Second Chance Matric Support Programme BRIGHT IDEAS Revision Booklet AGRICULTURAL SCIENCES



basic education

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







Agricultural Sciences

Grade 12 REVISION BOOKLET



TABLE OF CONTENTS		
1.	Forward	3
2.	How to use this booklet	5
3.	Key (SUBJECT) concepts	7
4.	Revision Questions Set 1 (Master 40%)	XX
5.	Revision Questions Set 2 (Master an additional 20%)	XXX
6.	Check your answers Set 1	XXXX
7.	Check your answers Set 2	ZZZZ
8.	Study and Examination Tips	
9.	Message to Grade 12 learners from the Writers	

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10. Thank you

2

1. Forward

Message from the Minister of Basic Education



Message to Second Chance Learners/ Grade 12 learners from the Minister of Basic Education

"Matric" (Grade12) is perhaps the most important examination you will prepare for. It is the gateway to your future; it is the means to enter tertiary institutions; it is your opportunity to create the career of your dreams.

It is not easy to accomplish but it can be done with hard work and dedication; with prioritising your time and effort to ensure that you cover as much content as possible in order to be well prepared for the examinations.

3

I cannot stress the importance and value of revision in preparing for the examinations. Once you have covered all the content and topics, you should start working through the past examination papers; thereafter check your answers with the memoranda. If your answers are not correct, go back to the Mind the Gap Series and work through the content again. Retest yourself. Continue with this process until you get all the answers right.

The Bright Idea....getting exam ready Booklet will allow you to do this in a systemic way. It has been developed to assist you to achieve a minimum of 40% in the examinations, if you work hard and follow the advice and guidance provided in the book. I also urge you to continue with the next section that deals with an additional 20%, which will ensure you have covered the basics to achieve 60%.

Use this valuable resource which has been developed especially for YOU, work hard, persevere, work every day, read and write every day to ensure that you are successful.

I have faith that you can do this. Remember "SUCCESS" depends on the second letter, "U".

Best Wishes

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MRS AM MOTSHEKGA, MP MINISTER OF BASIC EDUCATION DATE: 24/02/2017

2. How to use this Revision Booklet

2.1....

- Explain use of book
- Ensure you understand all the relevant concepts, formulae etc.
- Explain the sections of mastering the 40% first and then the additional 20%
- Explain how to work with questions and then how to check answers in Section 6 and 7
- Explain how to link to Mind the Gap and Textbooks
- Explain what a learner should do if they get questions wrong (go back to section in mind the gap/ textbooks/ask questions and re learn the section) then answer the questions again.
- Continue with this process until you get every question correct
- Then find the other past question papers and go through similar questions and check the memoranda to ensure that you get them right
- If you don't go back to the content and go through again
- Next attempt Section 5 (additional 20%) follow the same process until you have mastered all concepts
- You are now ready to answer 60% of the question paper

SEC	TION 2			
0.4		6.0		

2.1 The purpose of the book:



Many students don't know how to study and they also don't know how to prepare for exams! They come to dread studying and even avoid it! Learning how to study is not difficult at all and once you know how to do it, you're set.

SECTION 3:

Key concepts

This section deals with the basic knowledge and questions found in Paper 1 and Paper 2. Paper 1 deals with topics: Animal Nutrition, Animal Production, protection and control and Animal Reproduction. Paper 2 deals with Basic Genetics, Production Factors and Agricultural Management and Marketing.

3.1	Topic 1: Animal Nutrition(feeding)Did you know? A mind map is a diagram in whichinformation is presented visually, usually with a central ideaplaced in the middle and associated ideas arranged around it.To see the Mind map of Animal Nutrition: please turn over to page	
3.1.1	Terminology The following list of terms is used in nutrition. Try to study at least the terms that focus on the structure and functions of the parts of the alimentary canals of the three farm animals discussed in your textbook and in the diagrams on page 9	

N0	CONCEPT	DEFINITION
	Abomasum	-true/milk stomach of a ruminant
	Absorption	-is the movement of dissolved food into the cells
		of the body.
	Amino acids	-the building blocks/the monomers of proteins
	Amylase	-the enzyme that converts starch to maltose.
	Bile	-a yellowish, bitter, alkaline liquid made in the liver
		and emulsifies fats.
	Biological Value (BV)	-is an index of the quality of the protein in a feed
	Cardiac sphincter	-is a ring of muscle which controls the movement
		of food into the stomach
	Chemical digestion	-this involves chemical reactions by digestive
		enzymes.
	Co-efficient of	-is a measure of the digestibility of a feed
	digestibility	expressed as a percentage in terms of dry
		matter(DM).
	Concentrates	-feeds that have high percentage of TDN (> 60%)
		in small volume

Сгор	-the soft bag-like enlargement in the oesophagus
 Oruda fibra	of a fowl.
Crude fibre	-consists of cellulose and light, which are
	extremely difficult to digest.
Digestibility	-the portion of the feed that is absorbed and not
	excreted by the body.
Digestible energy	-gross energy value of a feed minus energy lost in
 Dimention	faeces.
Digestion	- the mechanical and chemical breaking down
	of food into smaller components that can be
D	absorbed into a blood stream.
 Dry matter	-all the constituents of feed except water.
 Emulsification	-fats broken down into small droplets
 Enterokinase	-enzyme that converts trypsinogen to trypsin.
Fore stomachs	-the rumen, reticulum and omasum of the
	ruminants.
Gross energy	-the energy that is released as heat when a feed
	is completely oxidized to carbon dioxide, water
	and gases.
Islets of Langerhans	- Irregular clusters of endocrine cells scattered
	throughout the tissue of the pancreas that secrete
	insulin and glucagon.
Lipase	-the enzyme involved in fat digestion(breaks fats
	into fatty acids and glycerol).
Maintenance ration	-amount of feed needed simply to maintain the
	body mass and composition of an animal (i.e.
	support life).
Mechanical	- this is a physical breakdown of food into smaller
digestion	pieces.
Metabolic energy	-gross energy value of a feed minus energy lost
	in faeces, urine and gaseous end-products of
	digestion.
Minerals	-inorganic elements needed in small quantities in
	an animal's body
Nett energy	-gross energy minus energy lost through faeces,
	urine, digestive gases and lost as heat.
Nitrogen free extract	-consists of easily digestible carbohydrates like
	sugars and starch
Non-ruminants	-animals that have a simple stomach.
Nutritive ratio (NR)	-ratio between digestible protein (DP) and
	digestible non nitrogen compounds

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Oesophagus (gullet)	-is a tube-like structure that leads from the back of
	the throat (pharynx) to the stomach.
Omasum	-the leaf shaped third and smallest stomach of the
	ruminant
Osteomalacia	-the disease found in fully grown animals when
	too much calcium has been removed from their
	skeletons.
Pepsin and Trypsin	-enzyme that breaks proteins to peptides
Peristalsis	-the wave-like contractions that move food along
	the digestive tract.
Production ration	-the additional amount of feed an animal needs
	on top of the maintenance ration in order to do
	work and for production
Pyloric sphincter	-is a ring of muscle which controls the movement
	of food into the small intestines (duodenum).
Rennin	-enzyme that changes soluble caseinogen of milk
	to insoluble casein.
Reticulum	-the honeycomb-shaped second stomach of the
	ruminant.
Retro-peristalsis	-when food from the stomach is moved back to
(reverse peristalsis)	the mouth, can occur during vomiting. / Ejection of
	contents of stomach through the mouth
Roughages	- feeds that have small percentage of TDN (<
	60%) in small volume
Rumen	-the largest compartment of the ruminant
	stomach.
Ruminants	-animals that have a complex stomach (divided
	into four chambers) and chew the cud.
Silage	-is a fermented feed resulting from the storage of
	green forages under anaerobic conditions
Urea	-is a cheap NPN source that can be used by
	ruminants to synthesize proteins.
Vaccination	-the injecting of an agent into an animal to prevent
	disease.
Villi (singular: villus)	-are tiny, finger-like projections found on the wall
	of the small intestines and they increase the
	surface area.
Vitamins	-organic compounds needed in small quantities in
	animal body



3.1.3 **The structure of the alimentary canals of farm animals:**

The structure of one or the comparison between the structures of the three different types of alimentary canals of farm animals are always found in the examination paper(Paper 1). Study the diagrams and the table containing the differences between a fowl/ chicken, pig(monogastric animal) and the ruminant animal(cattle).



Table of the differences between the three digestive systems:

Component	Diagram 1: Fowl	Diagram 2:	Diagram 3:
	Chicken	Monogastric animal	Ruminant animal
Mouth/ Beak	No Amylase	Salivary Amylase	No Amylase
	No teeth	Teeth	Teeth
Oesophagus	Forms Crop	No Crop	No Crop
Stomach	Proventriculus Ventriculus	Single Compartment	4 Compartment: Rumen, Reticulum Omasum, Abomasum
Caeca	Two	One	One
End of Digestive system	Cloaca/Vent Combined Urogenital System	Anus	Anus

3.1.4

.4 Important calculations in feeds and feeding of animals(to achieve at least 40% in the exam)

	(a) Coefficient of digestibility:						
There are several ways in which this can be asked ia paper. Think clearly and do not get lost in all theinformation. Let us look at the following examples:							
		Example 1:					
	An experimental trial was conducted with sheep to determine the digestibility of a newly developed grass/clover mixture. During the experimental period the mass of feed intake was measured as well as the mass of excretion. The table below shows the data from this experimental trial.						
		FEED COMPONENT Grass/ clover Manure (%)					
		Moisturo 8 4					
			0	4			
		Dry material	92	96			

The total feed intake of a sheep was 7kg of the mixture and the mass of	
excreted manure was 2kg.	
Calculate the co-efficient of digestibility of this experimental	
mixture. Show ALL your Calculations	





This means that 70,18% of the feed is digested or absorbed by the animal which indicates that this is a feed with a high digestibility content and most of it is taken into the blood stream of the animal to be utilised for energy, fattening or lactating purposes(production) or other life processes.

(b)	Nutritive ratio (NR:
	Nutritive ratio (NR)= <u>1: % Digestible non nitrogen substances</u>
	% Digestible protein
	This is an indicator of the relationship between digestible protein and digestible non-protein compounds .
	This calculation is important because it has a huge impact on the costs of animal feed, and therefore it is important to feed the correct feed to the correct type of animal
	It is important that this relationship has to do with the type of feed needed for different purposes . The following table summarizes the nutritional requirements of animals according to its function.

