parts of the stomach in a farm animal.



A



B



C

2.1.1 Name the farm animal with the stomach parts represented in the pictures above. (1)

2.1.2 Identify the letter of the stomach part where EACH of the following occurs:

(a) Foreign objects accumulate (1)

(b) Heat is produced (1)

2.1.3 The farm animal with stomach parts **A**, **B** and **C** above can survive on feed low in fat soluble vitamins. Justify this statement by indicating the adaptation feature and its role. (2)

2.1.4 Use the letters of the stomach parts to indicate the sequence with which the feed will flow after regurgitation. (3)

2.2 The following are the symptoms of nutrient deficiencies in farm animals:

A Deformation and ulceration of the cornea in the eye
B Porous bones, especially in older animals
C Bad sores on the skin
D Paleness of the mucous membrane
E Enlarged thyroid gland

2.2.1 Identify the mineral that is deficient in **C** and **D**. (2)

2.2.2 Name the deficiency symptoms shown by the farm animals in **B** and **E**. (2)

2.2.3 Classify the vitamin that causes the deficiency in **A** according to its grouping. (1)

2.2.4 State TWO methods of supplementing the vitamin that is deficient in **A**. (2)

2.3 The table below shows the results of a digestibility coefficiency trial conducted with two different farm animals that consumed wheat straw.

ANIMAL	DRY MATTER INTAKE (kg)	DRY MATTER EXCRETED (kg)	DIGESTIBILITY COEFFICIENCY (%)
A	15	13	13
B	15	5	67

2.3.1 Identify the type of farm animal used as **A**. (1)

2.3.2 Give a reason for the answer to QUESTION 2.3.1. (1)

2.3.3 Suggest TWO factors that might have influenced the digestibility of the feed used in the trial. (2)

2.3.4 State TWO methods of improving the digestibility of this feed. (2)

2.4 The information below shows the composition of a feed.

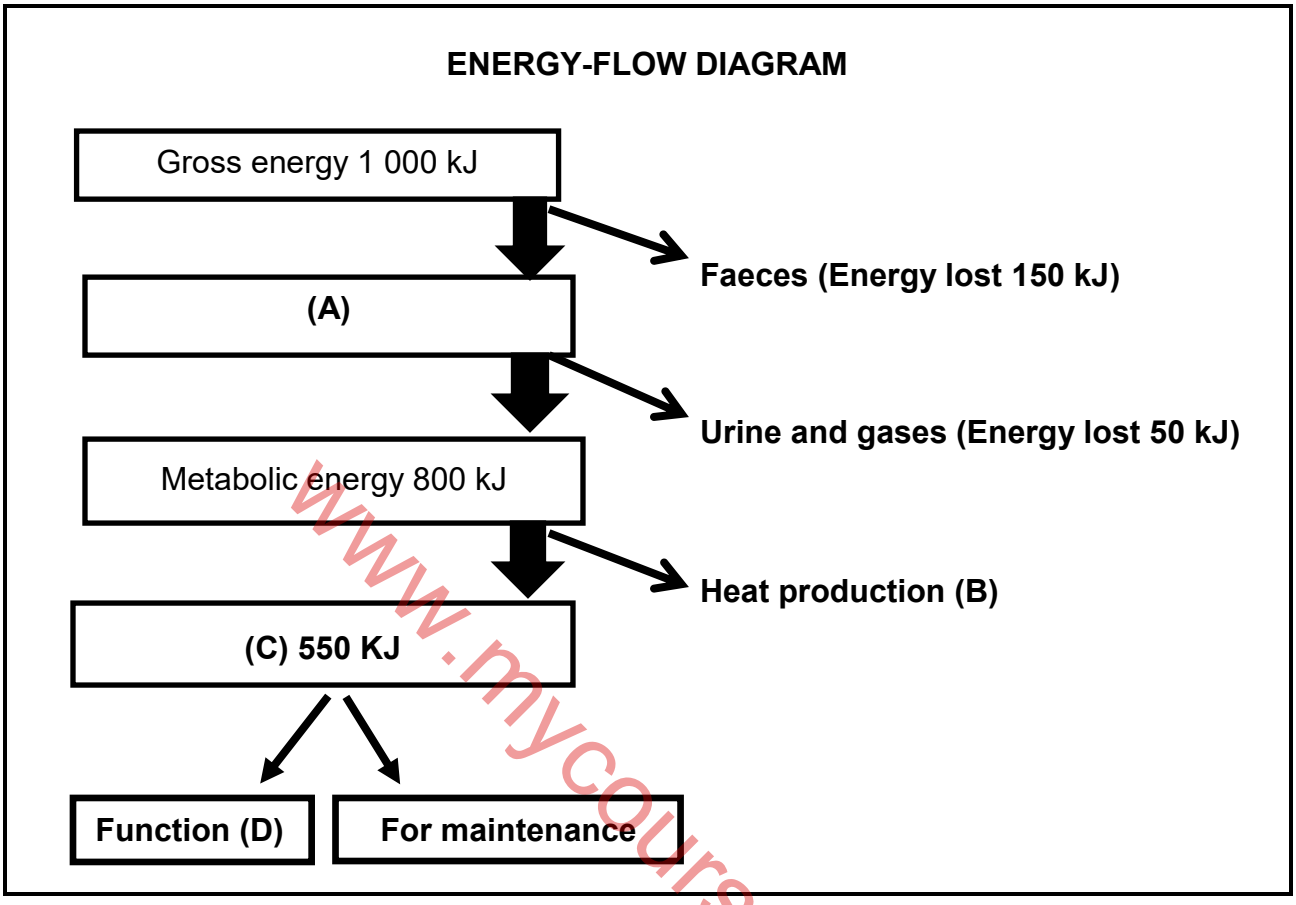
COMPOSITION OF A FEED	PERCENTAGE
Carbohydrates	55
Digestible protein (DP)	15
Fats	5
Total digestible nutrients (TDN)	–

