



EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE

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REPUBLIC OF SOUTH AFRICA, Website: www.ecdoe.gov.za

2020 NSC CHIEF MARKER'S REPORT

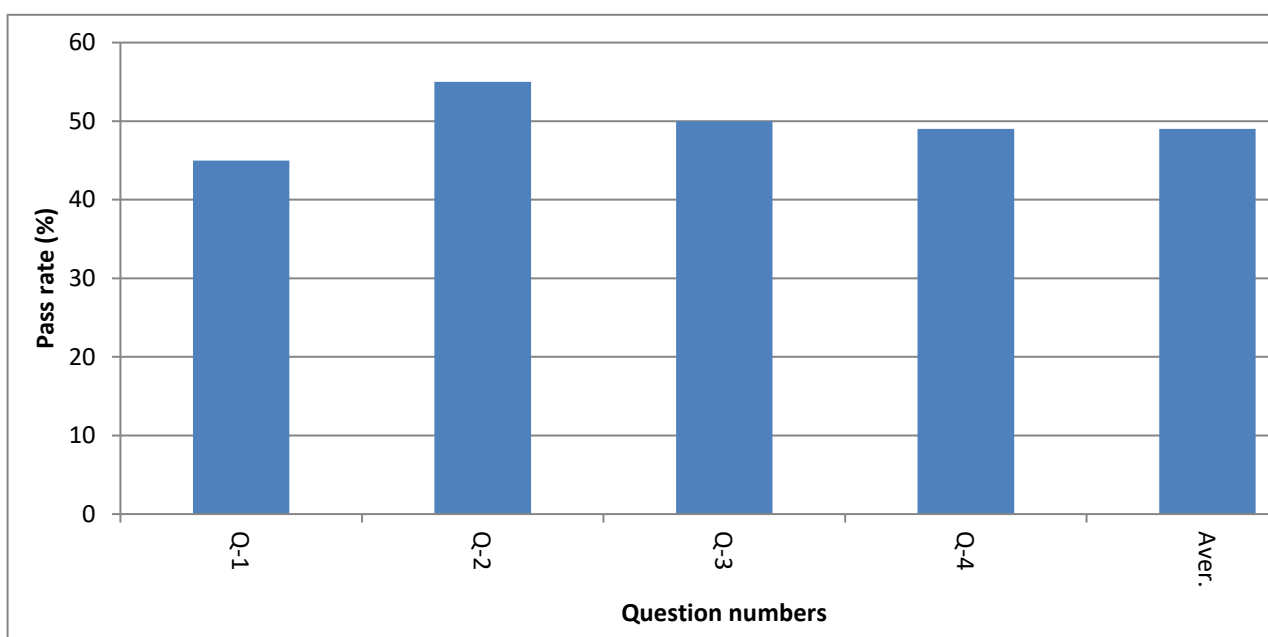
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|---------------------------|------------------------------|
| SUBJECT: | AGRICULTURAL SCIENCES |
| PAPER: | 1 |
| DURATION OF PAPER: | 2½ hours |

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

| | | | |
|---|--------------------|----------------------------|------------------------------|
| Average mark from the 7-point scale for the whole paper: | | 68 out of 150 marks | |
| TOPIC OR ASPECT TESTED | LOWEST MARK | HIGHEST MARK | AVERAGE % FROM SAMPLE |
| <ul style="list-style-type: none">• Animal Nutrition• Animal Production Protection and Control• Animal Reproduction | 07 | 138 | 58,0% |
| <p>Statistical analysis derived from Rasch for Agricultural Sciences P1 and the 7-point scale in the Eastern Cape indicates that performance in the paper might have improved this year compared to 2019. The 7-point scale has shown an improvement of candidates' average performance from 55% in 2019 to 58% in 2020, and the quality has also improved as there is a slight increase from levels 4 to 7. The question where candidates performed the best was question 2, followed by question 3 and 4. Candidates performed worst on Question 1 in 2020 with the least average performance of 45%.</p> | | | |

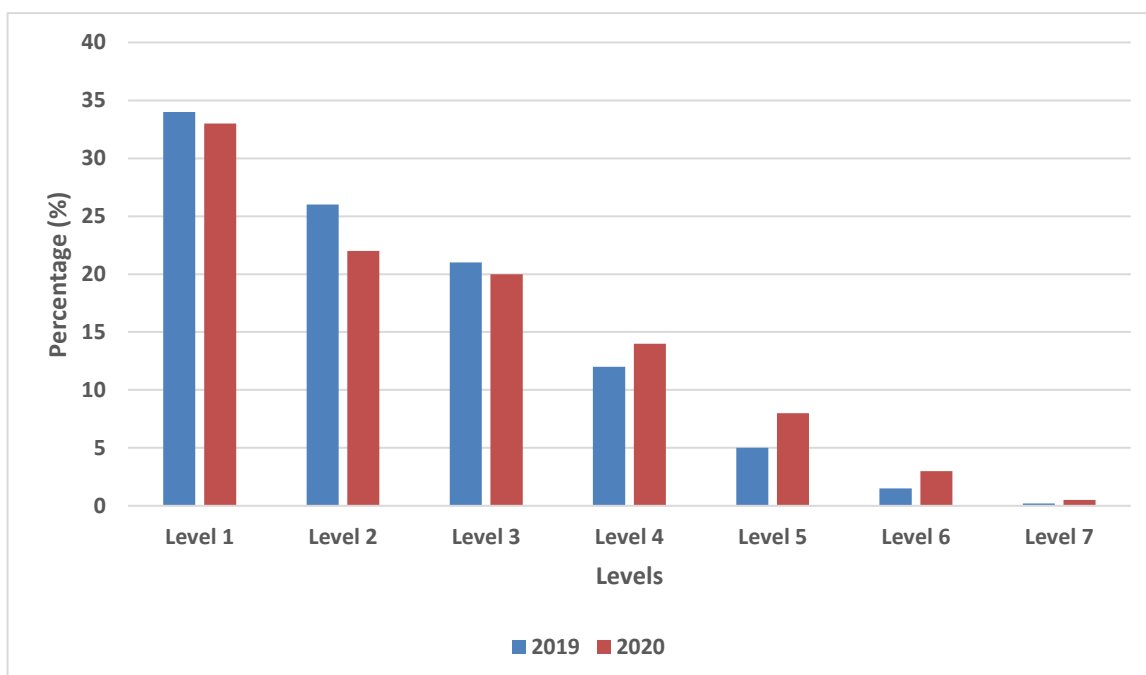
The bar graph below shows general overview of learner performance per question as represented in the sample of 100 scripts.

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 |

Figure 2: Performance according to levels as depicted by the 7 point scale for 2019 and 2020



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 candidates in the specific question. Was the question well answered or poorly answered? | | | |
| Average mark from the sample of 100 for question 1: | | 19 out of 45 marks | |
| TOPIC OR ASPECT TESTED | LOWEST MARK | HIGHEST MARK | AVERAGE % FROM SAMPLE |
| <ul style="list-style-type: none"> Animal Nutrition Animal Production Protection and Control Animal Reproduction | 0 | 45 | 45,0% |
| <p>The 2020 cohort of grade 12 candidates dropped in question 1 performance as compared to 2019. There was a slight improvement in performance for questions 1.2 and 1.3 (terminology) which usually pose problems for candidates, but poor performance was noted in questions 1.1 and 1.4. Many candidates seemed to be better prepared in terminology hence a slight improvement in questions 1.2 and 1.3. The highest mark scored in this question was 45 marks with the lowest being 0. Questions 1.1.1; 1.1.2; 1.1.3; 1.1.5; 1.1.7; 1.1.8; 1.1.9; 1.1.10; 1.2.1; 1.2.3; 1.2.4; 1.3.1; 1.3.3; 1.3.4; 1.3.5; 1.4.1; 1.4.2; 1.4.3; 1.4.4 and 1.4.5 troubled a lot of candidates and were the worst performed in Section A.</p> | | | |
| (b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by candidates in this question, and any misconceptions. | | | |
| <p>QUESTIONS 1.1 (Multiple choice – 20 marks)</p> <ul style="list-style-type: none"> This was the subquestion where most candidates performed poorly with an average of 44%. Candidates' responses in Q1.1.1 displayed that there is still a challenge for some in the mastering of subject language. The trick of the question was not the protein supplement but the adjective 'cost-effective', hence this question went above the heads of about 60% of candidates. They failed to analyse the question as it required a cost-effective protein supplement and many opted for any other protein feeds in the question and not urea. Poor performance in 1.1.2 clearly indicated that there is still a challenge with the deficiency symptoms of the different nutrient components of feeds because most candidates did not know that keratomalacia is a deficiency caused by a lack of vitamin A. Instead, they chose calcium, showing that they are confusing Keratomalacia with Osteomalacia. Question 1.1.3 tested the candidates' knowledge of the adaptation small intestines to effectively absorb the nutrients. Disappointingly, most candidates selected an incorrect combination because they could not link the long length of the small intestines with increased surface area for absorption. Question 1.1.5 was high order and certainly not easily accessible to most candidates who lack basic analytical skills and language proficiency. Many candidates picked B instead of A because they struggled to see that the question demanded a concept from the alternatives that is not an advantage to shelter. Question 1.1.7 was straightforward. However, candidates lost marks due to their inability to categorise diseases; in this case "protozoal diseases" which is coccidiosis. Question 1.1.8 which also belongs to the higher order category, was not well answered, and may have offered some difficulty even to stronger candidates. It is one of those questions that may look easy, but it needed good conceptual skills, hence only 3 in 10 candidates chose C which is the correct answer. | | | |

- More than 60% of the candidates lost the 2 marks on offer in question 1.1.9 despite the two alternative responses catered for in the marking guidelines. This indicates that the concept of 'multiple births' especially twins resulting from ovulation of two oocytes during the same oestrus cycle was not correctly understood by candidates.
- A substantial number (about 78%) of candidates lacked knowledge needed to identify the correct hormone applicable to question 1.1.10. They could not correctly identify the hormone prostaglandin; instead, they chose progesterone or oestrogen which shows that they do not know the main functions of different hormones in the reproductive cycle.