For	For growth	Milk	For	For fattening
maintenance		production	reproduction	
NR between1:6	NR 1:5 or less	NR 1:5 or less	NR less than	NR 1:9- 1:10
and 1:8			1:5	
Protein	Lots of protein	Lots of protein	Lots of protein	Protein only for
needed for the	needed of high	needed of high	needed of high	maintenance
replacement of	biological value	biological value	biological value	
tissue				
Carbohydrates,	Carbohydrates,	Sufficient	Carbohydrates,	Carbohydrates
fats and	fats and	carbohydrates	fats and	and fata
vitamins	vitamins	and fats for	vitamins for	and lats
only for	only for	maintenance	maintenance.	needed in large
maintenance	maintenance	and production	An increase	quantities
			needed	
			to support	
			last third of	
			pregnancy	
Minerals	Sufficient	Sufficient	Sufficient	Minerals and
only for the	minerals and	minerals and	minerals and	vitamins for
replacement of	vitamins for	vitamins	vitamins	maintenance
losses	growth			

Example of Nutritive ratio question:

A feed contains total digestible nutrients of 80% and a dig protein of 8%	gestible
1. Calculate the nutritive ratio of this feed.	(3)
 How would you describe the nutritive ratio of the above (1) 	e feed?
3.Indicate the use of this feed. Explain your answer	(3)

	The formula: This is non nitrogen substances, therefore the protein component must be subtracted	
	Nutritive ratio (NR)= <u>1: % Digestible non nitrogen substances</u>	
	% Digestible protein	
	Thus $80 - 8 = 72 = 94$	
	8 8	(3)
	The nutritive ratio is the 1: $9\checkmark\checkmark$	
	2. The nutritive ratio of this feed is wide \checkmark	(1)
	3. This feed would be used for fattening \checkmark , because the it contains relatively few digestible proteins \checkmark and a relatively higher proportion of other digestible nutrients such as carbohydrates and fats \checkmark	(3)
(c)	The Pearson square method:This calculation is used when a feed ration needs to be mixed to achieve a certain feed requirement. This can be used for Crude Protein, Total digestible nutrients (TDN) or any other feed component.	

Example:

A farmer produces his own maize and soybeans on his farm. In an attempt to save on feed costs he decides to mix his own feed ration to meet the Digestible protein (DP) needs of his dairy cows. He needs a DP of 16% for the cows. Maize contain a DP of 8% and Soy beans a DP of 18%

Calculate the ratio in which these feeds needs to be mixed to achieve the required DP:

Step 1: Draw a square and write the required DP in the middle

Step 2: Then write what you have on the side

Step 3: Do a cross over calculation whereby you subtract the figures on the sides from the middle. If it is a negative ignore the minus symbol(-)





Step 4: Don't mix up the figure. The parts are indicated bythe fat arrows
Thus the feed ration is 2:8 2 parts of maize and 8 parts of soya
You can then be requested to mix a certain amount of this feed e.g
200kg
Then mathematically it looks as follows : 8 + 2 = 10
For the maize it is then 2/10 × 200 = 40kg of maize
For the Soya it is 8/10 × 200 = 160kg and check if it adds up to 200kg

With calculations all formulas must be studied (none is given in the examination paper) Extra tips on calculations:

- > Always first decide which formula to use
- Write down the formula to see what figures(amounts) are available from the question
- > Underline the figures given
- > Substitute the figures(amounts) into the formula
- > Make sure you know how to use your calculator

Example 2:

1. In this example you are given a number of components and you must calculate the % Digestible Coefficient of the feed as a whole as well as for the different components. The formula for the calculation for the whole feed as well as for the different components is the same.

In this calculation you are again indicating another method of getting rid of the moisture. You can use any method as long as it is mathematically correct.

Intake:

Moisture is 10 % Thus 100% - 10% = 90% Intake is the 240Kg x 90% = 216 Kg DM Excretion: Moisture is 60% Thus 100% - 60% = 40% Excreta in then 14kgx40% = 5.6Kg DM Thus Coefficient of digestibility = <u>DM Intake (kg) – DM Excreted(kg)</u> DM Intake (kg) = <u>216 kg -5.6kg</u> \checkmark 216 = 0.97 x 100 \checkmark = <u>97%</u> $\checkmark \checkmark$

In the case where you have to calculate the different components the calculation stays the same. You use the same formula for **every component**

In the example given the Crude Protein is 12 % to then calculate the Coefficient of digestibility of the protein:

You have already calculated that the **Intake** of the complete feed is 216 kg DM

To calculate CP (Crude protein intake) = 216 × 12% = 25.92 kg DM

The CP Excreted is 8% of the complete feed. Thus 5.6kg excreta (calculated in complete feed). Thus CP = $5.6 \times 8\% = 0.448 \text{ kg DM}$

To calculate then the Coefficient of digestibility of the crude protein (CP)

 $= 25.92 - 0.448 \qquad \checkmark$ $25.92 = 0.98 \times 100 \quad \checkmark$ $= 98\% \checkmark \checkmark$ (4)

Therefore the calculation for each component works on the same basis.



3.2	Topic 2: Animal ReproductionDid you know? A mind map is a diagram in whichinformation is represented visually, usually with a central ideaplaced in the middle and associated ideas arranged aroundit. One can draw mind maps on every topic or sub-topic inAgricultural Sciences.To achieve at least 40% in the exam paper it would be a good	
	idea to focus on both the male and female reproductive systems in Animal Reproduction. Study the two mind maps on pages 23 and	
	24	
3.2.1	Terminology:	
	I ne important terms and concepts in Animal Reproduction are	
	listed in the following table:	

NO	CONCEPT	DEFINITION
	Abortion	 Termination of pregnancy before the normal pregnancy period has elapsed
	AI	 The process whereby sperm is placed into a female's uterus/ cervix by artificial means rather than natural mating
	Ampulla	Site for fertilisation
	Anoestrus	 A sexually mature, non-pregnant cow shows no signs of oestrus
	Calving	• Ejection of a calf at the end of pregnancy period
	Cervix	 A firm tube-like structure found between the uterus and the vagina
	Clitoris	 Small elongated erectile organ at the anterior part of the vulva
	Colostrum	 Yellow milk secreted during the first 3 days after calving
	Cryptochydism	 A condition whereby the testes remain in the abdominal cavity and do not move down to the scrotum
	Dry period	 Period from the end of lactation until the mother has another offspring
	Dystocia	 Condition of prolonged & difficult parturition

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Ejaculation	 Release of semen into the vagina during copulation
Embryonic transfer/ transplant	 Removal of a fertilised ovum from the uterus of a superior cow & transferring it to the uterus of the inferior cow
Embryo	 A developing animal formed from a fertilised ovum
Epididymis	 A single, narrow, coiled tube that transports sperm from testes to the vas deferens
Fallopian tubes/	 A pair of coiled tubes that extend from the
oviducts	ovaries to the uterus
Fertilisation	 Fusion of an ovum and a sperm cell to form a zygote
Fertility	 Ability to produce offspring
 Infertility 	 Inability to produce offspring
Sterility	 Permanent loss of fertility
Foetus	 An unborn animal in the later stages of development
Freemartin	 A heifer(female calf) born as a twin with a bull calf
FSH	 A female hormone produced by the pituitary gland which stimulate the development of follicles in the ovaries
Gametogenesis	 Formation of gametes
■Oogenesis/ ovigenesis	 Formation of a mature ovum from a primary oocyte
 Spermatogenesis 	 Formation of spermatozoa in the testes
Hypoplasia	 Incomplete development of the reproductive organs
Implantation	 Attachment of the embryo onto the uterus
Impotence	 Inability to copulate in male animals
Lactation	 Secretion of milk from the mammary glands
LH	• A female hormone responsible for the rapture of the Graafian follicle to release a mature ovum
Libido	 Lack of sex urge
Maceration	 A condition where a foetus dies and its tissues soften & decay due to excessive moisture

Mating	 A physical act whereby a male and a female animal come together and copulate for breeding purpose
Multiple births	 More than one offspring is born from a single gestation
Mummification	 A condition where a foetus dries up and becomes hardened
Nuclear transfer/ cloning	 A process that produces an identical copy of biological material
Oestrogen	 A female hormone responsible for onset of behavioural oestrus
Oestrus	 A period when a female is receptive of a male & allows mating
Oestrus cycle	 A 21 day period which a follicle develops into a mature ovum
Oocyte	 An immature ovum that into a follicle
Ovary	 Primary sex organ of a female
Ovulation	 A release of a ripe ovum from an ovary
Ovum	Female gamete
Oxytocin	 A female hormone responsible for the release of milk
	 A female hormone responsible for muscular contractions during ejection of a foetus
Parturition	 Normal ending of pregnancy
	 Process of ejection of a foetus & placenta at the end of gestation period
Penis	 A male organ of copulation
Placenta	 An organ that attaches an embryo to the uterine wall
Pregnancy/ gestation	 A period that begins with fertilsed ovum and ends with birth
Progesterone	 A female hormone secreted by the corpus luteum to maintain pregnancy
Prolactin	 A female hormone responsible for production of milk
Prostate gland	 A gland that lies in the form of a ring around the urethra in males
Reproduction	Production of offspring

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Scrotum	A sac that houses and protects the testes
Semen	 A mixture of sperm & fluids from the seminal vescicle, prostate gland & Cowper's gland
Sperm	Male gamete
Superovulation	 Treating a female with hormones in order to produce many ova at the same time
Synchronisation of oestrus	 A treatment of a large number of animals with hormones so that they all reach oestrus at the same period
Testis	Primary sex organ of a male animal
Testosterone	 A male hormone responsible for male characteristics
Umbilical cord	• A tube-like structure that connects an embryo to the placenta of a mother
Uterus	 An organ where a developing embryo is implanted
Vagina	A female mating organ/ a birth canal
Vulva	 External opening of the vagina

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3.2.2	Example	e of a multiple choice question:	
	In Section	on A of every question paper, Question 1.1 consists of	
	Multiple	choice questions. They cover all the topics in that paper	
	and norr	mally concentrate on terminology and understanding of the	
	content.	The following is an example of a multiple choice question	
	from the	topic Animal Reproduction.	
1.1	Various	options are provided as possible answers to the	
	followin	g questions. Write down the question number (1.1.1–	
	1.1.10),	choose the answer and make a cross (X) over the letter	
	(A–D) o	f your choice in the ANSWER BOOK.	
	1.1.1	Twins developing from two different ova and fertilised by	
		two different spermatozoa:	

A	Freemartin	
В	Monozygotic	
С	Dizygotic	
D	Maceration	(2)





3.3 **Topic 3: Animal Production, protection and control**



	How to study Animal production:	
	(for example why do animals need to be kept at a certain temperature)	
C	Farm animals are mammals. You are a mammal too. What happens to you when it is cold?	
C	You start to shiver which is consuming (using) energy	
	from your body. This energy could have been used for	
	production. The same happens to the animal - if an animal	
	is subjected to cold without proper shelter , that animal	
	uses the energy that he gets from his feed to warm up	
	instead of production. This makes rearing the animal too	
	expensive.	
0	• You eat less when it is extremely hot. So does a farm	
	animal, because eating produces energy which in turn	
	makes it feels too hot. If a farm animal eats less, it has less	
	energy for production purposes (of eggs, wool, meat, etc.)	
	Therefore to optimize production it is important to provide	
	shelter and make sure that animals are comfortable	

	See the mind map of Animal Production, Protection and Control on page 35	
3.3.1	Terminology	
	The following terms are important to Animal Production:	

N0	CONCEPT	DEFINITION
	Broiler	- chickens reared for their meat.
	Broodiness	- the tendency of a hen to sit on eggs.
	Extensive	- is a system where animals are kept on a large
		surface area they may be small or many.
	Feedlots	- a plot of ground/building where livestock are
		fattened for the market.
	Fertility	- having good semen or sperm production for
		reproduction purposes.
	Handling	- to touch or hold or move animals from one place
		to another.