2.4.1 Calculate the nutritive ratio (NR) of the feed. Show ALL calculations, including the formula. (4)

2.4.2 Indicate the suitability of the feed based on the nutritive ratio in QUESTION 2.4.1. (1)

2.4.3 Give a reason for the answer to QUESTION 2.4.2. (1)

2.5 The illustration below is a schematic representation of energy flow.



2.5.1 Name the energy in **C**. (1)

2.5.2 Give the function represented by **D**. (1)

2.5.3 Calculate the following based on the schematic representation above:

(a) Energy in **A** (2)

(b) The amount of energy lost in **B** (2)

2.5.4 State TWO aims of calculating the energy value of a feed. (2)
[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The table below shows expected growth rates of farm animals as the temperature changes.

GROWTH RATE (kg)		TEMPERATURE (°C)
COWS	PIGS	
110	130	35
100	90	25
90	50	15
80	25	5
70	5	0

3.1.1 Identify, in the table above, the farm animals that need to be kept in an environment with housing facilities. (1)

3.1.2 Give a reason, using data from the table above, to support the answer to QUESTION 3.1.1. (2)

3.1.3 Draw a line graph to compare the growth rate of cows and pigs under different temperatures. (6)

3.2 The following is a list of equipment used in a broiler production unit:

- Foldable curtains
- Electric heaters
- Fans on the roof and walls
- Insulation material on the roof

3.2.1 Indicate the equipment in the list above that is used for EACH of the following situations:

(a) Keeping the temperature inside the broiler unit constant day and night (1)

(b) Increasing the temperature inside during a sudden drop in environmental temperature (1)

(c) Reducing the temperature on a very hot day (1)

3.3 The pictures below show different intensive chicken production systems.

A

B

3.3.1 Identify the type of intensive chicken production system in **A** and **B**. (2)

3.3.2 State TWO factors leading to increased production in the production systems above, other than nutrition. (2)

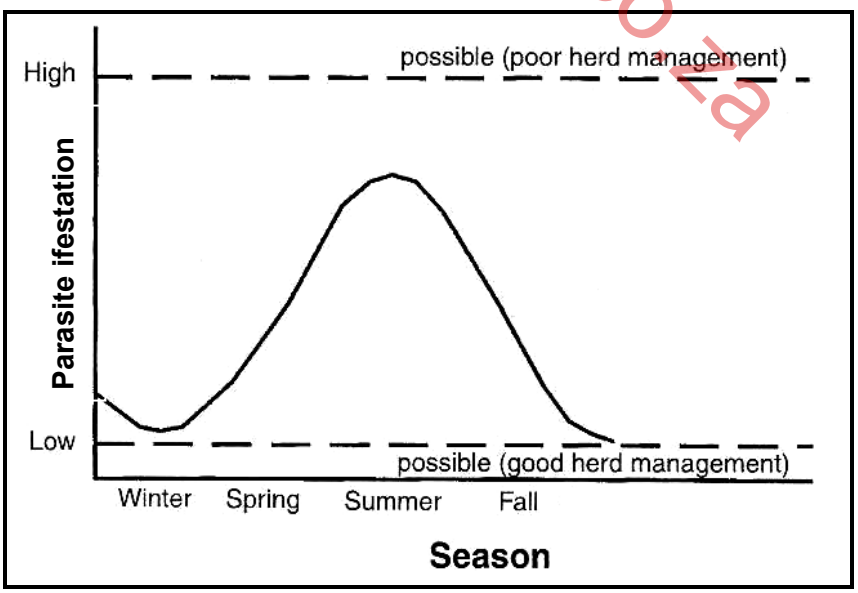
3.4 Name the farm animals to which the following basic guidelines apply when they are handled:

3.4.1 Carry them by both legs (1)

3.4.2 Catch them above the joint of the hind legs (1)

3.4.3 Use a plywood board when moving them (1)

3.5 The graph below indicates the seasonal trends in the occurrence of parasites that vary with regard to season and management.



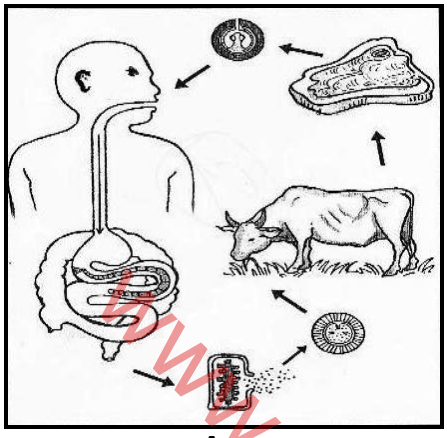
3.5.1 Identify the season with the highest parasite infestation. (1)

3.5.2 Give ONE possible reason for the increase in the parasite infestation during the season identified in QUESTION 3.5.1. (1)

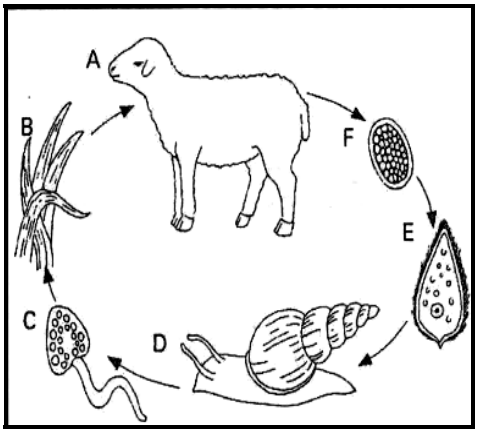
3.5.3 State TWO economic impacts of parasites. (2)

3.5.4 State TWO good herd management practices that could have led to a lower parasite infestation during the autumn months. (2)

3.6 The diagrams below illustrate the life cycle of two different parasites.



A



B

3.6.1 Classify the parasite in **B**. (1)

3.6.2 Name the parasites that are represented in **A** and **B**. (2)

3.6.3 State TWO biological measures that can be used to control the parasite in **B**. (2)

3.7 The table below shows different symptoms of diseases affecting farm animals.

ANIMAL 1	ANIMAL 2
Bleeds from the mouth, nose and anus	Urinates dark red urine, has pale to yellow eyes and later diagnosed with anaemia

3.7.1 Name the diseases affecting animal **1** and animal **2** respectively. (2)

3.7.2 Identify the animal suffering from a deadly bacterial disease. (1)

3.7.3 Indicate the animal with a non-infectious disease. (1)

3.7.4 Name the specific vector responsible for the transmission of the disease in animal **2**. (1)

[35]

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 Match the following accessory sex glands with the descriptions below:

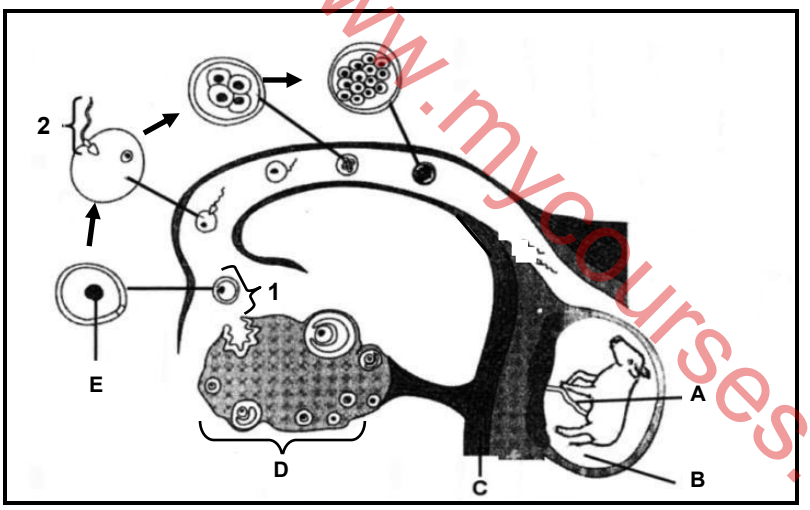
Cowper's glands; prostate; seminal vesicles