QUESTIONS 1.2 (Column A and B – 10 marks)

- Generally, candidates obtained 4 out of 10 marks (40%) on this question, mainly from questions 1.2.2 and 1.2.5
- Candidates failed to associate animal feed composed of straw and hay(roughages) with high crude fibre content in question 1.2.1, to choose "Both A and B" as the correct response in 1.2.1. They instead chose B (teff hay) only because of the word 'hay'.
- In Q1.2.3 candidates displayed a lack of knowledge when it comes to agricultural facilities as they could not differentiate between a furrowing pen and a pigsty in terms of functions/uses.
- Candidates did not analyse the description in column B which gave the clue through the "microscopic" parasite required in question 1.2.4, several of them identified the parasites as ticks instead of the mites which are parasites that cannot be seen with the naked eye (microscopic).

QUESTIONS 1.3 (Terminology – 10 marks)

- Many candidates obtained 6 out of 10 marks (55%) in this question, which were mainly from questions 1.3.1 (Digestibility co-efficient), 1.3.3 (Artificial Insemination) and 1.3.5 (Progesterone).
- Subquestion 1.3.2 was poorly performed. About 52% of candidates were unable to link the concept dosing with the oral intake of fluid medicine to control diseases. Most candidates wrote "oral intake" extracted directly from the question paper as an answer to the question.
- Question 1.3.4 was a straight-forward question. However, candidates lost 2 marks due to their inability to analyse a question and identify key words. Candidates focused on the phrase "no fertilisation takes place" hence the majority gave "infertility" as the response in Q1.3.4 not taking into consideration that the cause is due to congenital defects. Misunderstanding of the main concept "congenital defects" may have led to the error committed, because if they knew that such defects are inherited or born with, they would have known that the condition is permanent, hence the correct answer is sterility.

QUESTIONS 1.4 (Term replacement – 5 marks)

- Subquestion 1.4 was poorly performed at about 30% with most candidates experiencing a challenge in giving a correct response for questions 1.4.1, 1.4.2, and 1.4.5.
- In subquestion 1.4.1, 5 in 10 candidates wrote salivary instead of sublingual as a gland situated underneath the tongue of the pig for the secretion of saliva. Some had an idea as they wrote submandibular which is the gland found closer to the sublingual. Candidates lacked understanding that the glands are named according to their location in the mouth.
- In 1.4.2 candidates lost the mark because they wrote extensive production system instead of free range. The way the question was phrased might have influenced the poor performance by candidates, because free range and backyard systems are not indicated as the main production systems but as examples in the CAPS document.
- Embryo flushing/harvesting as a correct response to question 1.4.5 was written by very few candidates which clearly indicated that the concept of Embryo Transfer (ET) and its different phases was not well understood by candidates. They failed to see that the question is looking for a specific stage in the process of Embryo Transfer. Some committed spelling errors as they wrote embryo 'flashing' instead of 'flushing'.

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

- (a) Teachers should make subject terminology part of daily assessment and should make a glossary of terms for each topic to be taught and issue it well in advance for candidates to know which terms need to be mastered. 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) 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.
- (d) The use of electronic technology, such as smart boards and the internet, could be utilised to improve the candidates' reading abilities.
- (e) Teachers should train candidates on how to identify the main phrases in the question to relate with the content learnt in order to respond accordingly.
- (f) Teachers should form a cohesive unit in their clusters for support to address challenging topics.
- (g) Examples of salivary glands with their location and functions, methods of administering medication need re-emphasis.
- (h) 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) 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 still leave blank spaces in question 1 multiple choice question.
- (b) Candidate's responses to instructions, especially subquestion 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 are writing A, B and Both, without indicating ONLY.
- (c) Candidates are still struggling to spell subject concepts correctly e.g. they wrote embryo 'flashing' instead of 'flushing', which gives it 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 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 a concept bank from different references per topic to train 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 at school 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 emphasised to develop scientific skills in our candidates.

QUESTION 2

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

| <i>Average mark from the sample of 100 for question 2</i> | | | 19 out of 35 marks |
|---|--------------------|---------------------|------------------------------|
| TOPIC OR ASPECT TESTED | LOWEST MARK | HIGHEST MARK | AVERAGE % FROM SAMPLE |
| • Animal Nutrition | 0 | 35 | 55,0% |

Question 2 on animal nutrition is usually challenging to candidates in the subject, but the question was generally fair in 2020. As a result it was the best performed question in the paper. Candidates performed fairly in question 2 scoring an average of 19 marks out of 35 (55%). There was an improved performance for questions 2.1 on alimentary canals, 2.3 on digestibility co-efficient calculation and 2.5 on nutritive ratio calculation. Calculations in the subject are usually a threat to candidates, but the 2020 grade 12 class did very well. The highest mark scored in this question was 35 marks with the lowest being 0. Although the performance was generally pleasing for the majority of candidates, some candidates performed poorly.

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

- In question 2.1.1 candidates had no problem identifying the alimentary canals of two farm animals, however, differentiation between classifying and naming is still a challenge. The question was asking for the name (fowl/chicken/poultry and cattle/cow) of the farm animal and many gave the class (e.g. ruminant and non-ruminant). Some wrote pig instead of cattle in Diagram B an indicator that they still lack identifying skills and that might be caused by learning the different alimentary canals individually instead of learning them as a unit which will force them to do comparison.
- In question 2.1.3 there were good quality responses coming from the top candidates leading the way. Candidates failed to understand that the question requires adaptations of rumen to digest feed rich in crude fibre, instead they gave functions or requirements of micro-organisms. Spelling of papillae was also a problem and sometimes they confused papillae with the villi of the small intestines because they are both described as protrusions.
- More than 30% of candidates mixed up proteins on **A** (under inorganic components) with the minerals on **B** (under the organic components) in question 2.2.1. Clearly, they didn't know the exact meaning and examples of the two concepts. Others wrote roughages and concentrates in **A** and **B** which are not even components but types of feeds.
- Question 2.2.2 is a follow-up question building on candidates' responses in question 2.2.1 probing deeper into their understanding. There was a mixed bag of responses which were informed by choices of components written in question 2.2.1. Those who wrote, 'Water' gave the functions of water. Urea supplements, came from those who wrote 'proteins' in **A** and those who wrote roughages gave other answers related to roughages and concentrates.
- Question 2.2.3 (a) was based on the main functions of proteins and was answered with very little effort by the greater majority of the candidates and in question 2.2.3 (b) more than 40% thought that lipids were the main component needed to fatten farm animals instead of carbohydrates, this shows that they do not understand the functions of the lipids.
- It was evident in question 2.3.1 and 2.5.1 that calculations are no longer a challenge to candidates like before, as the majority of candidates scored full marks for both calculations in question 2.
- The common errors identified in the digestibility coefficient calculation were as follows:
 - (a) Incorrect formula: Abbreviating the formula as:
DMI - DME is not advisable, rather write it as DM intake – DM excreta and so forth, also if the formula doesn't have dry matter (DM), it is incorrect. The formula is again incomplete if the learner do not multiply by hundred (**X** 100).
 - (b) Incorrect substitution of values: Only the dry matter values are to be substituted in the DM intake and DM excreta fields.
 - (c) Simplification of values: Candidates are allowed to use calculators in the examination room and preferably calculators that they are familiar with.
 - (d) Incorrect units: A big number of candidates still write Kilograms (kg) in the final answer and loose marks for units. The journey for the unit Kg's ends in the substitution steps. Note that a unit for the final answer should be a % and not Kg.

- In question 2.3.2 candidates did not understand what the question requires when asking for implications of the calculated value.
Common erroneous responses were:
 - Digestibility coefficient is 74% / high
 - Digestibility is more than 60%
 - The feed is rich in protein
 - The feed can be used for growth, production, fattening
- In question 2.3.3 candidates responded with methods/ processes to improve the digestibility of feeds (e.g. soaking, popping, micronising) instead of writing the factors that may have influenced the digestibility of the feed used.
- Question 2.4.1 about the energy values was easily accessible to the majority of learners but to some it was just pure guesswork. Some candidates wrote gross energy, metabolic energy, digestible energy and even kinetic energy as incorrect responses.
- The question (2.4.2) was straightforward but it was a struggle to more than 50% of candidates to come up with the correct reasons as to why the knowledge of the energy value of the feed is important for the farmer to know. The question exposed the endemic lack of conceptual and reasoning skills in some of the candidates. A variety of reasons given by the different candidates were about nutrition, growth, production and fattening but they were not incorrect.
- The inclusion of crude fibre content in the data given in question 2.5.1 confused the learners. They also included the crude fibre content in their NR formulae and ignored the formula taught in class by their teachers. Others wrote the correct NR formula but decided to multiply by **×** 100 confusing it with the Digestibility Coefficiency formula, and those who did not know the formula ended up getting nil because both the substitution and the answer got affected. Some candidates kept forgetting that they are calculating a ratio, consequently abandoning the 1: that represent the protein part of the ratio.
- Some candidates failed to understand that question 2.5.3 required reasons for using the feed for young/growing animals. They wrote for growth instead of mentioning that the feed has more protein needed for growth.
Common errors were:
 - narrow instead of narrow NR,
 - and some wrote low or less NR.
- In question 2.6.2 and 2.6.3 more than 60% of the candidates took answers directly from the scenario and the question was not strenuous to them. They did not want to think outside the box.