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Hoppers	- containers for grain which narrow near the
	bottom and release grain from this end.
Hyperthermia	- condition in which the body temperature is much
	higher than normal.
Hypothermia	- condition in which the body temperature is much
	lower than normal.
Insulation	- protection to prevent loss of heat.
Intensive	-is a system where large numbers of animals are
	concentrated in a small area.
Large-scale or	- usually involves large numbers of animals
commercial farming	
Panoramic vision	-some animals can see all around e.g. cattle
Roost	- is when chickens settle for rest especially when
	they have laid eggs.
Rounding off	- fattening or growing animals for market
	readiness.
Small scale and	- involves a small number of animals.
subsistence farming	
Thermoregulate	- control the body temperature to its optimum
	level.
Ventilation	- the entry and circulation of air freely.
Watering points	- is the place where livestock receive their water.

Example of an exam question: Matching Columns(Animal Production)

In Section A in both Question papers **Question 1.2** is a question where you have to match terms and definitions/description with each other. There are descriptions in one column that you need to match with the term/concept in the other column. The trick is to use the correct **SYMBOL(S)** asked in the instructions, as many learners make the mistake of writing the definition/term or they do not write **A only or B only or BOTH A and B or NONE. This leads to the loss of easy marks. See example below:**

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 number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 B only.

		Column A	Column B
101	A	Modified environment	Intensive production evotom
1.2.1	B Feeding closely monitored	intensive production system	

Answer: Both A and B	
How to answer this type of question:	
Know what each of the descriptions in Column B is about	
and associate it with the most correct item in Column A.	
This explanation in column B is about intensive production	
system in animal farming.	
Evaluate each item/description in column A to establish	
if it can be correctly matched with the description/item of	
column B. Modified environment is associated with an	
intensive animal production system. Feeding closely	
monitored is part of ensuring value for money in the	
intensive animal production system.	
Select the best item/description in column A and match	
it with item/description in column A. Both A and B are	
correctly matching with description in column B.	
The following are important when answering this type of	
question:	
✓ Know what each description/item is about	
✓ Evaluate each item/description in column A	
✓ Select the best item/description from column A	



This question focuses mainly on the knowledge and understanding of **terms and concepts** in all the topics



Example of an exam question: CASE STUDY	
A case study is an account of an activity or problem that contains	
a real-life situation that would be encountered in farming.	
 Answering a case study question involves: Analysis of the situation Applying sound agricultural knowledge Thinking about the problem and its solutions Drawing conclusions 	

5 ANGORA FARMERS COUNT THEIR LOSSES			
		Four thousand Angora goats died in the cold and wet conditions in the Rietbron and Willowmore areas in July. The new-born animals could not withstand the bitter cold, strong winds and rain. It was not only the loss of animal progeny, but mohair was also lost.	
		With the assistance of the agricultural extension officer, the farmers were subsidised to build shelters that had special insulation material, foldable walls and heaters. [Adapted from <i>Farmer's Weekly</i> , 12 August 2011]	
	5.1	Name the production system practised by the farmers before the cold period in July. Give a reason your answer.	(3)
	5.2	Explain why the above-mentioned solution by the extension officer is recommended for these goats in relation to the following:	
		Shelter	(2)
		Insulation material	(2)
	F 0	Heaters	
	5.3	to assist the farmers in the passage above.	(2)

	must have analysed the situation in the case study to know that the production system is Extensive Farming . The reason required draws from the supporting text of cold and wet conditions .	(3)
5.2	The answers to question 5.2 involve the application of agricultural knowledge to ensure that animals must be protected from adverse weather conditions .	(6)
5.3	The answers to question 5.3 well thought out solutions and appropriate conclusions on the need for subsidy by government to help farmers in times of need.	(2)

Example of exam questions: Scenerios	
A scenario is an outline or picture of a situation based on assumptions and factors . It is used to estimate the possible effects of one or more of the factors. A scenario is used for situation analysis and future planning .	
Read the following scenario and answer the questions that follow.	

3.2	Shelters are used in both intensive and extensive farming systems. Besides protecting animals against unfavourable	
	weather conditions and wild animals, they are a means of	
	preventing stock theft and warding off pests in certain situations.	
	Shelters could take the form of planting trees, building kraals or concrete wall structures covered with roofing sheets.	
	Animals exposed to unfavourable weather conditions tend to use	
	up more energy, particularly at very low temperatures.	

3.2.1	Refer to the scenario above and name TWO forms of	
	shelters that could be used by indigenous farmers.	(2)

3.2.2	Identify THREE adverse consequences that a complete	
	lack of shelters will have on an extensive farming enterprise.	(3)

3.2.3	Give a reason why animals that are exposed to very low		
	temperatures tend to use up more energy.	(1))

How should you answer and approach a scenerio?	
Some answers to the questions can be found in the scenario itself	
This is the case with answers to question 3.2.1 where	
reference to the scenario is made by the question	
Answer 3.2.1:	
Planting trees, Building kraals and Erecting concrete walls,	
whereas answers to the other 2 questions need the background	
study on why shelters are necessary for animal protection.	
Answers 3.2.2:	
This answer has elements of situation analysis and future	
planning in that an animal will eat more when it is cold and less	
when it is hot so as to compensate for the lack of shelter under both conditions	
Note: These shelters are used to protect animals against	
unfavourable weather conditions (effect of factors on animal production)	
Answer to question 3.2.3 is addressing the possible effect of	
factors (weather conditions) to which animals are exposed. The	
effect of the cold weather condition is lowering available energy	
in the animal. Eating more food during cold weather conditions	
improves energy levels of the animal.	
1	

3.3.2 **Terminology**

The following key terms and concepts are used in Animal Protection and Control:

NO	CONCEPT	DEFINITION
	Animal pests	- are organisms that live in or on the body of an
		animal or share the same environment as the farm
	A (11 + 4)	animal
	Antibiotics	- are chemical compounds used to kill bactereal and
	Antihadiaa	nuungai intections
	Antiboules	-protein substances produced by white blood cells
	Bacteria	- are microscopically small, single celled organisms
	Biopsy	- is an examination, under a microscope of a tissue
		from a living body to determine the cause or extent
		of disease.
	Clinical examination	- is when you examine animals for signs of disease
	Contagious	- means an ability to infect other animals
	Diagnosis	- is the identification of a disease from the
		examination of symptoms.
	Endemic	- is when a disease occurs in a population regulary
		and can be predicted
	Epidermic	- is a widespread occurrence of a disease that spread
		rapidly through an area.
	External parasites	- are parasites that attack the body surface of animal.
	(ectoparasites)	
	Fight zone	- is a distance that agricultural and wild animals like to
		keep between themselves and a threat of danger.
	Fungi	- are single –celled or multicellular organisms
	Midges	- are very small flying insects they also transmitt
		diseases such as horse sickness and blue tongue
	Minerals	- are inorganic substances that play a very important
		role in chemical reaction in the body.
	Pathogens	- are disease –causing organisms
	Post mortem	- takes place when one cuts open the carcass of
		dead animal to determine the cause of death.
	Protozoa	- are singled celled organisms that live within the
		animal or on the animal
	Quarantine	- means keeping animals in isolation for a fixed period
		of time to enable officials from the Department of
		Veterinary Services to test for and detect diseases.

>

F	Respiratory rate	- is the number of breaths that the animal takes in one minute
F	Rotational grazing	- involves moving animals between different grazing camps so as to achieve veld management objectives.
S	Shelter	- is a place giving temporary protection from bad weather or predators, includes, simple shelters, open and closed housing, sheds, holding pens and crushes.
S	Sustained treatment	- is when medication is given on continuous basis
T	Fapeworms	- are flat animal that live in the intestine of animal
\ \	/accination	 is the injection of a single substance into an animal to prevent a specific disease
\ \	/ectors	- are insects or ticks, that carry the disease organism from infected to healthy animals.
	/iruses	- are very small acellular structures, only visible with a powerful electron microscope, they multiply only within a living cell and can be transmitted from one organism to another.


3.4	PAPER 2 Topic 1: Basic Genetics Did you know? A mind map is a diagram in which information is represented visually, usually with a central idea placed in the middle and associated ideas arranged around it. One can draw mind maps on every topic or sub-topic in Agricultural Sciences. See the Mind map of Basic Genetics on page	
3.4.1	TerminologyIn Basic Genetics it is very important to know the genetics termsin order to be able to do most of the questions. The followingis a list of terms and their definitions in Basic Genetics:	

NO	CONCEPT	DEFINITION
	Allele	- variations of the same gene
	Atavism	- reappearance of a characteristic in an organism after a period of absence
	Biometrics	- the use of statistics in biology
	Biotechnology	 the use of organisms to produce useful substances
	Breeding	 process of producing plants or animals by sexual reproduction
	Cloning	 a research activity that creates a copy of some biological entity (a gene/cell/organism)
	Dihybrid cross	 a genetic cross which involves 2 pairs of contrasting characteristics
	Dominant	- an allele that masks the effect of another & is expressed in the appearance of an individual
	Co-dominance	- type of inheritance where both alleles are dominant and fully expressed in the phenotype
	 Incomplete dominance 	 type of inheritance where both alleles are partially
		expressed, often producing an intermediate characteristic.
	Epistasis	 masking of the phenotypic effect of alleles at one gene by alleles of another gene

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Gametes	 a reproductive cell having haploid number of chromosomes
Gene	- unit of heredity that carries information for each
	characteristic of an organism
Genetics	- study of inheritance/ genes
Genotype	- genetic makeup of an organism
GMO	- an organism whose genetic characteristics
	have been changed by inserting gene/s of
	another organism into its DNA
Heredity	- transfer of genetic factors from one individual to
	the next
Heritability	- a degree to which genetics determines a
	characteristic
Heterozygous	- having different alleles of a gene e.g. Tt
Homologous pair	- chromosomes of the same shape & size from
	each parent
Homozygous	- having identical alleles for a particular gene e.g.
	TT or tt
Hybrid	- an organism resulting from a cross between
	geneticallydifferent individuals of the same or
	different species
Meiosis	- reduction division of sex cells that gives rise to
	4 haploid daughter cells
Monohybrid cross	- genetic cross which involves 1 characteristic
	with 2 alleles
Mutation	- sudden/random change in the structure of DNA
Phenotype	- physical appearance of an individual due to
	genetic
	makeup
Polygenic	- trait controlled by many genes
Polyploid	- an organism with more than 2 sets of
	chromosomes
Prepotency	- ability of one parent to transmit more
	characteristics to its offspring than the other
	parent
Pure breed	- an organism that is homozygous for a genetic
	trait and therefore continually gives rise to
	offspring with the same trait

•

Recessive Selection	 an allele that is masked by the presence of a dominant allele and only appears in the phenotype if the organism is homozygous the choice of individuals to be used for breeding
 Mass selection Pedigree selection 	 type of selection that is based on the individual animal's performance on the field type of selection that is based on the quality of the animal's ancestor
 Family selection Progeny selection 	 type of selection that is based on the quality of the animal's relatives of its generation (full/half siblings) type of selection that is based on the quality of the animal's offspring
Variation	 differences between individuals of the same species
Continuous variation	 type of variation in which the characteristc can take on a complete range of forms from one extreme to the other
Discontinuous variation	 type of variation that has a few clear cut forms with no forms in between

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You are expected to be able to make monohybrid and di-hybrid crosses with which you can earn easy marks. After writing down
and female parents (animals or plants), a few basic questions are always asked about the parents or offspring. The following is a step-
by-step demonstration of how to do a monohybrid cross. The di-hybrid cross will follow exactly the same pattern, but more genes
will be involved.