4.1.1 Surrounds the urethra at the neck of the bladder (1)

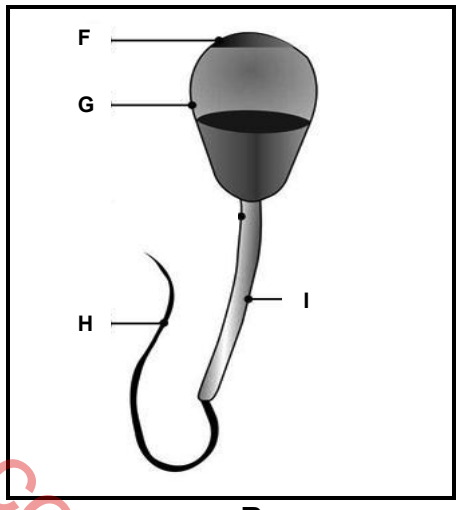
4.1.2 Located at the base of the penis on either side of the urethra and secrete an alkaline fluid that cleans the urethra (1)

4.1.3 Secretes a sticky yellowish fluid that provides energy to the sperm cells (1)

4.2 The pictures below illustrate a part of the reproductive system and a gamete.



A



B

4.2.1 Identify the following:

(a) Part **I** in picture **B** (1)

(b) Part **H** in picture **B** (1)

(c) The process taking place in **1** (1)

(d) The process taking place in **2** (1)

4.2.2 Indicate the hormone responsible for the process in **1** to take place. (1)

4.2.3 State ONE function of structure **D**. (1)

4.2.4 State ONE function of fluid **B** in picture **A**. (1)

4.2.5 Describe how part **F** enables the cell in picture **B** to penetrate the ovum. (2)

4.2.6 Name the process that leads to the formation of the cell in picture **B**. (1)

4.3 Artificial insemination (AI) improves the conception rate in cows. To achieve the expected objective, the farmer needs to observe the signs of oestrus in order to detect heat.

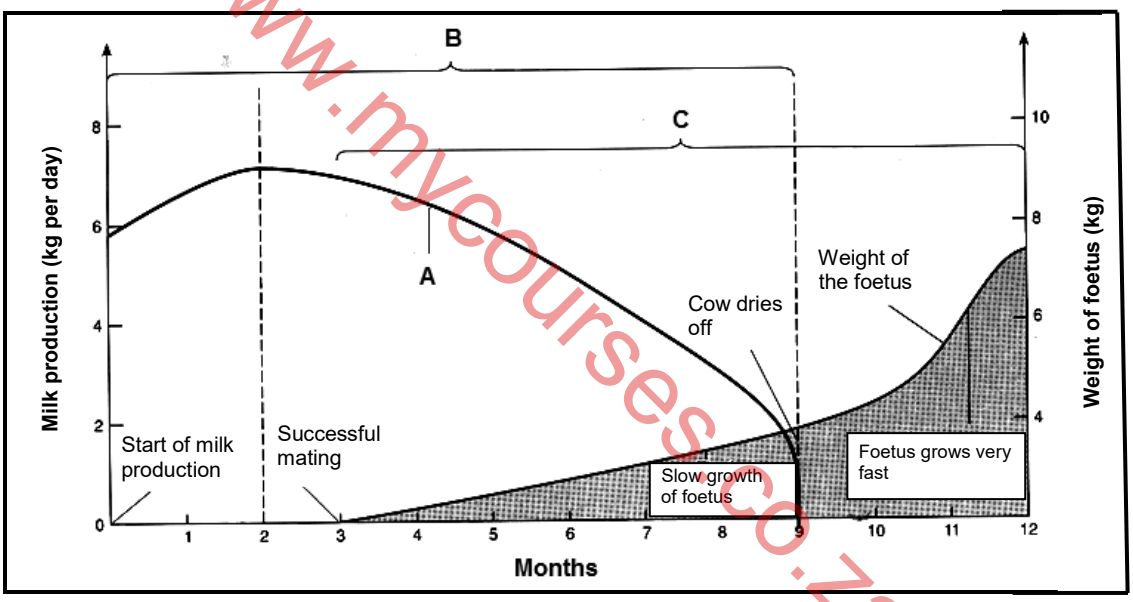
4.3.1 Name the phase of the oestrus cycle during which artificial insemination could be performed. (1)