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

- (a) It is advised that different diagrams of alimentary canals are taught simultaneously. A variety of textbooks and other resources should be used in this regard.
- (b) 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.
- (c) Carefully planned practical investigations and questionnaires will assist candidates to develop an in-depth understanding of the subject content.
- (d) Explanation of concepts to candidates for better understanding and the implication of the results after calculation, is important
- (e) Giving more exercises with different scenarios to candidates is imperative in making them aware of the importance of following instructions.
- (f) Teachers are encouraged to give regular informal assessments on calculations also considering the importance of the units of measurement to continue the good work.
- (g) 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. Teachers should further inculcate in candidates an understanding that Agricultural Sciences is a science subject and that all formulae should therefore be scientifically presented.

(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 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 memorising 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 memorising 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 | | | 17 out of 35 marks |
| TOPIC OR ASPECT TESTED | LOWEST MARK | HIGHEST MARK | AVERAGE % FROM SAMPLE |
| • Animal Production, Protection and Control | 0 | 31 | 49,0% |

Question 3 on animal production, protection and control was generally not easy for candidates to handle as a result the performance of candidates was not satisfactory. They scored an average of 17 marks out of 35 (49%). Candidates performed poorly in question 3 but their performance is still better than that of their counterparts in 2019. The worst performed sub-questions in question 3 are 3.3, 3.4 and 3.6. The performance of candidates in sub-question 3.1 on the drawing of a graph was excellent. The highest mark scored in this question is 31 marks with the lowest being 0.

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

- In question 3.1.1 approximately 76% of candidates were able to score 6 full marks in the graph. Most candidates were able to draw the graph with all required aspects such as type of graph, correct heading, correct placement of variables and correct placement of units. However, scaling is still a challenge which affects the accuracy in plotting the graph. Some candidates struggled to get full marks and they lost marks unnecessarily because they could not accurately include all the required aspects of the graph. Candidates who struggled to differentiate between dependent and independent variables could not provide a correct trend for the graph in the subsequent question 3.1.2.
- Most candidates were unable to give the correct trend in question 3.1.2, clearly showing that they did not understand the relationship between temperature requirements and age in broiler production. Only 35% of candidates were able to deduce the trend in temperature requirements of broiler chicken from the graph. The majority of candidates explained the shape of the graph or based their response on one variable. They failed to pick up that the older the chicks become the lesser are their temperature requirements.
- In subquestion 3.1.3 candidates were unable to correctly identify the equipment used to maintain temperature in a broiler house which led to the loss of the mark. The common incorrect responses that were given include light, ventilators, sun and air they failed to understand that ventilator is not an equipment but rather part of the structure and in a broiler house it may bring in draught instead of maintaining the temperature. An equipment is something that can be handled and moved around.
- Question 3.2 required in-depth understanding of animal behaviour during handling with more emphasis on farm animals. Some learner responses included dogs which do not form part of farm animals prescribed for grade 12 content areas and others wrote ruminants instead of the name of ruminant showing the behaviour.
- Most candidates struggled to identify the farming systems represented by pictures **A** and **B** in question 3.3.1. They confused farming systems with production systems (intensive and extensive) As a result they could not correctly compare the systems regarding their effect to the environment instead they associated their response with human interference in the two production systems, leading to responses such as in **A** the environment is highly controlled and in **B** the control is low instead of the influence on the natural environment.

- In question 3.4.2 many candidates struggled to make a clear distinction between zoonotic and enzootic diseases. Some of their responses were incomplete as they only wrote “disease transmitted from animals to humans” failing to mention the reverse transmission; consequently, they lost the second mark. Some wrote “spread” and “affect” instead of transmitted. Candidates did not understand the concept “enzootic” in question 3.4.3. The common response was “because it only affects pigs”. Some responded by saying “it affects “zoo” animals taking zoo from the term “zoonotic”.
- In Q3.4.4, some candidates confused the role of the state to that of a farmer in controlling the spread of tapeworms in farm animals. Their responses included deworming, sanitation dosing which are roles of the farmer.
- Candidates showed that they are not familiar with pictures of internal parasites. 60% of candidates could not identify the parasites **A** and **B** in question 3.5. They classified the parasites into internal and external instead of identifying their names. They also confused roundworm with ring worm and failed to name the visible symptoms in sheep infested with roundworms. Instead they gave symptoms of animal infected with ringworms.
- The majority of candidates got the response correctly in question 3.5.2, although some could not score full marks for erroneously writing symptoms of external parasites instead of those of internal parasites. Common incorrect answers given by candidates were “hair loss, head stay down, itchy skin, lumpy wool, and loose wool which are the general symptoms of sick animal.
- Some candidates gave responses like injection, vaccination, quarantine, isolation, burn the animals in question 3.5.3. This implied that they were aware of the general management practices but could not distinguish between those that applies to internal or external parasites. In some cases, it was evident that they could not differentiate between management, prevention, and treatment of internal parasites.
- In question 3.6.1 most candidates struggled to identify the plant disease or poison in the picture. They gave responses such as poison bulb, thorn apple, maize, maize meal, maize poison. They were then unable to respond correctly to question as a result did not get full marks. In Questions 3.6.2 and 3.6.3 candidates could not differentiate between measures to prevent contamination of stored feed and the measures to be taken when the fungus is detected in the feed. Candidates’ response to the question was on treatment whilst the question was asking about the preventative measures. They confused salt poisoning in animals and fungus contamination in feeds, of which plant poisoning does not directly relate to salt poisoning. Hence some wrote responses such as ‘giving animals too much water’ or ‘water given in frequent, small dosages’.

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

- (a) Teachers need to train candidates on the drawing of graphs and the guidelines on how to mark graphs should be explained.
- (b) Educators should emphasise on the differentiation of variables, exercise candidates through questioning the question statement in order to identify the variable that influences the other making it to be dependent and place it on the correct axis.
- (c) Teach candidates how to create scale at equal intervals (for example multiples of 5 or 10 or 20, etc.) to accommodate the data in question.
- (d) Teachers should access the internet, periodicals, and magazines for 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 practice (use) and the reason for its use.
- (e) 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.

- (f) The performance of candidates in 3.3.3 requires teachers to teach candidates how to analyse and identify responses from scenarios.
- (g) 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' emphasising content familiar to them and examination.

(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 can 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?

| <i>Average mark from the sample of 100 for question 4</i> | | | 16 out of 35 marks |
|---|-------------|--------------|-----------------------|
| TOPIC OR ASPECT TESTED | LOWEST MARK | HIGHEST MARK | AVERAGE % FROM SAMPLE |
| • Animal Reproduction | 0 | 33 | 49,0% |

Question 4 on animal reproduction was generally accessible to candidates who were well taught and prepared for the examination. It is against this background that the overall performance of candidates in this question was fair at an average of 49% (16 marks) which is an improvement of 4% from 2019 results in this question. The worst performed subquestions in question 4 were 4.3.4; 4.5; 4.6.2 and 4.7. Candidates' performance was very good (76%) in subquestion 4.1 dealing with the reproductive system of a bull. The highest mark scored in this question is 33 with the lowest being 0.

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

- In question 4.1, 76% of candidates had no problem identifying the parts of the reproductive system of a bull. However, some could not differentiate between seminal tube and seminal vesicles in question 4.1.1 C and some took it further by writing prostate gland as an answer. The way the diagram was labelled (not pointing to a specific part of the diagram) might have caused some confusion to candidates in the follow up question 4.1.2 because they gave a function not related to the part labelled in question 4.1.1 A. In question 4.1.3 learners confused the role of seminal vesicles with those of prostate glands, hence their response was extracted directly from section A (1.4.4) stating that it secretes the mucus that gives semen its characteristic smell which is the role of prostate glands.
- Impotence, sterility, infertility and libido were the popular incorrect response to question 4.2.1 instead of lack of libido. Consequently, candidates failed to indicate the THREE causes of lack of libido in the follow up question 4.2.2 and they gave responses like lack of libido and injuries. Learners missed the last part of the statement that the bull lacks the drive to service the cow which is the lack of libido and not sterility or infertility.
- In question 4.3.1 many candidates lacked the analytical skill needed to identify the hours after oestrus when the highest pregnancy percentage may be achieved from the graph provided. Instead, they gave the hours in groups ranging from 0 – 24 hours, which clearly indicated that they did not understand the graph.
- Most candidates struggled to give the correct response in question 4.3.4. They lacked knowledge about inseminating a cow before ovulation, they could not link the lifespan of the ova and sperm cells to the act of inseminating before the release of egg cells by the cow. Consequently, the sub-question was the worst performed in question 4.
- In question 4.4, candidates managed to score the total mark of 4, however, others were unable to label C writing Embryo instead of the correct answer zygote. They could not distinguish between a zygote and embryo, some even included the fusion, fused ovum and sperm as a result they forfeited some of the marks.
- In question 4.5.1 some candidates misinterpreted the illustration showing pregnancy with oestrus cycle some with mating and others with parturition. The illustration gave a clue of the process as gestation and not just oestrus cycle because it mentioned that FSH level is low for about 280 days, but candidates could not pick that hint. They might have been influenced by the opening statement above the illustration talking about oestrus cycle. Consequently, they failed to give correct stages of pregnancy in the follow-up question 4.5.2 instead they gave oestrus cycle stages, mating and parturition phases.
- In question 4.5.3, candidates gave the explanation of the normal presentation instead of indicating the term used when referring to the normal presentation. They were also unable to provide 'anterior' as a correct answer and disappointingly, those who managed to get it, misspelt it.
- In question 4.6.1, candidates didn't know dystocia as the condition commonly experienced by heifers during birth. Some learners struggled with the spelling of 'dystocia'.