Example 1: Mono-hybrid cross: A Punnett square depicting a cross between two pea plants- <u>heterozygous</u> for purple (B b)



- $\checkmark \checkmark$ for gametes of parents (2)
- $\checkmark \checkmark$ for correct offspring (2)

Examples of questions that could be asked from the above example:	
Indicate the genotype of both the parents,	(2)
Answer: Male (pollen) $Bb\checkmark$ and female (pistil) $Bb\checkmark$	
Indicate the phenotype of both parents	(2)
Answer: Male purple ✓ and female purple ✓	(_)
Indicate the a) genotype ratio of the offspring b) the phenotype ratio of the offspring	
Answer: a) 1(BB) ✓: 2(Bb) ✓: 1(bb) ✓(3) b) 3 purple ✓: 1 white ✓(2)	(5)
Indicate the percentage of the a) Genotype b) phenotype of the off spring	
Answer a) 25:50:25 % (3 ✓) b) 75:25% (2 ✓)	(2)
Example 2: A Homozygous Purple flower (BB) x Heterozygous	1
Purple Flower (Bb)	
Draw a Punnet square to indicate the result of a cross between the above parents.	









3.5	PAPER 2 Topic 2: A factors	Agricultural Management – Production map of the production factors on page 45			
3.5.1	Terminology:				
	The key concepts in Agricultural Management are found in the				
	following table:				
N0	CONCEPT	DEFINITION			
	A budget	- is a financial that shows how income			
		will be generated and how it will be spent			
	A cash flow	-shows the money coming and going-out		\prod	
	statement	of a business over period of time			
	An entrepreneur	-is a person who is able to generate a			
		business from a novel idea and becomes			
		successful			
	Assets	- are things that the farmer owns which			
		are of financial value.			
	Capital	-is the wealth accumulated through			
		savings which is employed in the			
		production process.			

Collateral	- is the form of security that a bank	Π
	requires before giving one a loan.	
Control	- involves checking if the plans are	
	implemented correctly.	
Co-ordination	-involves synchronising all parts of an	
	activity for its smooth running.	Ш
Decision making	- is making a choice between different	
	alternatives /solutions of a problem.	
Equity scheme	- is a financial arrangement between the	
	land reform beneficiaries and labourers to	
	buy shares in a farm	
Financial records	- show money coming in and money	
	spent in a business over a period of time.	
Hedging	-is keeping the market price constant.	
Interest	- is an amount that the financial institution	
	charges for lending capital.	
Labour	-is the physical and mental human	
	endeavour which employed in expectation	
	of remuneration.	
Liabilities	- incudes all the things that the farmer has	
	to pay.	\square
Organisation	- is the bringing together of all parts of an	
	activity for production.	\square
Overcapitalisation	-is when more than required capital is	
	employed in a business	
Planning	- is a mental process where a manager	
	determines what needs to be done by	
	whom and when.	
Restitution	- involves the return of land to their rightful	
	owners	\prod
Soil	-is an area of land with its inherent	
	characteristics, including its resources	
	and characteristics	\square
Undercapitalisation	-is when less than required capital is	
	employed in a business	



3.6	PAPER 2 Topic : Agricultural Management – Management and Marketing Did you know? A mind map is a diagram in which information is represented visually, usually with a central idea placed in the middle and associated ideas arranged around it. One can draw mind maps on every topic or sub-topic in Agricultural Sciences. See the Mind map of Management and Marketing on page		
3.6.1	Terminology		
	Study the terms on Management and		
	Marketing found in the following table:		
NO		DEFINITION	
	A business plan	- is a plan of now the	
	A coiling price	is the highest price of	
		- is the highest price of	
	A market	- is a situation where	
		supply and demand	
		meets. It is a public	
		place of sale	
	Co-operative marketing	- is when producers	
		pool their products and	
		market them through	
		the co-operative society.	
	Demand	- is the quantity of	
		goods bought at a	
		particular time and at a	
		particular moment.	
	Diversification	- is when a farmer	
		decides to be involved	
		in different enterprises	
		and therefore spreading	
		the risk.	

 \checkmark

Free marketing	- is the form of
	marketing where
	producers market their
	products as they please.
Market equilibrium	- is a situation where
	supply and demand are
	equal.
Marketing research	- involves the collection
	about the customers,
	the market and
	competitors in order
	to design an effective
	marketing strategy.
Mass marketing	- is selling a product
	in different to different
	segments of the market.
Multi-segment marketing	- involves choosing a
	few segments of the
	market and developing
	a marketing strategy
	that suits that segment
	of the market.
Niche marketing	- involves selling to a
	small segment of the
	market
Planning	- is a mental process
	where a manager
	determines what needs
	to be done by whom
	and when.
Price elasticity	- refers to a response to
	price change.
Processing	- is the conversion and
	modification of product
	in order to add value on
	it.
Specialisation	- is when a farmer
	focuses on one product
	/form of enterprise

>

Strategic management	- involves developing
	objectives, vision,
	mission and developing
	the business strategies.
Supply	- is the quantity of
	goods offered for sale
	at a particular time at a
	particular moment.
The agri-business chain	- involves all the
	activities from
	production to the
	marketing of agricultural
	products
The marketing chain	- involves all the
	activities from
	harvesting till the
	product reaches the
	consumer. It includes
	harvesting, cleaning,
	sorting, packaging,
	processing, storage and
	transporting

~

<u>Marketing of agricultural products</u> Channels of free marketing – direct sales Advantages – Cash immediately available, no middle man which can lead to better prices

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Disadvantages: - Fluctuations in price Perishability of products, Framer to market his products himself Cooperative marketing_ make use of the "pool system", Collective bargaining power

Advantages: Storage facilities can be shared Ensure efficient and orderly marketing

Ú

Marketing: Factors which hampers marketing: Perishability Standardization Seasonal fluctuations Locality restrictions Long term production Large volumes low unit value Middle men usually required

Market

Consist of buyers and sellers. Possess the following functions Planning and development of production Standardization and grading & sales

Functions of physical supply: what, where

Storage, transport, processing Supportive functions:

Financing Bearing the risk

Market information

Demand: quantity of a product which Market equilibrium: when supply and Price of the product, preferences of Number of consumers, price of the Factors which determine demand: Price is determined by supply and Supply: the amount of a product available for sale at a given time can be bought at a certain time. demand are at the same level the consumer, Income of the Usefulness of the product. Establishment of price competitive products consumers demand

<u>Agrícultural Marketíng</u>

Seasonality, profit margin, stability of

Period of production

the product

Factors that determine supply:

Tables and graphs

How to plot or read information from graphs:

A line graph:

When	you are asked to draw a graph, you will be presented with values or	
figures, normally in a table format. Study the example below to see how		
easy it is to draw a line graph. If you do certain basic things correctly, you		
can earn 5-6 marks very easily!		
2.1	The values indicated in the table below represent potatoes that	
	were sold at different prices and the quantities of potatoes (pockets)	
	sold per week.	

Price	Quantity of potatoes
(rand per bag)	(pockets per week)
5	2 500
10	1 500
15	1 000
20	800
25	500
30	250

2.1.1	Use the figures in the table above to draw a line graph from	
	which some conclusions can be made.	(6)
	Answer: See line graph below	
2.1.2	Deduce from the graph the price at which the biggest	
	amount of potatoes was purchased by the consumers.	(2)
	Justify your answer.	(2)
	Answer : R5,00	
	Reason : 2500 pockets of potatoes were bought at R5,00.	

-

2.1.3	Give TWO reasons for the fluctuation (not constant) of the quantities of potatoes offered for purchase.	(2)
	Answer : Seasonal fluctuations, increase in production	(2)

To draw a graph from the presented data follow the steps:

- Choose a scale most suitable for the data(In this case. 5,10,15... 30 at 1cm apart on the Y -axis), and units of 500, 1000,1500....2500 every cm apart on the X -axis
- Make sure that the axis has been correctly selected
- Clearly indicate what units are to be used on each axis
- ✤ Give an accurate title to the graph
- Plot the points at the correct position
- If a Line graph is needed connect the points.

When interpreting the above please take not of the following:

- > This is called a **line graph**
- The dependent variable (the variable that changes due to changes in the other variable) ALWAYS must be indicated on the Y axis (vertical axis), whereas the independent variable must be on the X axis (horizontal axis)
- In this case, which one is the dependent variable? Answer: Price in Rand
- Why would you interpret the Price as being the dependent variable? Because the price changes with the amount of potatoes being sold or available for sale on the market
- In the above examples the price are dependent on the amount of potatoes delivered and sold, thus the quantity will be on the X- axis and the price will be on the Y- axis.



The influence of quantities of potatoes sold versus the price per week



A line graph





The influence of quantities of potatoes sold versus the price per week



Quantity of potatoes sold (pockets /week)





FARM ANIMAL		OPTIMUM
	TEMPERATURE	TEMPERATURE
	(0 °)	(°C)
Cow	2	12
Calf	10	15
Piglet	20	27
Layer	7	12
Broiler	15	18

3.5.1	Use the data in the above table and draw a bar graph to	
	indicate the lower critical temperature and the optimum	
	temperature requirements of the farm animals.	(6)

3.	.5.2	Which farm animal in the graph has the highest optimum	(1)
		temperature requirement?	

Answer:

3.5	The temperature required by farm animals	

3.5.1 Bar graph



Key verbs in the question paper:

The success of the learner in the examination largely depends on whether they **understand** what is **required** of them. There are **many ways** that questions can be formulated. Below are some of the more common cognitive level A and cognitive level B **key verbs** used together with an **interpretation of their meaning**:

Cognitive	Context Word	Key Verbs and their meaning
Level		
		Name - give a list
		State - write briefly the main points
		Give - mention or state a list
A	Knowledge	Indicate - point out something
		Define - describe exactly the nature of something
		Label - to give information of sections of diagram
		List - make a list of
		Provide - supply/make a list
		Supply – give or mention a list of
		Define - Write in detail what can be observed or
		what can be understood
		Describe - Write in detail what can be observed or
	Comprehension	what can be understood
В	and Application	Draw - produce a picture or diagram
		Explain - Make clear
		Select – choose from
		Identify - Spot
		Distinguish - Explain the difference

EXAM REVISION QUESTIONS: (to strive for at least 40% performance)

0	To strive for at least 40% achievement, answer the following exam		
	questions by writing your answers down in a work book.		
0	After that, check your answers in Section 5 to see how well are		
	you prepared.		
0	If you do not get an answer correct, go back to the notes in the		
	beginning of Section 3 on that Topic and your textbook and study		
	that part again!		
0	Do not stop until vou get 100%!!		