4.3.2 State TWO methods that dairy farmers could use to detect heat in cows. (2)

4.3.3 State TWO characteristics of good quality semen. (2)

4.3.4 State TWO disadvantages of artificial insemination. (2)

4.4 The graph below shows different reproductive processes that occur in dairy cows.



4.4.1 Identify curve **A**. (1)

4.4.2 Deduce the following from the graph above:

(a) The reproductive process from month 3 to 12 (1)

(b) The stage of the process in QUESTION 4.4.2(a) between month 9 and 12 (1)

4.4.3 Identify the month when the reproductive process in QUESTION 4.4.2(a) normally ends. (1)

4.4.4 Name TWO causes of abortion. (2)

4.4.5 Give a reason why it is necessary for pregnant lactating cows to dry off before the next lactation. (1)

4.5 The table below represents three different techniques used in animal reproduction.

1	2	3
Cows are treated with hormones to come into oestrus at approximately the same time.	As many as possible embryos are taken from selected female animals after fertilisation.	The nucleus of a cell is removed and placed into another prepared egg cell.

4.5.1 Name the reproductive techniques numbered **1**, **2** and **3**. (3)

4.5.2 Name TWO hormones that are used in technique **1** to achieve the intended results. (2)

4.5.3 Name TWO female animals involved in technique **2**. (2)

4.5.4 State the aim of technique **3**. (1)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2022

MARKING GUIDELINES

MARKS: 150

SM Gcwensa
Umalusi
4/12/2022

TA Tshabang
Umalusi
4/12/2022

DN Mathobo
Umalusi
4/12/2022

RA Seloane
Internal moderator
4/12/2022

JN Mokhantso
Internal moderator
4/12/2022

These marking guidelines consists of 11 pages

SECTION A

QUESTION 1

1.1	1.1.1	C ✓✓		
	1.1.2	B ✓✓		
	1.1.3	A ✓✓		
	1.1.4	D ✓✓		
	1.1.5	C ✓✓		
	1.1.6	B ✓✓		
	1.1.7	D ✓✓		
	1.1.8	A ✓✓		
	1.1.9	B ✓✓		
	1.1.10	C ✓✓	(10 x 2)	(20)
1.2	1.2.1	B only ✓✓		
	1.2.2	A only ✓✓		
	1.2.3	None ✓✓		
	1.2.4	None ✓✓		
	1.2.5	Both A and B ✓✓	(5 x 2)	(10)
1.3	1.3.1	Passive absorption/diffusion ✓✓		
	1.3.2	Quarantine/isolation ✓✓		
	1.3.3	Adrenalin ✓✓		
	1.3.4	Semen ✓✓		
	1.3.5	Vagina ✓✓	(5 x 2)	(10)
1.4	1.4.1	Ideal/complete/egg ✓		
	1.4.2	Knife/scalpel ✓		
	1.4.3	Ectoderm ✓		
	1.4.4	Mating/copulation ✓		
	1.4.5	Mitosis ✓	(5 x 1)	(5)
			TOTAL SECTION A:	**45**

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 Stomach compartments in farm animal

2.1.1 Naming the farm animal
Cattle/sheep/goat ✓ (1)

2.1.2 Identification of the letter
(a) C ✓ (1)
(b) B ✓ (1)

2.1.3 Justification of animal surviving on food poor in vitamins
Stomach has rumen micro-organisms ✓ that can synthesise vitamins ✓ (2)

2.1.4 Letters indicating the sequence of feed flow
B ✓ → C ✓ → A ✓ (3)

2.2 Nutrient deficiencies

2.2.1 Identification of the mineral deficient in
C - Zinc/Zn ✓ (1)
D - Iron/Fe ✓ (1)

2.2.2 Naming of the deficiency symptoms
B - Osteomalacia/porous bones ✓ (1)
E - Goitre/enlarged thyroid gland ✓ (1)

2.2.3 Classification of vitamin A
Fat-soluble vitamin ✓ (1)

2.2.4 TWO methods of supplementing vitamin deficiency in A
- Injection ✓
- Dosing/water based vitamin A mixed with drinking water ✓
- Supplementing the ration ✓ (Any 2) (2)

2.3 Digestibility co-efficiency trial

2.3.1 Type of farm animal
Animal A - Non-ruminant/monogastric farm animal ✓ (1)

2.3.2 Reason
Feed is less digested/low digestibility co-efficient/stomach of the animal is not adaptable to digest crude fibre/simple stomach/13%/2 kg of the feed was digested and 87%/13 kg was excreted ✓ (1)