- In question 4.6.2 learners gave normal signs of parturition instead of those of animals experiencing difficult birth.
- Prolactin and relaxin were the popular incorrect responses to question 4.6.4 instead of oxytocin, an indicator that they could not differentiate between the functions of the three hormones involved in milk production.
- Nuclear transfer (Cloning) was mistakenly provided as an answer for question 4.7.1 whereas Embryo transfer (ET) was the correct answer. It shows that learners could not differentiate between cloning and embryo transfer as the scenario is about superior donor cows that are inseminated and yet there is no insemination in nuclear transfer process. That had a direct influence on question 4.7.2 on the importance of Embryo transfer as candidates were giving aims of cloning instead of the importance of ET resulting in the loss of 2 marks.
- Most candidates struggled to score 2 full marks in question 4.7.3. They confused donation of embryo with egg cell, some even wrote donation of nucleus. This clearly showed a lack of understanding of the ET technique and its phases. They could not pick up that mentioning transfer of 'superior characteristics' to 'inferior recipient' are key in the explanation.

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

- (a) 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.
- (b) Animal reproduction section should be taught using diagrams and charts or the slides from ASAAE for enrichment and enhancement.
- (c) Subject terminology is of utmost importance and needs to be taught, assessed and revised.
- (d) 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.
- (e) Animal reproduction section should be taught using diagrams and charts or the slides from ASAAE for enrichment and enhancement.
- (f) Subject terminology is of utmost importance and needs to be taught, assessed and revised.
- (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 clearly differentiate between *sterility* and *infertility* in both male and female animals as well as the causes.
- (j) Candidates must be drilled through assessment tasks to adhere to instructions.

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

- (a) Interpretation skills when it comes to graphs still lack. Lack of scientific language when expressing themselves.
- (b) Lack of understanding of processes, terms and concepts involved in reproduction such as ET; AI; cloning; ovulation etc.



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE/ NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2020

MARKS: 150

TIME: 2½ hours

This question paper consists of 14 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 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 A cost-effective protein supplement for a ruminant animal is ...

- A fish meal.
- B cottonseed oil-cake meal.
- C urea.
- D carcass meal.

1.1.2 Keratomalacia is caused by a deficiency of ... in farm animals.

- A thiamine
- B vitamin A
- C calcium
- D vitamin C

1.1.3 The small intestine is adapted for effective absorption of nutrients because:

- (i) It has many folds to increase the surface area.
- (ii) Its length decreases the surface area for absorption.
- (iii) It has muscles that contract and relax to move nutrients.
- (iv) It has small finger-like projections.

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 part of the alimentary canal of ruminant animals responsible for chemical digestion:

- A Rumen
- B Reticulum
- C Omasum
- D Abomasum



1.1.5 Protection against ... is NOT an advantage of shelters in livestock production.

- A optimum temperatures
- B predators
- C cold temperatures
- D rainfall

1.1.6 The following refer to an extensive production system:

- (i) Animals kept at a low density
- (ii) No environmental control and management
- (iii) More labour and care needed for the animals
- (iv) There are lower inputs

Choose the CORRECT combination:

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

1.1.7 ... is a protozoal disease in fowls that results in thin watery diarrhoea containing mucus.

- A Avian flu
- B Coccidiosis
- C Newcastle disease
- D H1N1

1.1.8 The effects of external parasites may be reduced by ...

- A applying fewer concentrated pesticides regularly.
- B dosing animals frequently using smaller dosages.
- C exposing animals to the parasite to develop resistance.
- D reducing the strength of the pesticide to save money.

1.1.9 Multiplets formed from the release of more than one ovum are ...

- A identical.
- B monozygotic.
- C freemartins.
- D non-identical.

1.1.10 The hormone that causes the corpus luteum to regress, as an indication that the cow is not pregnant:

- A Oestrogen
- B Prostaglandin
- C Relaxin
- D 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: | Oat straw | High crude fibre content |
| | B: | Teff hay | |
| 1.2.2 | A: | Lipase | Enzyme responsible for protein digestion |
| | B: | Amylase | |
| 1.2.3 | A: | Furrowing pen | Facility separating a sow from piglets |
| | B: | Pigsty | |
| 1.2.4 | A: | Ticks | Microscopic parasites with mouth parts used to suck blood and cause irritation for the host |
| | B: | Mites | |
| 1.2.5 | A: | Chin-ball marker | Method dairy farmers can adopt to assist with the identifying of cows on heat |
| | B: | Pedometer | |

(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 measure of the digestibility of a feed expressed as a percentage of the dry matter intake
- 1.3.2 Oral intake of drugs and medicines to control diseases
- 1.3.3 The process of depositing semen into the cervix of a female animal without mating taking place
- 1.3.4 A condition where successful mating occurs but no fertilisation takes place due to congenital defects
- 1.3.5 The hormone that prepares the uterus to receive the fertilised ovum

(5 x 2) (10)

- 1.4 Change the UNDERLINED WORD 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 The parotid gland is situated underneath the tongue of the pig for secretion of saliva.
- 1.4.2 In a backyard production system, animals are allowed to roam around freely.
- 1.4.3 Cryptorchidism refers to underdeveloped testes.
- 1.4.4 Cowper's gland secretes a milky, slightly alkaline mucus that gives semen a characteristic smell.
- 1.4.5 Embryo splitting is the removal of fertilised ova from superior cows to transplant them into inferior cows.

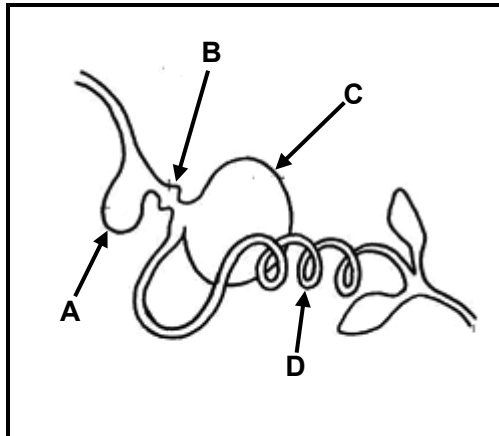
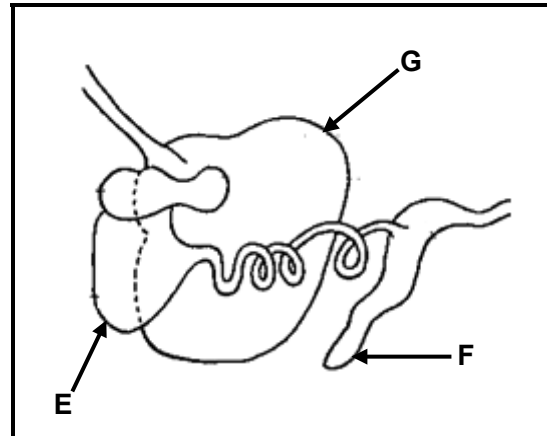
(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION**

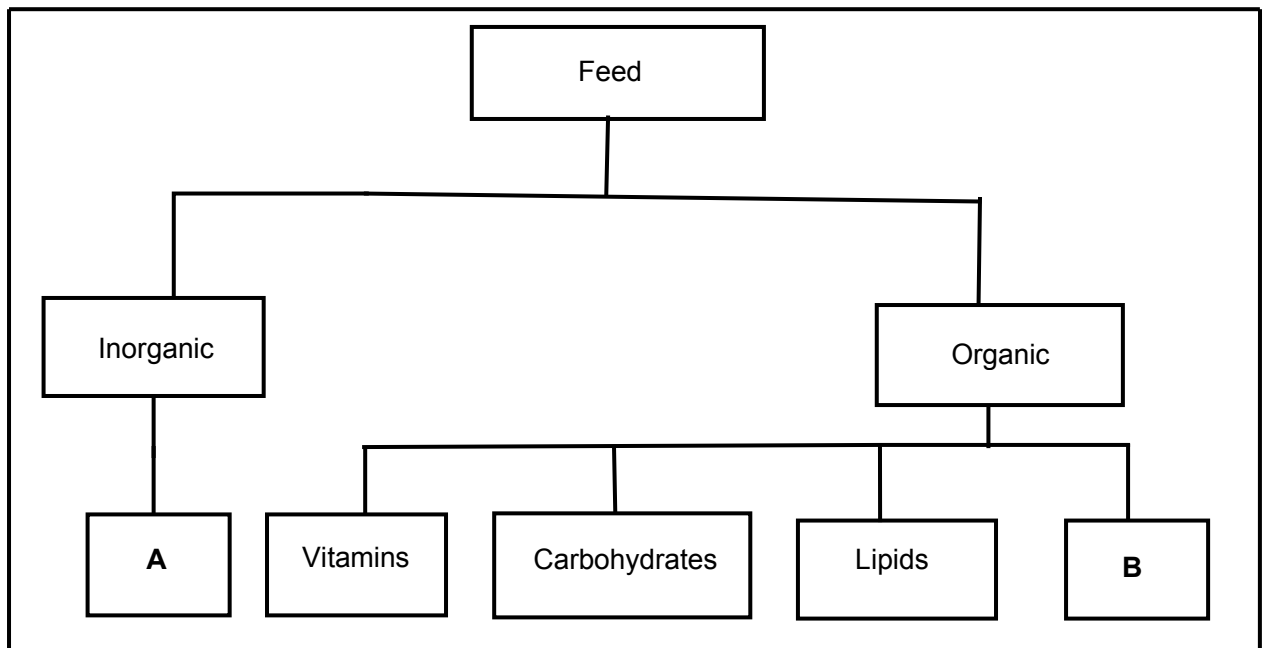
Start this question on a NEW page.