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 number (1.1.1–1.1.10) in the ANSWER BOOK, for	
	example 1.1.11 A.	

1.1.1	The biological value (BV) of protein is an index of the protein	
	quality, which is dependent on the	

А	nutritive ratio and amino acid content.	
В	amino acid content and the ration in which it occurs.	
С	amino acid content and the softness of the protein.	
D	content of non-essential and essential amino acids.	

1.1.2 Papillae in the wall of the rumen serve as ...

	Α	heating rods for fermentation of crude fibre.
	В	cooling rods for the synthesis of vitamins.
	С	rods which secrete cellulase to hydrolyse crude fibre.
	D	grinding rods and the drying of feed.
1.1.3	Ac	deficiency of this mineral causes pica in farm animals:

A	Cobalt	
E	Zinc	
0	Calcium	
	Phosphorus	

1.1.4	The process of alternating contractions and relaxations of	
	the muscles that push food through the alimentary canal:	

Α	Eructation	
В	Regurgitation	
С	Peristalsis	
D	Bloating	

1.1.5	Which of the following will mostly be used in indigenous	
	farming?	

-

(i)	Walls built by stacking stones	
(ii)	Movable electrical fencing	
(iii)	Wire fence dividing grazing areas	
(iv)	Kraal made up of sticks	

Choose the CORRECT combination:

A	(i) and (ii)	
В	(ii) and (iv)	
C	(i) and (iv)	
D	(i) and (iii)	

1.1.6	The best method to handle pigs:	

(i)	Make yourself known quietly and gently to avoid startling	
	the animals.	
(ii)	Throw cold water at them when waking the animals up.	
(iii)	Guide the animals with a plywood board.	
(iv)	Move them from darker to lighter areas with no shadow.	

Choose the CORRECT combination:

	A	(ii), (iii) and (iv)	
E	B	(i), (ii) and (iii)	
(С	(i), (iii) and (iv)	
[D	(ii), (iii) and (iv)	

1.1.7 The following applies to Newcastle disease:

(i)	A viral disease	
(ii)	Affects poultry of all ages	
(iii)	Leads to heart and kidney failure	
(iv)	No treatment for infected animals	

Choose the CORRECT combination:

A	(i) and (ii)	
В	(i), (ii) and (iv)	
С	(ii), (iii) and (iv)	
D	All the above-mentioned	

1.1.8	The foetus is surrounded by three layers while attached to	
	the uterus. What is the correct sequence of the layers from	
	the inner to the outer layer?	

Α	Amnion, allantois and chorion	
В	Chorion, amnion and allantois	
С	Allantois, chorion and amnion	
D	Amnion, chorion and allantois	

1.1.9	WHICH ONE of the statements below with regard to the	
	normal lactation of dairy cows is INCORRECT?	

Α	When the milk yield is at its highest, butterfat is at its lowest.	
В	The higher the crude fibre content in a feed, the higher the	
	butterfat content.	
С	Milk production drops before drying up.	
D	Feed with a lower fibre content produces milk with a low	
	butterfat content.	

1.	.1.10	The average length of the oestrus period of a cow is	
		hours.	

	A	24	
	В	8	
	С	12	
	D	18 (10 x 2)	(20)

1.2	Indicate whether each of the descriptions in COLUMN B applies	\square	
	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 number (1.2.1–1.2.5) in the ANSWER BOOK, for		
	example 1.2.6 B only.		

₹

	CC	DLUMN A	COLUMN B
1 2 1	A:	Copper	Westing disease
1.2.1	B:	Cobalt	wasting disease
	A:	80% TDN	A production ration including
1.2.2	п.		fish meal which is used for high-
	B:	4% DP	producing dairy cows
123	A:	Plant poisoning	Excessive selivation
1.2.3	B:	Urea poisoning	
	A:	Cryptorchidism	Condition where female animals
1.2.4	Б.	Repeat-breeder	are unable to conceive after several
	D.	syndrome	attempts at insemination
1 2 5	A:	Oestrus	Regulated by progesterope
1.2.0	B:	Ovulation	Regulated by progesterone

(5 x 2) (10)

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

1.3.1	A metabolic disorder resulting from a vitamin B ₁ deficiency	
	that causes neuromuscular problems	

1.3.2	The type of host represented by a snail in the life cycle of	
	a fluke worm	

1.3.3	The normal animal birth presentation where the head rests
	on the feet and the nose is stretched towards the pelvis

1.3.4	The process during which the nucleus of a female egg cell	
	is removed for nuclear transfer	

1.3.5	A device that is placed around the lower leg of a cow on heat	\square	
	to detect and record movement (5x2)		
			(10)

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

1.4.1	<u>Hay</u> is produced when a green crop is kept under anaerobic	
	conditions for fermentation and development of lactic acid.	

1.4.2	Parakeratosis is caused by a deficiency of <u>copper</u> .	
i i		

1.	.4.3	Feed flow is a method used to work out the exact	
		quantities of two feeds to be included in a feed	
		mixture to supply the required value.	

1.4.4	Tapeworm is an internal parasite that affects the livers of	
	sheep.	

1.4.5	Twinlambsdevelopingfromasinglezygote,ar	ereferredtoas		
	freemartin twins.	(5 x 1)	(5)

TOTAL SECTION A:	45

Section B

Question 2

Animal Nutrition

	11			
А	zh	E		
с —	\mathbb{C}	1000	2	
D	_0/ ``			۰F

2.1.1	Identify parts A , D and E .	(3)

2.1.2	Name TWO ways in which part ${f C}$ is adapted to perform its	(2)
	function.	

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2.1.3	Identify part B and estimate the pH of its contents.
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(2)



	2.1.1	Identify the type of farm animal shown in the diagram above.	\square	(1)	
--	-------	--	-----------	-----	--

2.1.2	Refer to at least ONE structure in the diagram above to	
	motivate the answer to QUESTION 2.1.1.	(1)

2.1.3	Identify the part where each of the following occurs and write	
	down only the letter (A–E):	

(a)	Excretion		(1)
(b)	Absorption of amino acids		(1)
(c)	Main absorption of water		(1)
	(a) (b) (c)	 (a) Excretion (b) Absorption of amino acids (c) Main absorption of water 	 (a) Excretion (b) Absorption of amino acids (c) Main absorption of water

2.1.4	Give TWO reasons why the animal above can NOT be fed	
	roughages.	(2)

2.3	The moisture content of hay for cattle in a feedlot is 8%. A herd of	
	beef weaners consumes 30 kg of the hay on average and excretes	
	12 kg dry manure every day.	

2.3.1	Refer to the information above and calculate the digestibility	
	coefficient of the hay. Show ALL the calculations.	(5)

2.3	.3.2	Suggest THREE processes that can be applied to improve	
		the digestibility of feeds.	(3)

2.4 The table below indicates the feeds available to a dairy farmer to compose a ration.

REQUIRED DIGESTIBLE	FEED	DIGESTIBLE PROTEIN
PROTEIN VALUE (DP) %		VALUE (DP) %
17%	Maize	9%
	Peanut oilcake	44%

	2.4.1	Use the Pearson square method to balance the ration.
--	-------	--

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14	, י	

2.4.2	Calculate	the	percentage	of	maize	to	be	included	in	the	(2)
	ration.										
										7	a = 20

Total = 20

Question 3

Animal Production, Protection and Control

3.1	The table below represents information on the floor space required	
	for pigs per live mass.	

LIVE MASS (kg)	FLOOR SPACE REQUIRED FOR 10 PIGS (m ²)
20	14
40	22
60	30
80	37
100	42
120	47
140	53

floor space they require. (6)	

3.1.2	Refer to the table above and indicate the trend in terms	
	of floor space required in relation to the live mass of pigs.	(2)

3.4	The South African government plays an important role in the	
	regulation of farming practices. It ensures quarantine services and	
	control measures regarding the import and export of animals. They	
	also conduct research and provide veterinary services.	

3.4	.4.1	Indicate THREE types of animal health research done at the	
		Veterinary Institute.	(3)

	3.4.2	What is the purpose of a quarantine station?	(2)
--	-------	--	-----

3.4.3	Besides the roles mentioned in the above extract, name	
	TWO other roles performed by the state to protect the	$\langle \mathbf{O} \rangle$
	South African animal industry.	(2)

3.5	Parasites can cause serious economic loses; hence the farmer	
	should ensure that parasites are effectively controlled.	

Suggest the most appropriate method used to administer remedies	
to control each of the following parasites and conditions:	

3.5.1	To eradicate round and flat worms	(1)
3.5.2 3.5.3	To treat external parasites such as ticks and mites To treat blowfly attacking open wounds	(1)
		 (1) (18)

Question 4

Animal Reproduction

Disturs A and D balance names and a sure stars of nontruction in soft-	
Pictures A and B below represent some stades of partitrition in cattle	
\mathbf{A} is a second solution of the second s	



	Α	В	
4.1.1	Name the stages of parturition in picture A	and picture B .	(2)

4.1.2	Identify, in picture A or B , the incorrect positioning of the calf.	
	Give a reason for the answer.	(2)

4.1.3 Which picture (**A** or **B**) corresponds to the following activities?

(a)	Oxytocin is released to initiate contractions.	(1)
(b)	Contractions occur every two minutes.	(1)
(c)	The umbilical cord breaks and the calf starts breathing.	(1)

4	4.1.4	There a	are noticeable behavioural changes in the cow	
		during	stage B . Name THREE of these changes.	(3)

4.2	The colour and quality of semen will determine the success of	
	artificially inseminating livestock.	

4.2.1	Give a reason why semen could have the following colour:	
	(a) Red	(1)
	(b) Grey	(1)

4.2.2	State TWO ways in which the quality of semen may be	
	negatively	(2)
	affected.	(_)

4.4	Usually, after detecting signs of oestrus in the cow, the farmer takes	
	a bull to the cows for mating to take place.	

4.4.1	Apart from visible and behavioural signs that a cow may	(3)
	show, name THREE devices a farmer may use to detect	
	oestrus in a cow.	

4.4.2	Give FOUR reproductive hormones, in sequential order, that	(4)
	are produced by a cow from gestation to parturition.	
		[21]

Revision Exam Paper 2(for at least 40% achievement)

SECTION A

QUESTION 1

1.1	Various options are provided as possible answers to the following	\square	
	questions. Choose the answer and write only the letter (A–D) next		
	to the question number (1.1.1–1.1.10) in the ANSWER BOOK, for		
	example 1.1.11 A.		

Example:

1.1.11 **B** C D

1.1.1	The actual sorting process of agricultural products according	
	to agreed specifications:	

- A StandardisationB GradingC AuctionD Merchandising
- 1.1.2 Two individuals are most likely members of the same species if they...