2.3.3 **TWO factors that have influenced digestibility of feed**

- Type/composition of feed ✓
- Type of animal ✓
- Individuality ✓
- Preparation of the feed ✓
- Age of the animal ✓
- Age of the plant ✓
- Quantity of feed consumed ✓ (Any 2) (2)

2.3.4 **TWO methods of improving digestibility of wheat straw**

- Pelleting ✓
- Supplementing/mixing with additives/molasses/urea/ ammonification ✓
- Grinding ✓ (Any 2) (2)

2.4 **Composition of a feed**

2.4.1 **Calculation of the nutritive ratio**

TDN = 55%+15%+5% = 75% ✓

NR = 1: $\frac{\%TDN - \%DP}{\%DP}$ ✓

NR = 1: $\frac{75\% - 15\%}{15\%}$ ✓

NR = 1:4 ✓

OR

DNNS = 75% – 15% = 60% ✓

NR = 1: $\frac{\%DNNS}{\%DP}$ ✓

NR = 1: $\frac{60\%}{15\%}$ ✓

NR = 1:4 ✓ (4)

2.4.2 **Suitability of feed**

Suitable for growth/production/reproduction ✓ (1)

2.4.3 **Reason**

High in protein/has a narrow nutritive ratio/less than 1:6 ✓ (1)

2.5 **Energy flow**

2.5.1 **Name of the energy in C**

Net energy/NE ✓ (1)

2.5.2 **Function of energy represented by D**

Production/growth/reproduction/work ✓ (1)

2.5.3 **Calculation of digestible energy and energy lost through heat**

(a) **Calculation of digestible energy**
Gross energy – energy lost in faeces
= 1000 kJ – 150 kJ ✓
= 850 kJ ✓ (2)

(b) **Calculation of amount of energy lost through heat**
Metabolic energy – net energy
= 800 kJ – 550 kJ ✓
= 250 kJ ✓ (2)

2.5.4 **TWO aims of calculating the energy value of the feed**
- To determine the animal's diet ✓
- To determine the feeding standards ✓
- To determine the ration formulation ✓ (Any 2) (2)

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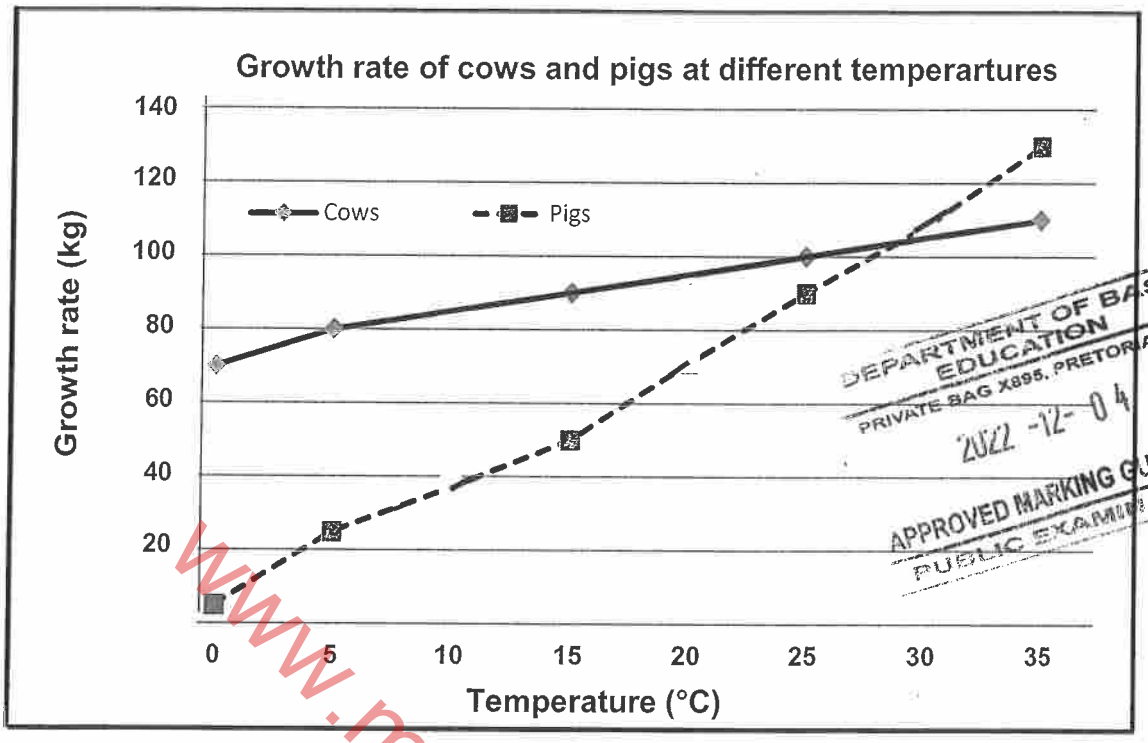
QUESTION 3 : ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 **Temperature ranges and the expected growth rates**