2.1 The diagrams below represent the alimentary canals of farm animals.

**DIAGRAM 1****DIAGRAM 2**

- 2.1.1 Name the farm animals whose alimentary canals are represented in DIAGRAM 1 and DIAGRAM 2. (2)
- 2.1.2 Identify the part in DIAGRAM 1 where EACH of the following occurs. Write down only the letter (A–D). (1)
- (a) Digestive juices are secreted (1)
 - (b) Mechanical digestion occurs (1)
 - (c) Food is moistened and softened (1)
- 2.1.3 Name TWO adaptations of part **G** in DIAGRAM 2 which enables the animal to digest feed rich in fibre. (2)

2.2 The flow chart below shows the components of feed.



2.2.1 Identify components **A** and **B**. (2)

2.2.2 State TWO ways in which component **A** can be supplemented in farm animals. (2)

2.2.3 Indicate the main component that is needed for EACH of the following functions:

(a) Production of eggs and milk (1)

(b) Fattening of farm animals (1)

2.3 During a digestibility trial, an animal ingested 15 kg of feed with a moisture content of 10% and excreted 3,5 kg dry manure.

2.3.1 Calculate the digestibility coefficient of the feed above. Show ALL calculations. (5)

2.3.2 Give the implication of the digestibility of the feed calculated in QUESTION 2.3.1. (1)

2.3.3 Name TWO factors that may have contributed to the digestibility of the feed used in the trial. (2)

2.4 The value of the feed depends on the energy content that remains after all metabolic processes have occurred in the body.

2.4.1 Name the energy that is important for production and maintenance. (1)

2.4.2 Give TWO reasons why it is important for the farmer to know the energy value of the feed. (2)

2.5 A farmer formulated a feed with the following composition:

Digestible protein (DP) = 13%

Total digestible nutrients (TDN) = 75%

Crude fibre content = 12%

2.5.1 Use a formula to calculate the nutritive ratio (NR) of this feed. (3)

2.5.2 Indicate the age group of the animal that will benefit most from this feed. (1)

2.5.3 Give TWO reasons for using this feed to feed the animals indicated in QUESTION 2.5.2. (2)

2.6 Planning and managing feed is the most critical management function on a farm. Livestock farmers must ensure that enough fodder is available to meet the animal feed requirements throughout the year so that they produce on an ongoing basis.

2.6.1 Give an appropriate term for the scenario above. (1)

2.6.2 Give TWO reasons for planning fodder production. (2)

2.6.3 State TWO aspects the farmer has to consider when planning fodder production. (2)

[35]



QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

- 3.1 The table below shows the temperature requirements of broiler chickens at various ages.

| AGE IN WEEKS | TEMPERATURE REQUIREMENTS (°C) |
|--------------|-------------------------------|
| 1 | 35 |
| 2 | 30 |
| 3 | 25 |
| 4 | 22 |
| 5 | 20 |
| 6 | 20 |
| 7 | 20 |

- 3.1.1 Draw a bar graph showing the temperature requirements of broiler chickens at various ages. (6)
- 3.1.2 Deduce the trend in temperature requirements of broiler chickens. (2)
- 3.1.3 Name the equipment that can be used to maintain the temperature in a broiler house. (1)
- 3.2 Indicate the farm animals that show the following types of behaviour during handling:
- 3.2.1 Pawing when in distress (1)
- 3.2.2 Easy to handle when they are together (1)
- 3.2.3 Panting when they are stressed (1)
- 3.2.4 Peck when feeding (1)
- 3.3 The pictures below show farming systems.

**PICTURE A****PICTURE B**

- 3.3.1 Identify the farming systems shown in PICTURE A and PICTURE B. (2)
- 3.3.2 Compare the farming systems identified in QUESTION 3.3.1 with regard to their effect on the environment. (2)

3.4 Swine flu, anthrax, foot-and-mouth disease, tuberculosis and rabies are all highly contagious and pandemic diseases. Some are zoonotic while others are enzootic. Most of these diseases are notifiable diseases. The diseases are caused by different pathogens which could be transmitted by either direct contact or inhaling infected air. Some can remain infectious for weeks or even many months. People can also be infected by eating animal products from affected animals.

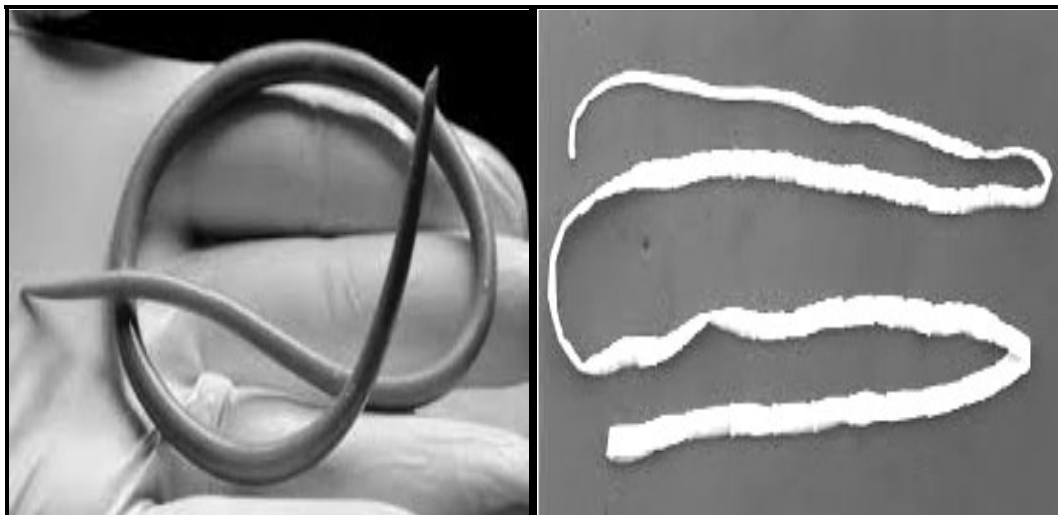
3.4.1 Classify the diseases in the scenario above according to the pathogens that cause them. (2)

3.4.2 Explain the meaning of *zoonotic diseases*. (2)

3.4.3 Why is swine flu regarded as enzootic? (1)

3.4.4 Give TWO roles of the state in controlling all notifiable diseases such as anthrax, swine flu and tuberculosis (TB). (2)

3.5 Internal parasites are a problem for sheep farmers. They may cause serious losses if not controlled.



PARASITE A

PARASITE B

3.5.1 Identify PARASITE A and PARASITE B. (2)

3.5.2 Name TWO visible symptoms in sheep that are heavily infested with PARASITE A. (2)

3.5.3 State TWO management practices that can be applied to prevent the infestation of a flock by internal parasites. (2)

- 3.6 The picture below is an example of a plant that can cause poisoning of animals and even result in death with continuous exposure.

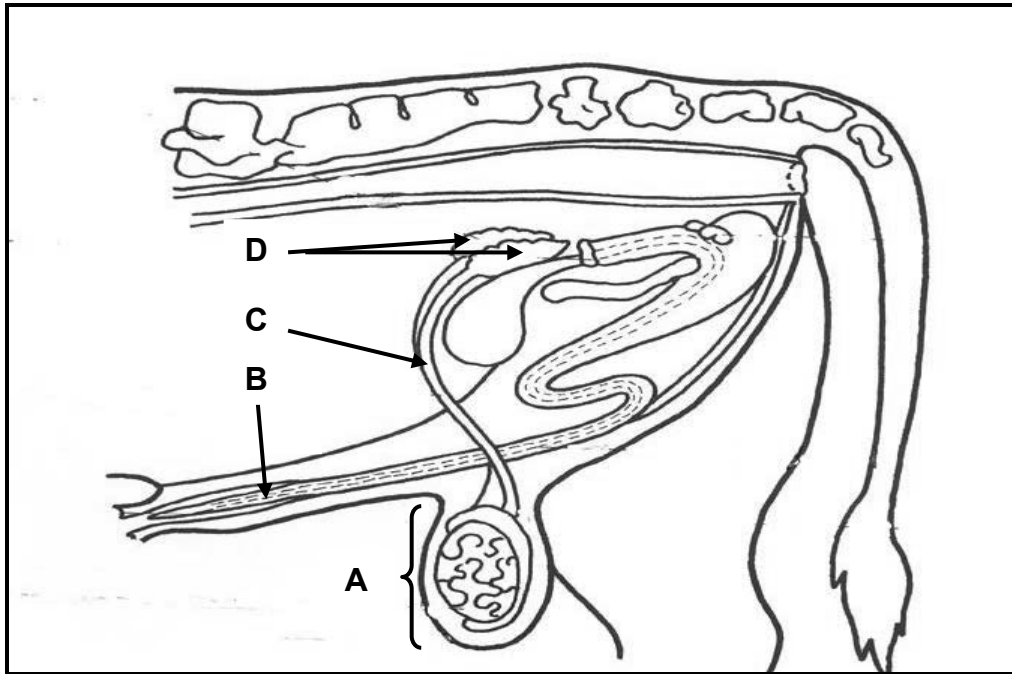


- 3.6.1 Identify the poisonous plant in the picture above. (1)
- 3.6.2 State TWO measures which can be taken to prevent stored feeds from being contaminated by the plant identified in QUESTION 3.6.1. (2)
- 3.6.3 Indicate TWO actions that can be taken once the presence of the poison identified in QUESTION 3.6.1 is detected in feeds. (2)
- [35]**

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 The picture below shows the reproductive system of a bull.