A	have a	different	number of	chromosomes.
---	--------	-----------	-----------	--------------

B can mate and produce fertile offspring.

C breed at the same time.

D are phenotypically different.

- 1.1.3 The law of diminishing returns refers to the situation where ...
 - A the low yield can be improved by additional inputs.
 - B the soil reaches a stage of maximum production and further inputs will not increase the yield indefinitely.
 - only fertiliser can be used to increase yield indefinitely.
 - D the soil reaches a stage of maximum production and further inputs will increase the yield indefinitely.

1.1.4 The Dorper sheep breed was developed from the breeding of the Dorset Horn and the Blackhead Persian breeds. This is an example of a/an breeding system.

Α	species-crossing
В	upgrading
С	cross-
D	line-

 1.1.5
 The financial planning aspect on the farm, that ensures that money required to maintain production is available at all times, is called...

 A income tax.

 B insurance.

insurance. cash flow.

estate duty.

С

D

A source of capital resulting from farming profits that have	
been allowed to accumulate in a bank and which is used to	
buy capital goods:	

A	Credit.	
в	Savings.	
С	Production.	
D	Donations.	

1.1.7	The following is an example of a niche marketing	
	approach where a farmer sells a product to a small	
	segment of the market:	

- A A commercial maize farmer sells maize to the local agricultural cooperative.
- B A fruit farmer sells fruit to grocery stores.
- C A dairy producer supplies dairy products to a franchise that operates nationwide.
- D A small egg producer sells egg whites to a local baker.

1.1.8	The type of capital that is regarded as a permanent and	
	durable asset is	

A	wages for workers.	
В	fuel for tractors.	
C	a dam.	
D	a tractor.	

1.1.9	The turning back and reunion of a part of a chromosome	
	is an example of	

A	deletion.	
В	doubling.	
C	translation.	
D	inversion.	

1.1.10	A written plan that outlines the future actions based on	
	projections, historic data and experience on income and	
	expenses of a farming business:	

	A B C D	Budget plan Strategic income pla Year plan Cash flow	an	(10x2)	(20)	
1.2.	In the table below, a description and TWO possible answers are given. Decide whether the description in COLUMN B relates to A only, B only, both A and B or NONE of the answers in COLUMN A and make cross (X) in the appropriate block next to the question number (1.2.1-1.2.5) on the attached ANSWER SHEET. Example:					
	С	OLUMN A		COLUMN B		
	А	Capital	Amou	nt paid for	money	
	В	Interest	borro	wed.		
	Answer:					
The	statement refe	ers to:				
		R only		A and P	NL	
				A and D		ine i
	A	B		С		D
	A	B		C A and B		D
	A	B		C		D
	A	B COLUMN A		C COL		
1.2.1	A 01119	B COLUMN A Recessive		C C C C C C C C C C C C C	UMN B	D is only
1.2.1	A 01119 A (A B	B COLUMN A Recessive Dominant		A and B C C A characterist expressed v	UMN B ic that vhen	is only in the
1.2.1	A Only A A B A A	B COLUMN A Recessive Dominant		C C C A characterist expressed v homozygous sta	UMN B ic that vhen ate	is only in the
1.2.1	A 01119 A A B A B A B	B COLUMN A Recessive Dominant Stability of the produce	luct	C C A characterist expressed v homozygous sta This factor(s) af	UMN B ic that vhen ate fects den	is only in the nand.
1.2.1	A 0111y A A B A B A A	B COLUMN A Recessive Dominant Stability of the produce Price of the produce	duct	C C A characterist expressed v homozygous sta This factor(s) af	UMN B ic that when ate fects den	is only in the nand.
1.2.1 1.2.2 1.2.3	A 0111y A A B A B A B A B A B	B COLUMN A Recessive Dominant Stability of the produce Price of the produce Unemployment Self-employment	duct	C C C C C C C C C C C C C C C C C C C	UMN B ic that when ate fects den of sudde	is only in the nand.
1.2.1 1.2.2 1.2.3	A 0111y A A A B A B A B A A A	B COLUMN A Recessive Dominant Stability of the product Price of the product Unemployment Self-employment Diversification	Juct t	C C A characterist expressed v homozygous sta This factor(s) af Repercussions mechanisation A farmer has a	UMN B ic that when ate fects den of sudde	is only in the nand.
1.2.1 1.2.2 1.2.3 1.2.4	A 0111y A A A B A B A B A B A B A B A B A B	B COLUMN A Recessive Dominant Stability of the product Price of the product Unemployment Self-employment Diversification Flexibility	duct	C C A characterist expressed v homozygous sta This factor(s) af Repercussions mechanisation A farmer has a different product	UMN B ic that when ate fects den of sudde number c	is only in the nand. n
1.2.1 1.2.2 1.2.3 1.2.4	A 01119 A A B A B A B A B A B A B A B	B COLUMN A Recessive Dominant Stability of the product Price of the product Unemployment Self-employment Diversification Flexibility	duct	C C A characterist expressed v homozygous sta This factor(s) af Repercussions mechanisation A farmer has a different product spread the risk.	UMN B ic that when ate fects den of sudde number c tion ente	n n n n n n n n n n n n n n n n n n n
1.2.1 1.2.2 1.2.3 1.2.4 1.2.5	A 0111y A A A B A B A B A B A B A A B A A A	B COLUMN A Recessive Dominant Stability of the product Price of the product Unemployment Self-employment Diversification Flexibility Discontinuous varia	duct t	C C A characterist A characterist expressed v homozygous stat This factor(s) af Repercussions mechanisation A farmer has a different product spread the risk. Variation within	UMN B ic that when ate fects den of sudde number c tion ente a popula	n n n tion n n
1.2.1 1.2.2 1.2.3 1.2.4 1.2.5	A 0111y A A A B A B A B A B A B A B A B A B A	B COLUMN A Recessive Dominant Stability of the product Price of the product Unemployment Self-employment Diversification Flexibility Discontinuous variation	duct t ation on	C C A characterist A characterist expressed v homozygous stat This factor(s) af Repercussions mechanisation A farmer has a different product spread the risk. Variation within in which there is	UMN B ic that when ate fects den of sudden number c tion ente a popula s a range	n is only in the nand. n f rprises to tion of
1.2.1 1.2.2 1.2.3 1.2.4 1.2.5	A 0111y A A A B A B A B A B A B A B A B A B A	B COLUMN A Recessive Dominant Stability of the product Price of the product Unemployment Self-employment Diversification Flexibility Discontinuous variation	duct t ation on	C C A characterist A characterist expressed v homozygous stat This factor(s) af Repercussions mechanisation A farmer has a different product spread the risk. Variation within in which there is intermediate ph	UMN B ic that when ate fects den of sudden number c tion ente a popula s a range enotypes	n is only in the nand. n f rprises to tion of

1.3	Give ONE word/term/phrase for each of the following descriptions. Write only the word/term/phrase next to the question number (1.3.1- 1.3.5) on the attached ANSWER SHEET.	
1.3.1	The unit of the hereditary material, which contains information for characteristics.	
1.3.2	When too little capital is invested in the farming enterprise with the result that soil and labour cannot be fully utilize and maximum profit cannot be realized.	
1.3.3	The system providing for payment to employees because of injury in the workplace or during working hours.	
1.3.4	The process that describes the changes to primary agricultural products at an industrial plant to increase their value.	
1.3.5	The process by which certain individuals in a population are chosen for the production of the next generation.	
	(5 x 2) (10	
-	1	

1.4	Change the UNDERLINED WORD(S) in each of the following	
	statements to make them TRUE. Write the appropriate word(s) next	
	to the question number $(1.4.1 - 1.4.5)$ on the attached ANSWER	
	SHEET.	

1.4.1	Supply and demand are the two factors that are used when establishing the <u>value</u> of an agricultural product.	
1.4.2	The genes that cause an organism to die or be badly deformed are known as mutant genes.	
1.4.3	The product <u>sale</u> is the result of the interaction of supply and demand on a market.	
1.4.4	Line breeding is practiced by stock farmers to obtain hybrid vigor.	

1.4.5	An alternative gene which is located on corresponding loci of homologous chromosomes is called <u>genome</u> .	
		(5)

TOTAL SECTION A: [45]

Section B

Question 2

	With guinea fowls the gene for black colour (B) is dominant over the			
2.1	gene for white (b). Two heterozygotic black guinea fowls are crossed			
	2.1.1	Use a schematic representation to show the possible		
		genotypic results that would be expected in the F1-	(1)	
		generation.	(4)	
	2.1.2	Indicate the Genotype ratio and the Phenotype ratio of the	(4)	
		offspring		
	2.1.3	One of the white offspring from the F1-generation was		
		crossed with its heterozygotic black parent. Use a Punnet	(1)	
		square to show the possible results of this crossing	(4)	
			[12]	

2.2	A race horse owner buys two purebred black horses from a
	reputable breeder. However, when the first foal was born it was
	a white foal. The buyer must now convince the court that he
	was misled by the breeder.

2.2.1	Use a punnet square to explain to the judge why it is not possible for two purebred black horses to have a white foal	(5)	
2.2.2	Explain the difference between the concepts " <i>homozygous</i> " and " <i>heterozygous</i> ".	(4)	
		(9)	
2.3	The owner of a horse stud farm is breeding specifically for gre horses. He crosses a black stallion with a white mare.	y	
-----	---	---	--
	Of the first four year's offspring all are grey.		

2.3.1 2.3.2	Indicate the genotype for both parents Present the above mentioned cross in a schematic diagram	(2) (4)
2.3.3	Indicate the type of dominance relevant in the above- mentioned cross	(2)
2.3.4	If the farmers crosses the grey offspring with the white one, indicate the percentage chance of getting grey offspring	(2)

2.4	Traditionally people used a selection and breeding method whereby	
	the best bulls for growth, health and fertility were shared between	
	family and friends. They also cared for their animals by utilising	
	the best available pastures and keeping them away from wet and	
	muddy areas.	

2.4.1	Define the concept <i>selection</i> .	(2)
2.4.2	Determine the method of selection mentioned in the	(1)
	passage above.	

2.4.3	Identify THREE animal production characteristics in the passage that were used for selection by these people.	(3)
2.4.4	Indicate how the following aspects were used by the people in the passage above to improve the phenotype of the animals: (a) Genetic variation (b) Environmental variation	(1) (1) []



QUESTION 3: AGRICULTURAL MANAGEMENT AND MARKETING

Marketing is a very important part of running a farm as a successful	
business enterprise.	

3.1		



3.1.1	Define the term ' <i>market</i> '.	(3)

3.1.2	Tabulate TWO differences between marketing and selling.	(4)
3.1.3	The farmer decides to process his milk product. Describe THREE advantages of processing the milk to the farmer.	(3)

3.2 Sustainable agricultural marketing is the adoption of sustainable business practices.



	3.	.2.2	Discuss a factor which will hamper the marketing chain of agricultural products.		(3) () []	
--	----	------	--	--	-----------------	--



What if you can achieve an extra 20% in the Examination? Try the questions in Section 5 that are a bit more difficult!