3.1.1 **Identification of animals that need an environment with housing facilities -** Pigs ✓ (1)

3.1.2 **Reason**
- Growth rate shows a substantial decrease✓ with a slight decrease in temperature ✓
- Growth rate shows a substantial increase ✓ with a slight increase in temperature ✓ (Any 1) (2)

3.1.3 **Line graph**



CRITERIA/RUBRIC/MARKING GUIDELINES

- Correct heading ✓
- X-axis: Correctly calibrated and labelled (Temperature) ✓
- Y-axis: Correctly calibrated and labelled (Growth rate) ✓
- Line graph ✓
- Correct units (kg and °C) ✓
- Accuracy (80%+ correctly plotted) ✓ (6)

3.2 **Equipment in a broiler production unit**

3.2.1 **Indication of equipment**

(a) Insulation material on the roof ✓ (1)
(b) Electric heaters ✓ (1)
(c) Fans on the roof and walls/foldable curtains ✓ (1)

3.3 **Types of intensive chicken production systems**

3.3.1 **Identification of the types of intensive chicken production systems**

PICTURE A - Free range ✓ (1)
PICTURE B - Backyard ✓ (1)

3.3.2 **TWO factors leading to increased production other than nutrition**

- Environment ✓
- Reproduction/breeding ✓
- General enterprise management ✓ (Any 2) (2)

3.4 **Type of animal handled**

3.4.1 Chicken/poultry/fowl ✓ (1)

3.4.2 Sheep/goat ✓ (1)

3.4.3 Pigs ✓ (1)

3.5 **Seasonal trends of parasite infestation**

3.5.1 **Identification of the season**
Summer ✓ (1)

3.5.2 **ONE possible reason for the higher parasite infestation**
- Conducive environmental conditions for parasites to breed ✓
- Poor herd management ✓ (Any 1) (1)

3.5.3 **TWO economic impacts of parasites**
- Stock losses ✓
- Loss of production/reproduction ✓
- Degrading of carcasses ✓
- Increased production costs ✓
- Loss of income/profit ✓ (Any 2) (2)

3.5.4 **TWO good herd management practices**
- Adequate feeding ✓
- Well planned health programme/chemical/biological control ✓
- Avoiding breeding places of parasites/wet areas ✓
- Practice rotational grazing ✓
- Avoid keeping animals in infested pens ✓
- Good clean/hygienic practices ✓
- Creating an environment for natural enemies ✓
- Using/selecting/breeding more resistant animals ✓
- Burning of veld and pasture fields ✓ (Any 2) (2)

3.6 **The life cycle of two different parasites**

3.6.1 **Classification of the parasite in DIAGRAM B**
Internal/endo parasite ✓ (1)

3.6.2 **Naming the parasites that are represented by**
DIAGRAM A - Tapeworm ✓ (1)
DIAGRAM B - Liver fluke/fluke worm ✓ (1)

3.6.3 **TWO biological measures of controlling liver fluke**
- Creating an environment for natural enemies ✓
- Introduction of dung beetles/micro-fungi ✓
- Breeding parasite resistant animals ✓ (Any 2) (2)

3.7 **Different symptoms of diseases that affect farm animals**

3.7.1 **Indication of diseases**
ANIMAL 1 - Anthrax ✓ (1)
ANIMAL 2 - Red water ✓ (1)

3.7.2 **Identification of the animal**
Animal 1 ✓ (1)

3.7.3 **Indication of the animal with non-infectious disease**
Animal 2 ✓ (1)

3.7.4 **Name of the vector**
Blue tick ✓ (1)
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QUESTION 4: ANIMAL REPRODUCTION

4.1 **The accessory sex glands**

4.1.1 Prostate ✓ (1)

4.1.2 Cowper's glands ✓ (1)

4.1.3 Seminal vesicle ✓ (1)

4.2 **Part of the reproductive system**

4.2.1 **Identify the following**
(a) Part I - Mid piece ✓ (1)
(b) Part H - Tail ✓ (1)
(c) Process taking place in 1 - Ovulation ✓ (1)
(d) Process taking place in 2 - Fertilization ✓ (1)