4.1.1 Identify **A**, **B** and **C**. (3)

4.1.2 State ONE function of **A**. (1)

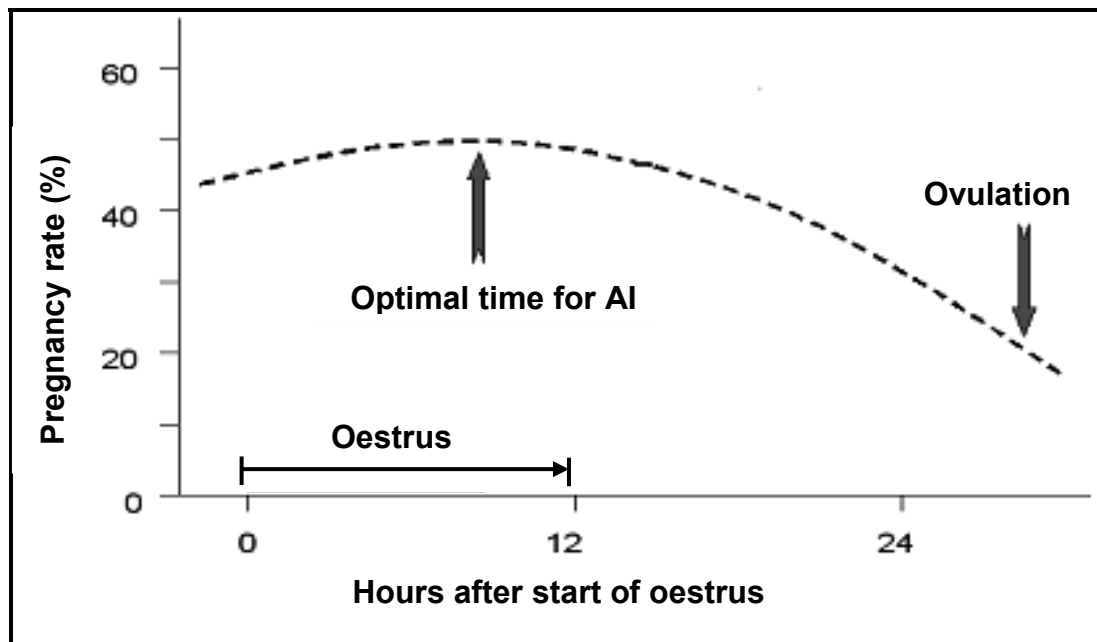
4.1.3 Indicate the role of gland **D**. (1)

4.2 Bulls may appear healthy and normal but lack the drive to service cows.

4.2.1 Give a term for the condition described in the statement above. (1)

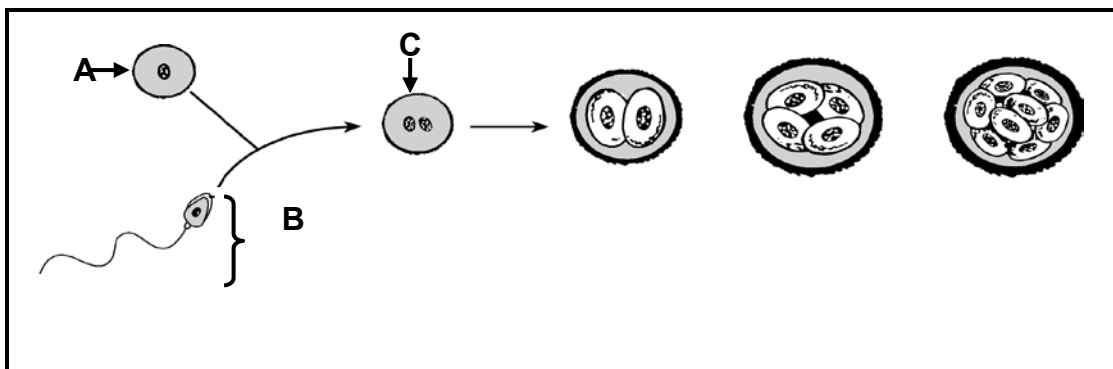
4.2.2 State THREE causes of the condition given in QUESTION 4.2.1. (3)

4.3 The illustration below shows a process that occurs in female animals.



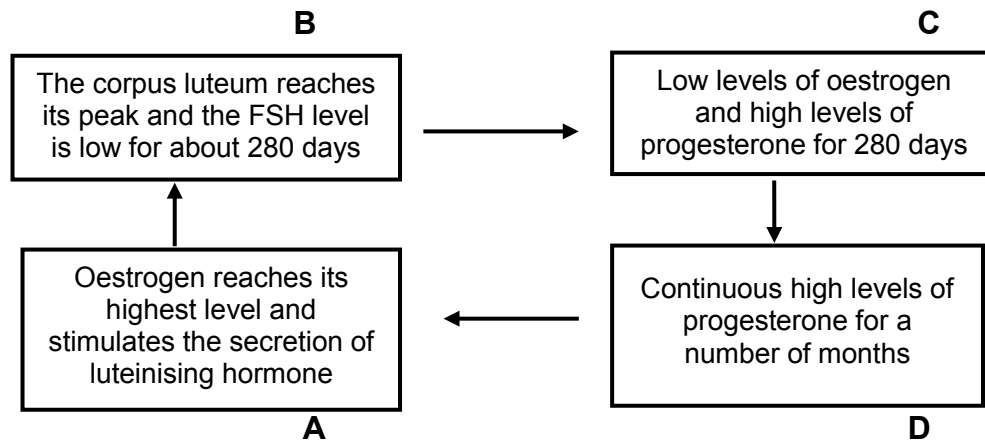
- 4.3.1 Identify the hours after oestrus when the highest pregnancy percentage rate may be achieved. (1)
- 4.3.2 Give a reason why an inseminator will be able to inseminate the cow between the first hour and 12 hours after the start of oestrus. (1)
- 4.3.3 State TWO visible signs showing that the cow is in oestrus. (2)
- 4.3.4 Give ONE reason why a cow is inseminated hours before ovulation. (1)
- 4.3.5 Indicate ONE requirement of a successful insemination. (1)

4.4 The diagram below represents a process that occurs in female animals.



- 4.4.1 Label **A**, **B** and **C**. (3)
- 4.4.2 Name the reproductive process represented in the diagram above. (1)

- 4.5 Hormones cause reproductive changes in cows that occur between one heat period and the next. Below is an illustration of the changes in the reproductive cycle of a cow.



- 4.5.1 Identify the process in the reproductive cycle of mature cows illustrated above. (1)
- 4.5.2 Name the THREE stages of the process identified in QUESTION 4.5.1. (3)
- 4.5.3 Indicate the normal presentation of the calf in the pelvis at birth. (1)
- 4.6 Problems are usually experienced by heifers that are calving for the first time.
- 4.6.1 Name the condition referred to in the statement above. (1)
- 4.6.2 Give TWO signs of an animal that is experiencing birth problems. (2)
- 4.6.3 State ONE cause of birth problems in heifers. (1)
- 4.6.4 Name the hormone that initiates milk release. (1)
- 4.6.5 Name the milk produced in the first three days after calving. (1)
- 4.7 Superior donor cows are treated with an intravaginal drug to stop the cows from coming to oestrus. FSH is injected every morning and night. Later prostaglandin is injected. After the repeated injections with formulated hormones, the superior cows are inseminated. After seven days the fertilised egg cells are removed to be implanted into the recipient cows.
- 4.7.1 Name the process explained in the scenario above. (1)
- 4.7.2 What is the importance of the process named in QUESTION 4.7.1? (2)
- 4.7.3 Explain what a *donor cow* is. (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150





basic education

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GRADE 12

AGRICULTURAL SCIENCES P1

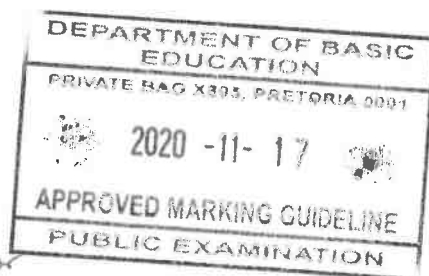
NOVEMBER 2020

MARKING GUIDELINES

MARKS: 150

Approved

Sefoane MA
Internal moderator
17/11/2020



Approved

TSHABANG AT
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17/11/2020

These marking guidelines consist of 11 pages.

Approved

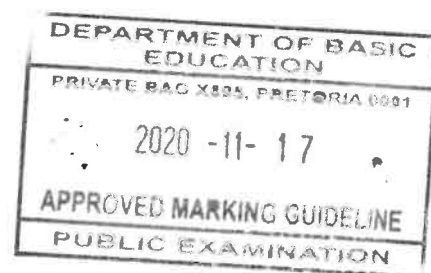
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Approved

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17-11-2020

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 | A ✓✓ | | |
| | 1.1.6 | C ✓✓ | | |
| | 1.1.7 | B ✓✓ | | |
| | 1.1.8 | C ✓✓ | | |
| | 1.1.9 | C/D ✓✓ | | |
| | 1.1.10 | B ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | Both A and B ✓✓ | | |
| | 1.2.2 | None ✓✓ | | |
| | 1.2.3 | A only ✓✓ | | |
| | 1.2.4 | B only ✓✓ | | |
| | 1.2.5 | Both A and B ✓✓ | (5 x 2) | (10) |
| 1.3 | 1.3.1 | Digestibility co-efficiency ✓✓ | | |
| | 1.3.2 | Dosing/drenching ✓✓ | | |
| | 1.3.3 | Artificial Insemination/AI ✓✓ | | |
| | 1.3.4 | Sterility ✓✓ | | |
| | 1.3.5 | Progesterone ✓✓ | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Sublingual ✓ | | |
| | 1.4.2 | Free range ✓ | | |
| | 1.4.3 | Hypoplasia ✓ | | |
| | 1.4.4 | Prostate ✓ | | |
| | 1.4.5 | Flushing/harvesting ✓ | (5 x 1) | (5) |

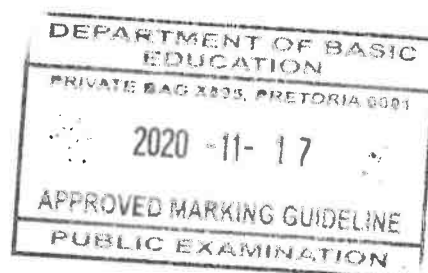
TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canal**