Section 4: Marking Guideline for questions in Section 3

(memorandum for 40% achievement)



Let us mark your work!!

PAPER 1

Marking Guideline

- 1.1 1.1.1 B √√
 - 1.1.2 A ✓ ✓
 - 1.1.3 D ✓ ✓
 - 1.1.4 C ✓ ✓
 - 1.1.5 C ✓ ✓
 - 1.1.6 C ✓ ✓
 - 1.1.7 B √ √
 - 1.1.8 A ✓ ✓
 - 1.1.9 D ✓ ✓
 - 1.1.10 $D \checkmark \checkmark$ (10 x 2) (20)



			TOTAL SEC	TION A: 45
	1.4.5	Monozygotic/identical ✓	(5 x 1)	(5)
	1.4.4	Fluke worm/liver fluke 🗸		
	1.4.3	Pearson square ✓		
	1.4.2	Zinc/Zn ✓		
1.4	1.4.1	Silage ✓		
	1.3.5	Pedometer ✓✓	(5 x 2)	(10)
	1.3.4	Enucleating ✓✓		
	1.3.3	Anterior 🗸 🗸		
	1.3.2	Intermediary/intermediate host $\checkmark\checkmark$		
1.3	1.3.1	Polyneuritis ✓✓		
	1.2.5	None VV	(5 x 2)	(10)
	1.2.4	B only ✓✓		
	1.2.3	Both A and B $\checkmark \checkmark$		
	1.2.2	A only ✓✓		
1.2	1.2.1	B only ✓✓		

Section B

Question 2

74

Animal Nutrition

2.1	Alime	entary canal of fowls			
			1	1	
	2.1.1	Identify			
		A – Crop ✓			
		B – Duodenum/small intestine ✓			
		E – Pancreas ✓		(3)	

.

2.1.2	Ways in which structure C is adapted	
	 Thick, muscular walls for grinding feed ✓ Presence of small stones for grinding feed ✓ 	(2)
 1		
2.1.3	Identification of structure B and estimation of pH	

•	Proventriculus/true stomach/glandular stomach 🗸
---	---

● pH less than 7/acidic ✓

(2)	

2.3	Digest	ibility co-efficiency	
	2.3.1	Calculation: 8% (0,08) x 30 kg = 2,4 kg	
		Dry material: 30 kg - 2,4 kg = 27,6 kg ✓	
		DC = Dry material intake (kg) – Dry mass of manure(kg) x $100 \checkmark$	
		Dry material intake (kg) 1	
		= <u>27,6 kg – 12 kg</u> x <u>100</u> ✓ 27,6 kg 1	
			(5)
		= 56,5/57 ✓ % ✓	

2.3	3.2 F	Processes to improve digestibility of feeds	
	•	 Mechanical processes/grinding/milling/crushing/ rolling ✓ 	
	•	Pelleting ✓	
	•	Heating/roasting/boiling/cooking/steaming ✓	
	•	Additives/supplementing with NPN/molasses/	
		treating feed with dilute caustic soda (NaOH) solution	
		\checkmark	
	•	Soaking ✓	
	•	Popping and micronising ✓	
	•	Mixing of complementary feeds ✓ (Any 3)	(3)

2.4 **Pearson square**



2.4.2	Maize percentage to be included in the ration	
	27 ÷ 35 x 100 ✓	
	= 77,14/77% ✓	(2)
		(20)

Question 3

Animal Production, Protection and Control

- 3.1 Floor space required by pigs
 - 3.1.1 Bar graph



Criteria/rubric/marking guidelines

- Correct heading ✓
- X-axis correct calibrations and labelled (Live mass) \checkmark
- Y-axis correct calibrations and labelled (Floor space required)
- Both units are correct unit (m²/kg) ✓
- Bar graph ✓
- Accuracy ✓

3.1.2 Trend between floor space required and live mass

- The increase in live mass ✓ leads to
- Increase in floor space required ✓

(2)

(6)

3.4 **The role of the state in regulating farming practises**

3.4.1	Type of research done by the state at the Veterinary Institute	
	 Veterinary research to improve vaccines/diagnostic/ new products ✓ 	
	 Surveillance/control/preventing diseases ✓ 	(3)
	 Producing disease/blood vaccines ✓ 	



3.4.2	Purpose of a quarantine station	
	• To isolate/detain animals and \checkmark	
	 prevent diseases/pests entering/spreading in the country ✓ 	(2)

3.4.3	Other roles the state play to protect the animal industry	
	 Animal health schemes ✓ 	
	 Duties of owners of animals ✓ 	(2)
	● Import bans ✓	
	 Importation of vaccines ✓ 	
	Movement permits ✓ (Any 2)	

3.5 **Control of parasites**

Appropriate method used to administer remedies

3.5.1	Dosing/drenching/injecting/provision of licks ✓	(1)
3.5.2	Dipping/spraying/spot treatment/injecting ✓	(1)
3.5.3	Cleaning/apply ointments/medication/apply insecticides/ dipping ✓	(1) (18)

Question 4

Animal Reproduction

4.1	Embry	o development					
	4.1.1	Stages of parturition as in pictures A and B					
		A - Ejection/expulsion ✓					
		B - Preparatory ✓		(2)			

4.1.2	Incorrect posture of the calf	\square	
	 ● Picture B/B ✓ Reason 		(1)
	 Retention of one leg towards the vulva/second leg is folded back ✓ 		(1)

4.1.3	Letter that corresponds with the following activities	
	(a) B ✓	(1)
	(b) A ✓	(1)
	(c) A ✓	(1)

4.1.4	Behavioural changes	
	 Restlessness/walks around/in pain and discomfort 	
	 Loss of appetite ✓ 	
	 Isolation/nesting behaviour ✓ 	
	 Tail raising ✓ 	
	 Lows often/bellowing noises ✓ 	
	Frequent urination ✓ (Any 3)	(3)

4.2 Semen colour and quality

4.2.1 **Reason for the colour of semen**

- (a) Presence of fresh blood \checkmark (1)
- (b) Presence of old blood/infection \checkmark (1)

4.2.2 **TWO negative effects on quality of semen**

- Poor nutrition \checkmark
- Severe environmental conditions/temperature√
- Age√
- Diseases ✓

(Any 2)

(2)

4.4 **Mating during oestrus**

4.4.1	Devices to detect oestrus in the cow	
	Pedometer ✓	
	Chin-ball marker ✓	
	Tail-chalking ✓	
	 Kamar heatmount detector ✓ 	(Any 3) (3)

4.4.2	Sequential order of FOUR reproductive ho are	rmones that	
	produced by a cow		
	Progesterone ✓		
	Luteotrophic hormone/LTH/prolactin ✓		
	● Relaxin ✓		(4)
	• Oxytocin ✓	(Any 4)	(21)
		Section B:	59
		Grand Total:	[104]

~_		
\sim		
	\sim	



Memorandum:

SECTION A

QUESTION 1.1

1.1.1	Α	X	С	D
1.1.2	Α	X	С	D
1.1.3	Α	X	С	D
1.1.4	Α	В	X	D
1.1.5	Α	В	Х	D
1.1.6	Α	X	С	D
1.1.7	Α	В	С	X
1.1.8	Α	В	X	D
1.1.9	Α	В	С	X
1.1.10	Х	В	С	D

QUESTION 1.3

- 1.3.1 Gene √
- 1.3.2 Under-capitalization JJ
- 1.3.3 Worker's compensation JJ
- 1.3.4 Processing/Value adding 1/
- 1.3.5 Selection V

(5 x 2) (10)

(10x2) (20)

Question 1.4

- **QUESTION 1.2**
- 1.2.1 A√√ В С D 1.2.2 В C√√ А D С 1.2.3 A√√ в D 1.2.4 A√√ В С D 1.2.5 А B√√ С D

(5X 2) (10)

- 1.4.1 Price J
- 1.4.2 Lethel genes J
- 1.4.3 Price J
- 1.4.4 Cross-breeding/
- 1.4.5 Alele/

(5 x 1) (5)

[45]



Section B

Question 2

2.1								
	2.1.1	Parents:Bb	✓ I	8 b 🗸				
				B b	ХВ		-	
		I	88		ВЬ	Bb	bb √√	(4)
	2.1.2	Genotype ra	tio : 1(E	BB): 2 (Bb)): 1 (bb)	✓ ✓		(2)
		Phenotype r	atio: 3 Bla	ack : 1 Wh	ite ✓ ✓			(2)
	2.1.3				$\checkmark\checkmark$	for game	etes of	
			b	b		parents		
		В	Bb	Bb				
		b	bb	bb				
					$\checkmark\checkmark$	for correct	t offspring	(4)
							(4)	
								(12)

2.2

2.2.1	Pure bred m	eans Homozyg o	ous black in this	s case.	
	Therefore:				
	parents	BB	BB ✓		
	BB	BB	BB		
	BB	BB	BB		
	✓				
	Marks: 1√ f	or each parent	(2)	_	
	2√ f	or correct offspri	ng (2)		
	Homozygou: black offsprir	s black parents ng. ✓ (1)	can produce (ONLY homozygous	(5)

-

2.2.2	Homozygous means the two alleles for the same characteristic is the SAME. \checkmark Thus for black BB or bb. \checkmark	
	Heterozygous means the two alleles for the same characteristic is DIFFERENT. ✓ Thus Bb. ✓	(4) (9)

2.3	Horse breeding	

2.3.1	BB√ x bb√	(2)

2.3	BBx bb Bb Bb Bb	
2.3	3 Incomplete Dominance√ ✓	(2)
2.3	4 50% of the offspring will be grey $\checkmark \checkmark$	(2)
		(10)

2.4	Traditional selection method	
		 ,

2.4.1 **Define selection**

- Process of choosing/identifying specific individuals \checkmark
- For their desired characteristics/traits \checkmark
- To be used in the production of quality offspring \checkmark (Any 2) (2)

2.4.2 Method of selection in the scenario.

Mass selection ✓

2.4.3 **THREE characteristic considered for selection**

- Growth ✓
- Health ✓
- Fertility ✓

(3)

(1)

2.4.4 Aspects to improve phenotype of animals

	(a) Best bulls for growth/health/fertility were shared \checkmark	(1)
	(b) Utilizing the best available pastures/keeping them away	
	from wet/muddy areas ✓	(1)
		(8)
		[39]
Question 3	Marketing	

3.1.1 Market – refer to the supply and demand \checkmark for specific goods and services \checkmark .

The market consists of people namely sellers, producers and buyers (consumers)√

any 2 (2)

3.1.2

84

Marketing	Selling	
Profit orientated	Product orientated	
Long term plans are made	Short term objective is to sell the	
	product	
Emphasis on consumer needs and	Needs and satisfaction of the	
satisfaction	consumer are neglected	
Different departments work together	Sales department does not work	
	with other departments	
Technological innovation is	Costs are reduced to achieve	
important	maximum sales and profit	
	any 2 x 2	(4)

any 2 x 2

3.1.3 Advantages of processing

- Improves the quality of a product (value adding)
- Increases the shelf life
- Makes the product more appealing to the customer
- Solves the oversupply problem and reduces wastage
- Enhances food security
- Creates job opportunities for low-income groups (3) any 3

			[9]	
Question 4	Sustainable agricultural	marketing		
4.1.1 Create bette	r businesses 🗸			
Better relat	ionships ✓			
Better world	d ✓			
Reduce ca	rbon footprint 🗸	an	y 2	(2)
4.1.2 - Bulkiness i	n relation to the value			
- Perishabil	ity			
- Seasonal	character of production			
- Standardi	sation			
- Lack of co	ontrol over production			
- Wide distr	ibution of production areas			
- Marketing	through intermediary	Any 1 discussed	(3)	
			[5]	
		GRAND TOTAL:	98	1



Section 5

20% More Exam Practice Questions

Paper 1

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Animal Nutrition

2.5	The table below r	represents the lab	oratory results of	THREE feeds.	
	FEED	TDN (%)	DP (%)	NR	
	1	84	12	1:6	
	2	75	15		
	3	70	7	1:9	
<u> </u>	I				1 1
	2.5.1 Calcula	te the nutritive rat	io (NR) of feed 2.		(3)

2.5.2	Recommend a feed (1, 2 or 3) for milk production in a dairy	(1)
	herd.	

2.5.3	Give ONE reason for the answer to QUESTION 2.5.2.	(1)
254	Refer to the table and identify the cheapest feed.	(1)

2.5.4	Refer to the table and identify the cheapest feed.

2.5.5	Motivate the answer to QUESTION 2.5.4.	(1)
		[7]

Animal Production, Protection and Control



The diagram below represents farm animals and the ways in which 3.2 they lose heat.