4.2.2 **The hormone responsible for the process in 1 to take place**
Luteinizing hormone/LH ✓ (1)

4.2.3 **ONE function of structure D**
- Produce female gametes/egg cells/ova/oogenesis/ ovigenesis ✓
- To produce female sex hormones ✓ (Any 1) (1)

4.2.4 **ONE function of fluid in B**
- Protects the embryo from injuries/shock absorber ✓
- Hydration/prevents dehydration/drying out of the foetus ✓
- Lubricates the birth canal during parturition ✓
- Thermo regulation ✓
- Prevents the embryo to attach to other tissues ✓ (Any 1) (1)

4.2.5 **Description of how the acrosome enables sperm penetration**
Part F - Releases an enzyme ✓ that break the egg wall for the sperm cell to enter ✓ (2)

4.2.6 **The process that leads to formation of the sperm cell**
Spermatogenesis ✓ (1)

4.3 **Artificial Insemination (AI)**

4.3.1 **The phase of oestrus during which AI could be performed**
Oestrus/met-oestrus ✓ (1)

4.3.2 **TWO methods to detect heat in cows**
- Chin ball marker ✓
- Tail chalking ✓
- Heat mount/watching detectors
- Heat observation ✓
- Pedometer ✓
- Good record keeping ✓
- The use of teaser animals ✓ (Any 2) (2)

4.3.3 **TWO characteristics of good quality semen**
- Opaque/milky in colour ✓
- Sticky ✓
- Less than 15% dead sperm cells ✓
- No deformed sperm cells/deformities ✓
- No blood in semen ✓
- Healthy sperm cells ✓
- Viable sperm cells ✓
- High concentration of sperm cells ✓ (Any 2) (2)

4.3.4 **TWO disadvantages of AI**
- Spread of diseases if semen is not tested ✓
- Inexperience/unskilled operator may cause damage ✓
- Decreased genetic variation ✓
- Some heifers are difficult to inseminate successfully ✓
- May not give the desirable results ✓
- Higher management demands ✓
- Undesirable traits/congenital defects may be transferred to more offspring ✓
- Labour intensive ✓
- Time consuming ✓
- Expensive procedure ✓
- Difficult under extensive production systems ✓ (Any 2) (2)

4.4 **The different reproductive processes that occur in a dairy cow**

4.4.1 **Identification of curve A**
Lactation curve ✓ (1)

4.4.2 **Indication of the reproductive process and pregnancy stage**
(a) **Months 3 to 12 -** Pregnancy/gestation ✓ (1)
(b) **Stage of the process -** Foetal stage ✓ (1)

4.4.3 **Identification of the month**
Month 12 ✓ (1)

4.4.4 **TWO causes of abortion**
- Malnutrition ✓
- Injuries ✓
- Hormonal disturbances/stress conditions ✓
- Toxins/poisonous substances/laxatives/allergies/ clovers high in oestrogen/immunization of pregnant animals ✓
- Diseases/infections/high fever ✓
- Multiple births ✓
- Genetic factors ✓
- Transportation/moving of pregnant animals ✓
- Embryo abnormalities ✓ (Any 2) (2)

4.4.5 **Reason for drying off pregnant lactating cows before the next lactation**
- For tissues in the mammary gland to recover ✓
- To store body reserves/to prepare for the next lactation ✓
- Supply the foetus with nutrients ✓ (Any 1) (1)

4.5 **Different techniques used in animal reproduction**

4.5.1 **Reproductive techniques**
- **1 -** Synchronization of oestrus ✓ (1)
- **2 -** Embryo transfer/ET ✓ (1)
- **3 -** Cloning/nuclear transfer ✓ (1)

4.5.2 **TWO hormones used in technique 1**
- Prostaglandin ✓
- Gonadotropin-releasing hormone (GnRH) ✓
- Progestin (synthetic progesterone) ✓
- Oestradiol ✓
- MGA/Melengestrol acetate ✓ (Any 2) (2)

4.5.3 **Naming the two female animals in technique 2**
- Donor/superior cow ✓
- Recipient/inferior/surrogate cow ✓ (2)

4.5.4 **The aim of cloning**

- To preserve/revive endangered species ✓
- Rapid increase of animals with superior genetic traits ✓
- For medical reasons ✓
- To preserve and extend superior genes ✓
- To create a replica/genetically identical organisms ✓ (Any 1) (1)

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TOTAL SECTION B: 105
GRAND TOTAL: 150