- 2.1.1 **Naming of the animal in**
DIAGRAM 1 - Chicken/fowl/poultry ✓ (1)
DIAGRAM 2 - Cattle/sheep/goats ✓ (1)
- 2.1.2 **Identification of the letters**
- (a) B ✓ (1)
 (b) C ✓ (1)
 (c) A ✓ (1)
- 2.1.3 **TWO adaptations of the rumen to digest feed rich in fibre**
- Presence of micro-organisms/rumen micro-flora ✓
 - Presence of papillae/heat rods for the provision of heat ✓
 - Contractions mix the food and bring it onto contact with micro-organisms ✓
 - It has a large fermentation vessel ✓ (Any 2) (2)

2.2 Components of feed

- 2.2.1 **Identification of the components**
- A - Minerals/elements ✓ (1)
 B - Proteins ✓ (1)
- 2.2.2 **TWO ways of supplementing minerals to animals**
- Mineral lick ✓
 - Drinking water/mixing it with water ✓
 - Soil sods ✓
 - Dosing/drenching ✓
 - Injection ✓
 - Cafeteria- style mineral provision/free -choice ✓
 - Supplementing rations ✓ (Any 2) (2)
- 2.2.3 **Indication of the component**
- (a) Proteins/B ✓ (1)
 (b) Carbohydrates ✓ (1)



2.3 Digestibility co-efficiency

2.3.1 Calculation of the digestibility co-efficiency

$$DC = \frac{\text{Dry matter intake (kg)} - \text{dry mass manure (kg)}}{\text{Dry matter intake (kg)}} \times \frac{100}{1} \checkmark$$

$$\text{Moisture content in feed: } 15 \text{ kg} \times \frac{10}{100} = 1,5 \text{ kg}$$

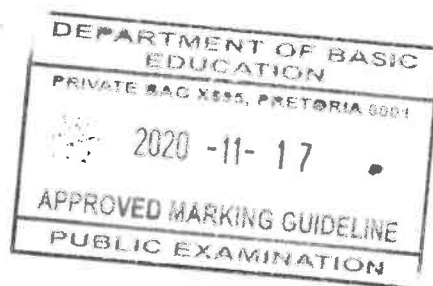
$$\text{Dry material in feed: } 15 \text{ kg} - 1,5 \text{ kg} = 13,5 \text{ kg} \checkmark$$

OR

$$\frac{90}{100} \times 15 \text{ kg} = 13,5 \text{ kg} \checkmark$$

$$= \frac{13,5 \text{ kg} - 3,5 \text{ kg}}{13,5 \text{ kg}} \times \frac{100}{1} \checkmark$$

$$= 74,07 \checkmark \% \checkmark$$



(5)

2.3.2 Implication of the calculated value

- The feed was highly digested ✓
- 74,07% of feed is digested ✓
- 25,93% is excreted ✓

(Any 1) (1)

2.3.3 TWO factors contributed to the digestibility of the feed used during the trial

- Composition of the feed/ration ✓
- Preparation of the feed/ration ✓
- Individuality/animal factor ✓
- Type of the animal ✓
- Age of the animal ✓
- Feed additives/supplements NPN/molasses ✓
- Palatability of the feed ✓
- Water intake ✓
- Age of the plant ✓
- Level of feeding ✓

(Any 2) (2)

2.4 Energy value of feeds

2.4.1 Energy important for production and maintenance

Net energy/NE ✓

(1)

2.4.2 TWO reasons for knowledge of the energy value of the feed

- To determine the type of animal diet ✓
- To determine feeding standards ✓
- Meet animal requirements at different stages of production ✓
- To determine ration formulation ✓

(Any 2) (2)

2.5 Nutritive ratio**2.5.1 Calculation of the nutritive ratio (NR)**

$$\text{Nutritive Ratio} = 1 : \frac{\% \text{DNNE}}{\% \text{DP}} \quad \checkmark$$

$$1 : \frac{62}{13} \quad \checkmark$$

$$1 : 4,77 \quad \checkmark$$

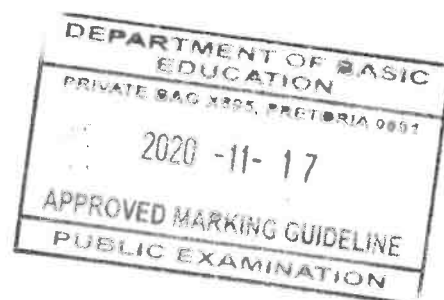
OR

$$\text{Nutritive Ratio} = 1 : \frac{\% \text{TDN} - \% \text{DP}}{\% \text{DP}} \quad \checkmark$$

$$1 : \frac{75\% - 13\%}{13\%} \quad \checkmark$$

$$1 : 4,77 \quad \checkmark$$

(3)

**2.5.2 Indication of the age group that will benefit most from the feed**
Young/growing/producing animal \checkmark

(1)

2.5.3 TWO reasons for using the feed to feed young animals

- Ration has a narrow nutritive ratio/less than 1:6 \checkmark
- Has more protein needed by growing animals \checkmark
- Low crude fibre content \checkmark

(Any 2)

(2)

2.6 Planning and managing of the feed**2.6.1 Appropriate term**Feed/fodder flow programme \checkmark

(1)

2.6.2 TWO importance of planning fodder production

- To ensure safe use of resources \checkmark
- To meet the animal feed requirements throughout the year \checkmark
- To marginalise feed costs \checkmark
- To manage for production/animal feed \checkmark

(Any 2)

(2)

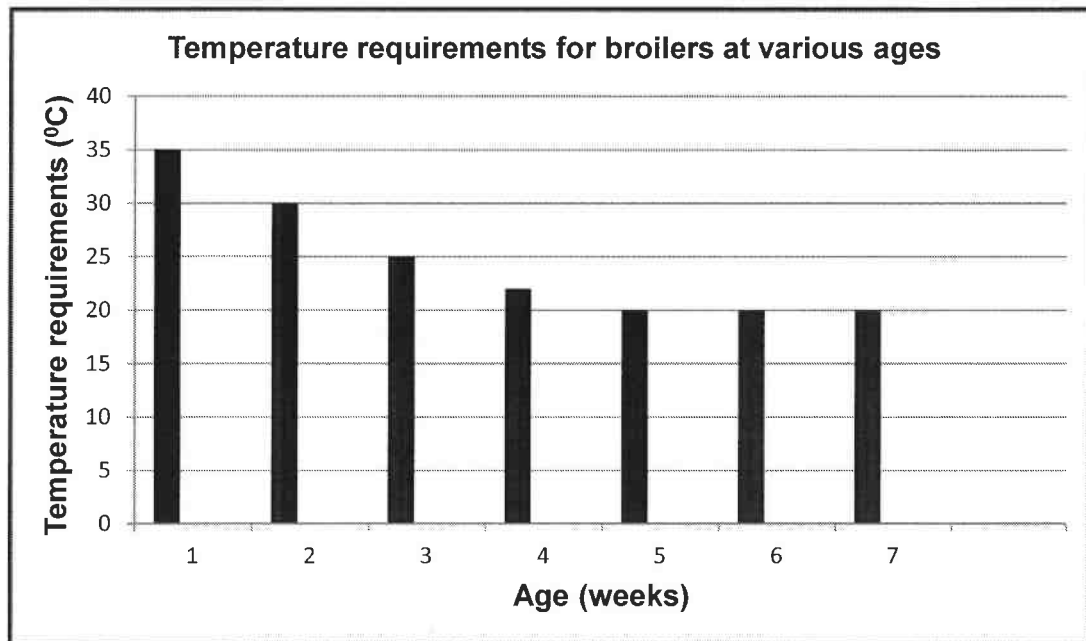
2.6.3 TWO aspects to be considered when planning fodder production

- The number of livestock \checkmark
- Nutrient content of the feed \checkmark
- Possible feeds available \checkmark
- Requirements of the herd \checkmark
- Cost of buying the feed \checkmark
- Timing of production season \checkmark
- Carrying capacity of the veld \checkmark

(Any 2)

(2)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Temperature requirements for broiler chickens****3.1.1 Bar graph****CRITERIA/RUBRIC/MARKING GUIDELINES**

- Correct heading ✓
- X-axis: Correctly calibrated with label (Age in weeks) ✓
- Y-axis: Correctly calibrated with label (Temperature) ✓
- Correct units (weeks and °C) ✓
- Bar graph ✓
- Accuracy ✓

(6)

3.1.2 Trend of temperature requirement for broiler chickens

- Temperature requirement of broiler chickens decreases ✓
with increase in age ✓
- The younger the chickens ✓
the higher the temperature requirements ✓
- The older the chickens ✓
the lower the temperature requirements ✓

(Any 1) (2)

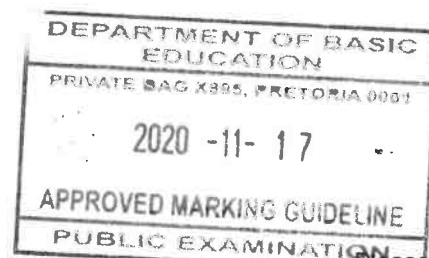
3.1.3 Equipment to maintain temperature in a broiler house

Heaters/air conditioners/fans/infra-red lamps/curtains/insulators ✓

(1)

3.2 Indication of the animals showing the behaviour

- 3.2.1 Cattle ✓
- 3.2.2 Sheep ✓
- 3.2.3 Pigs ✓
- 3.2.4 Chickens/poultry/birds ✓



(1)

(1)

(1)

(1)