3.2.1	Identify THREE ways in which heat (energy) is lost in animals	
	A, B and C.	(3)

 3.2.2	Indicate TWO ways in which heat (energy) is lost, other than		
	those shown in the diagram above.	(2)	

3.2.3 Name TWO signs of heat stress in farm animals.	2)

3.2	4 Suggest TWO management practices to reduce the type of heat loss in animal A .	(2) [9])
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Animal Reproduction

4.1	The graph below shows the volume and concentration of semen in	
	different farm animals.	



4.1.1	Determine the concentration of semen at a volume of $6 \text{ m}\ell$	
	In dairy cattle.	(1)
4.1.2	Refer to the graph and give the correlation between semen volume and semen concentration of dairy cattle and sheep.	(4) [5]

	TOTAL: 21
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Paper 2

88

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.2	The table below shows the price, supply and demand of pockets of oranges over a five-week period.					
		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
	Price (in	10	15	20	25	30
	rand)					
	Supply	5	10	15	20	25
	Demand	25	20	15	10	5

2.2.1	Refer to the table above and explain the relationship	
	between the price, supply and demand.	(3)

2.2.2	Draw a line graph to illustrate the supply and demand of	(6)
	oranges.	

2.2.3	Explain why there was a higher demand for oranges in	
	Week 1 than in Week 5.	(2)
		[11]

QUESTION 3 : PRODUCTION FACTORS

3.4	The table below indicates a list of ca livestock enterprise.	apital items and costs for a	
	ITEM	COST	
		(IN RAND)	
	Cattle sales	110 500	
	Marketing levy	42 350	
	Telephone bill	22 500	
	Sheep sales	80 900	
	Electricity	20 000	
	Grain feed	12 500	

3.4.1	Classify the items in the table above under the following	
	headings:	

		(b) Variable costs	(2	2)
		(c) Overhead costs	(2	<u>')</u>
3	.4.2	Use a formula to calculate the net income of this	(4	.)
		enterprise.	[1	0]

QUESTION 4: BASIC AGRICULTURAL GENETICS

(a) Income

4.4	GM lettuce with a high yield was produced using a gene from a water	Π	
	plant. An experiment was conducted to test the effects of this genetic		
	modification on lettuce plants. Scientists grew one group of plants		
	consisting of GM lettuce and non-GM lettuce in a greenhouse and a		
	second group in an open field. The results of the experiment are given		
	in the bar graph below.		

(2)



4.4.1	Explain the difference in yield of GM lettuce and non-GM lettuce grown in the greenhouse and open field respectively.	(2)
4.4.2	Deduce, from the graph, ONE advantage of GM lettuce for the farmer under both growing conditions.	(1)
4.4.3	Identify THREE benefits of genetic engineering over traditional methods as depicted in the scenario above.	(3)
4.4.4	Suggest TWO potential environmental risks posed by genetically modified plants.	(2) [8]
	GRAND TOTAL:	[29]

Section 6 Answers to Revision 20% more:

	Let us mark the extra questions: (extra correct questions mean	
	extra marks, mooh?)	(1)

Paper 1

Animal Nutrition

2.5	Data representing the laboratory results of THREE feeds	

2	2.5.1	Calculation of the NR for feed 2	
		NR = 1: <u>TDN% - DP%</u> ✓	
		DP%	
		= 1: <u>75% - 15%</u> ✓ OR = 1: <u>60%</u> ✓	
		15% 15%	
		NR = 1: 4 ✓	(3)

2.5.2	Identification of the feed (1, 2 or 3) recommended	
	 Feed 2 ✓ 	(1)

2.5.3 Reason to justify the answer in QUESTION 2.5.2			
	• It has a narrower nutritive ratio \checkmark		
	Suggesting a comparatively higher protein necessary		(1)
	for milk production \checkmark (Any 1)		

2.5.4	The cheapest feed	
	Feed 3 ✓	(1)

2.5.5	Reason for the answer in QUESTION 2.5.4	
	 This feed has a lower protein content ✓ 	
	Feed with lower protein is cheap ✓ (Any 1)	(1)
		[7]

Animal Production, Protection and Control

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3.2	Farm animals loosing heat	

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3.2.1	Ways in which animals lose heat	
	A – Radiation/evaporation/perspiration ✓	
	B – Conduction ✓	
	C – Excretion/defecation ✓	(3)

3.2.2	Other ways of heat loss		
	Convection ✓		
	Movement/work ✓		
	Production level ✓		
	Urination ✓		(2)
	■ Breathing ✓ (A	(ny 2)	

3.2.3	Signs of heat stress in animals	
	Excessive salivation/drooling ✓	
	■ Drop/decrease in production ✓	
	• Excessive panting/high respiratory rate/sweating \checkmark	
	• Open mouth breathing with tongue hanging out \checkmark	
	Loss of appetite ✓	
	 Cattle move away from each other ✓ 	
	Restlessness ✓ (Any 2)	(2)

3.2.4	Man	agement practice to reduce heat in A		
	•	Provision of shelter/shade/cool area \checkmark		
	•	Breeding of heat adapting animals \checkmark		
	•	Use of mechanical cooling systems \checkmark		
	•	Work calmly with animals \checkmark		
	•	Access to drinking water \checkmark	(Any 2)	(2)
				[9]

Animal Reproduction

4.1 **Graph showing volume and concentration of semen in animals**

4.1.1 Concentration of semen at volume of 6ml

- 1 billion/ml \checkmark (1)
- 4.1.2 **Correlation**

Dairy cattle

Dairy bulls produce a lot of semen ✓ that is less concentrated (2)
 ✓

Sheep

- (2)
- Sheep produce less semen \checkmark that is highly concentrated \checkmark [5]

GRAND TOTAL: 21

Paper 2 Answers: to score 20% more marks

MARKING GUIDELINE:

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.2	Dema	nd and supply	
	2.2.1	Relationship between price, supply and demand	
		• The higher the	
		price \checkmark , the higher the supply \checkmark and the lesser	
		the demand \checkmark	
		OR	
		• The lesser the price \checkmark , the lesser the supply \checkmark and the higher	
		the demand ✓	(3)
	2.2.2	Graph on the supply and demand of oranges	





	2.2.3	Reason for higher demand		
		 Price for pocket of oranges was low (R10) in week 1✓ 	(2)	
		 but higher (R30) in week 5 ✓ 	[11]	
QU	ESTIC	N 3 : PRODUCTION FACTORS		
3.4	Сарі	tal and Costs		
	3.4.1	Classification of items		
		(a) Income - Cattle sales \checkmark , sheep sale \checkmark	(2)	
		(b) Variable costs - Marketing ✓, grain feed ✓, electricity telephone bills ✓ (Any 2)	(2)	
		(c) Overhead costs - Telephone bills \checkmark , electricity \checkmark	(2)	

3.4.2	Calculation	of net income with the formula	
	Income	= R110 500 + R80 900 = R191 400 ✓	
	Expenditure	= R42 350 + R22 500 + R20 000 + R12 500	
		= R97 350 ✓	
	Net income	= Income – expenditure ✓	
		= R191 400 – R 97 350	
		= R 94 050 ✓	
		OR	
	Net income	= Income – expenditure ✓	
		= R191 400 ✓ – R 97 350 ✓	
		= R 94 050 ✓	(4)
			[10]

QUESTION 4: BASIC AGRICULTURAL GENETICS

4.4	Geneti	c modification of lettuce	
	4.4.1	Difference in yield of GM lettuce and non-GM lettuce	
		GM lettuce produce better under different conditions \checkmark than non- GM plants under the same conditions \checkmark	(2)

4.4.2	One advantage of GM lettuce in both conditions	
	Higher yield/ produce better ✓	(1)

4.4.3	Benefits of genetic engineering over traditional methods	
	 Precise/desired genes are transferred ✓ Not limited to crossing of the same species ✓ More convenient ✓ Faster/requires only one generation to complete ✓ More resistant to pests/drought/diseases/herbicides ✓ Higher yields ✓ (Any 3) 	(3)



 4.4.4 TWO environmental risks of genetically modified plants Creation of herbicide resistant 'superweeds'/harmful pesticide resistant plants ✓ Indiscriminate use of herbicides pollute the environment ✓ Beneficial insects can be killed ✓ (Any 2) GRAND TOTAL : 	(2) [8] [29]
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Section 7 Exam Tips

- 7.1 General tips when preparing for the exam:
- 7.2 Exam tips for Agricultural Sciences:

Study tips:

- Plan ahead make a weekly and a daily study plan.
- Divide the day into 40-60 minute blocks.
- After each 40-60 minutes of studying, take a rest break of at least 10 minutes.
- Try studying in the same places in the same times each day.
- Sit in a well-ventilated room when studying.
- Organize a large table and a suitable chair

Writing the exam:

- ✤ Keep all stationary at hand
- Make sure that you bring along your own calculator with which you are confident (for both papers).

Time management when answering the paper:

- The time spent on each question, must correlate with the marks that you can earn from that question or sub-question. Do not spend too much time on any section as you will struggle to finish the whole paper in time.
- If you struggle with an answer/answer you can always return to those questions after finishing the whole paper.



Section 8:



When studying Agricultural Sciences, always remind yourself that you are fortunate in studying in a field where the wonders of the creation is portrayed. There are sections in the exam paper where you can use your common sense, but also sections where you need to have knowledge of terminology.

Passing examination seems impossible when you are not ready. This user-friendly booklet will help you to pass.

We wish you all of the best and remember perseverance pays off!









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