3.3 Farming systems

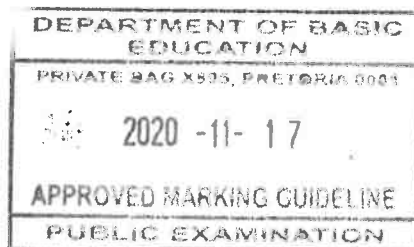
- 3.3.1 Identification of the farming system**
- PICTURE A** - Commercial ✓ (1)
- PICTURE B** - Subsistence ✓ (1)
- 3.3.2 Comparison of the farming systems**
- **Commercial farming system** - High environmental pollution due to heavy use of chemicals/release gases like methane ✓ (1)
 - **Subsistence farming system** - Low environmental pollution due to low animal density/less use of chemicals ✓ (1)

3.4 Parasites

- 3.4.1 Classification of diseases according to pathogens**
- Bacterial ✓ (1)
 - Viral ✓ (1)
- 3.4.2 Meaning of zoonotic diseases**
Diseases that can be transmitted from animals to humans ✓ and humans to animals ✓ (2)
- 3.4.3 Reason for swine flu to be enzootic**
Affects specific animals in a particular region ✓ (1)
- 3.4.4 TWO roles of the state in controlling notifiable diseases**
- Implementation of legislation ✓
 - Creation of buffer zones for testing and vaccination of clean stock before movement ✓
 - Establish quarantine zones/isolation ✓
 - Research ✓
 - Prevent stock movement ✓
 - Deployment of state veterinarians for testing and vaccination ✓
 - Removal/culling of infected stock ✓
 - Public awareness ✓
 - Import/export bans ✓ (Any 2) (2)

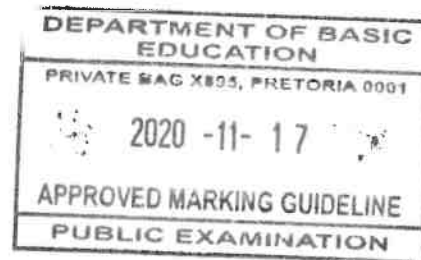
3.5 Internal parasites

- 3.5.1 Identification of the internal parasites**
- **Parasite A** - Round worm/nematodes ✓ (1)
 - **Parasite B** - Tape/flat worm/cestodes ✓ (1)



3.5.2 **TWO visible symptoms in sheep infested with roundworm**

- Diarrhoea ✓
- Whitish mucus membranes in the inside of the eyelids ✓
- Anaemia ✓
- Weight loss ✓
- Rough coat ✓
- Loss of appetite ✓
- Bottle jaw ✓
- Rapid breathing ✓
- Coughing ✓
- Bloated stomach ✓
- Wasting diseases ✓
- Pneumonia ✓



(Any 2) (2)

3.5.3 **TWO management practices to manage heavy infestation of a flock by internal parasites**

- Resting, rotational grazing of camps ✓
- Avoid wet grazing areas ✓
- Feed animal well ✓
- Clean drinking water/sanitation ✓
- Veld burning ✓
- Fencing off infected areas ✓
- Use feeders to avoid contamination of food/zero grazing ✓
- Hygienic measures ✓
- Breeding animals that are more resistant ✓
- Good health programme (deworming/dosing) ✓

(Any 2) (2)

3.6 **Plant poisoning**

3.6.1 **Identification of the poison**

Maize fungus ✓

(1)

3.6.2 **TWO measures to prevent fungus contamination of stored feeds**

- Store feeds in a dry cool place/avoid wet areas ✓
- Improved ventilation ✓
- Continuously checking the place for leaks/dampness where feed is stored
- Clean the sheds ✓

(Any 2) (2)

3.6.3 **TWO actions to be taken once the presence of maize fungus is detected in feeds**

- Remove and dispose of the feed contaminated with fungus ✓
- Clean off the space and give animals fresh feed ✓
- Use fungicides to prevent fungal growth ✓

(Any 2) (2)

[35]

QUESTION 4: ANIMAL REPRODUCTION**4.1 Reproductive system of a bull****4.1.1 Identification of parts**

- A** Testes/scrotum ✓ (1)
- B** Penis/urethra ✓ (1)
- C** Vas deferens/seminal tube/ductus deferens/sperm duct ✓ (1)

4.1.2 ONE function of testes

- Secretion of hormone testosterone/male sex hormone ✓
- Production of sperm cells/male sex cells ✓ (Any 1) (1)

OR**ONE function of the scrotum**

- Protects the testis ✓
- Regulates temperature of the testis ✓ (Any 1) (1)

4.1.3 Role of seminal vesicles

- Secrete fluid that transports the spermatozoa ✓
- Protect the semen against pH changes ✓
- Provide energy for sperm cells ✓ (Any 1) (1)

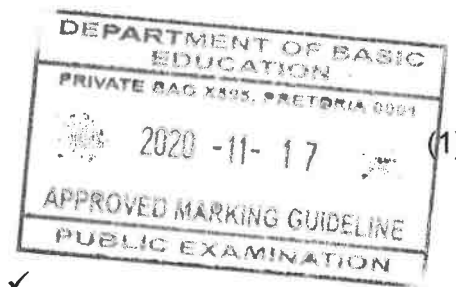
4.2 Lack of libido in bulls**4.2.1 Term for the condition**

Lack of libido ✓

4.2.2 THREE causes of lack of libido

- Immaturity/lack of experience ✓
- Overwork/exhaustion/over exertion ✓
- Malnutrition ✓
- Poor health/diseases/low testosterone ✓
- Change in environment ✓
- Stress ✓
- Temperament ✓
- Age/senility ✓

(Any 3) (3)

**4.3 Process of artificial insemination (AI)****4.3.1 Identification of the hours after oestrus to get the highest pregnancy rate**

10 to 13 hours after onset of oestrus ✓ (1)

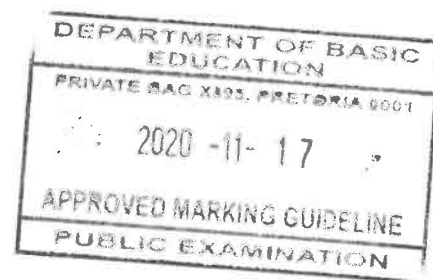
4.3.2 A reason why the cow would allow insemination between the first hour and 12 hours after the start of oestrus

The cow will be receptive to the bull/it will be on heat/in oestrus ✓ (1)

4.3.3 TWO visible signs the cow will show when in oestrus

- Allows mating/insemination ✓
- Mucus strings from the vulva ✓
- Swollen and red vulva ✓
- Mounts others ✓
- Hair on the back/rump are fluffed up ✓
- Mud patches on her back ✓
- Bellowing noises ✓
- Cows are excited/restless ✓
- Frequent urination ✓
- Sniffs the genitals of other cows ✓
- Raises their heads and curls her lips ✓
- Decrease in milk production ✓

(Any 2) (2)

**4.3.4 ONE reason to inseminate hours before ovulation**

- Ovum has a shorter lifespan than a sperm cell ✓
- Ovum needs to arrive when sperm cells are already waiting for fertilisation ✓

(Any 1) (1)

4.3.5 ONE requirement for a successful insemination

- Use of healthy/viable semen ✓
- Technique performed by a skilled/experienced technician ✓
- Insemination at the correct stage of oestrus ✓
- Use the correct sterilised equipment ✓

(Any 1) (1)

4.4 Fertilisation**4.4.1 Labels**

- | | | |
|----------|---------------------------------------|-----|
| A | Egg cell/ovum/female gamete ✓ | (1) |
| B | Sperm cell/spermatozoon/male gamete ✓ | (1) |
| C | Zygote/fertilized egg cell ✓ | (1) |

4.4.2 Name of the process represented by the illustration

Fertilisation ✓ (1)

4.5 Pregnancy**4.5.1 Identification of the process**

Pregnancy/gestation ✓ (1)

4.5.2 THREE stages of the process

- Ovum/stage of ovum ✓ (1)
- Embryo/embryonic stage/stage of embryo ✓ (1)
- Foetal/stage of foetus ✓ (1)

4.5.3 Indication of the normal presentation of the calf

Anterior ✓ (1)

4.6 Parturition

4.6.1 **The condition experienced by heifers calving for the first time**
Dystocia ✓ (1)

4.6.2 **TWO signs of an animal experiencing birth problems**

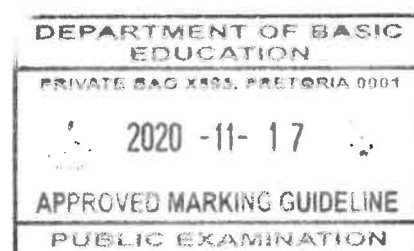
- Show signs of prolonged distress/excessive pain and discomfort ✓
- Foetus/after birth showing in birth canal without expulsion ✓
- Prolonged birth process ✓
- Exhaustion ✓

(Any 2) (2)

4.6.3 **ONE cause of problems during birth in heifers**

- Large foetus/small sized heifer ✓
- Small pelvic area ✓
- Inexperience ✓
- Incorrect presentation ✓
- Malformed foetus ✓
- Cervix not dilated ✓
- Twisted uterus ✓
- Weak labour ✓
- Diseases ✓
- Twinning/multiple birth ✓
- Hydrocephalus ✓
- Weak muscle contraction ✓
- Prolong gestation ✓
- Vaginal tear ✓

(Any 1) (1)



4.6.4 **Hormone that initiates milk release**
Oxytocin ✓ (1)

4.6.5 **First milk produced in the first 3 days after calving**
Colostrum/beestings ✓ (1)

4.7 Embryo transfer

4.7.1 **Process in the scenario**
Embryo transfer/ER ✓ (1)

4.7.2 **Main importance of embryo transfer**
Creation of multiple offspring ✓ with the desirable characteristics of superior parents ✓ (2)

4.7.3 **Explanation of a donor cow**
Production of superior ova ✓ for implantation to inferior cows ✓ (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

