



Further Education and Training: Grade 12 (FET)

BRIGHT IDEAS Revision Booklet AGRICULTURAL SCIENCES



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA



A Reading Nation is a Leading Nation





Agricultural Sciences

Grade 12 REVISION BOOKLET




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1. Forward

Message from the Minister of Basic Education



Message to 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.

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

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

SECTION 2		
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2.1	The purpose of the book:		
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The revision book will consist of the following main sections:

Section 3: For mastering the first 40%:

In this section learners will be assisted to achieve **at least 40%** in both Paper 1 and Paper 2 in Agricultural Sciences. The **most basic information** will be dealt with, including:

- mind maps for each topic
- terms and concepts that are very important in the subject in each topic
- exemplar questions and tips on how to answer them
- revision exam questions to achieve at least 40% in the exam



The exam questions should be attempted only after you have studied the topic. If you struggle with a question, go back to your textbook and notes on that topic and study that part again before attempting the question again.

Section 4: For mastering the extra 20% exam questions:

In this section learners who have mastered Section 3 can now attempt questions from Section 4. In this section the following can be found:

- extra revision questions and exercises on basic data response
- scenarios and case studies

Section 5: Answers to the questions of Section 3

Section 6: Answers to the questions of Section 4

Section 7: Tips how to approach the examinations

Section 8: A personal message from the team of developers and acknowledgements




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)  <i>Did you know? A mind map is a diagram in which information is presented visually, usually with a central idea placed in the middle and associated ideas arranged around it.</i> 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	

NO	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 digestibility	-is a measure of the digestibility of a feed expressed as a percentage in terms of dry matter(DM).
	Concentrates	-feeds that have high percentage of TDN (> 60%) in small volume



Crop	-the soft bag-like enlargement in the oesophagus of a fowl.
Crude fibre	-consists of cellulose and lignin, 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 faeces.
Digestion	- the mechanical and chemical breaking down of food into smaller components that can be 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 digestion	- this is a physical breakdown of food into smaller 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



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 (reverse peristalsis)	-when food from the stomach is moved back to 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

Animal Nutrition

Digestive Systems (3)

Fowl (Chicken)

Monogastric (Pig)

Ruminant (Cattle)

Fodder flow planning

Vitamins & Minerals

Functions & Deficiencies

Coefficient of Digestibility

Nutritive Ratio

Pearson Square

Calculations in Nutrition

Types Of feed → Roughages/ Concentrates

Proteins
Carbohydrates
Fats & Oils

Functions

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).

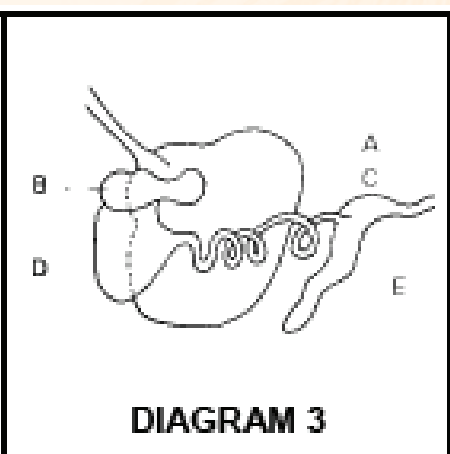
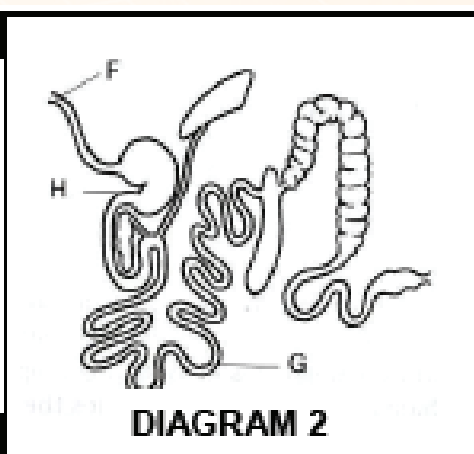
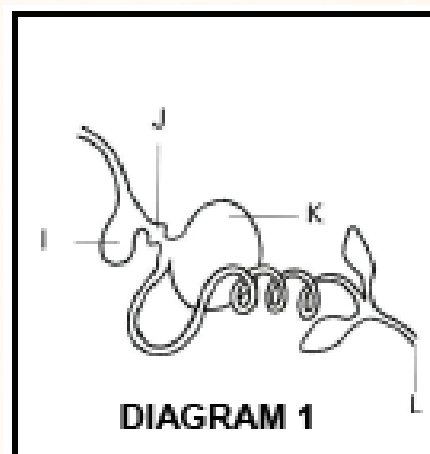


Table of the differences between the three digestive systems:

Component	Diagram 1: Fowl Chicken	Diagram 2: Monogastric animal	Diagram 3: Ruminant animal
Mouth/ Beak	No Amylase No teeth	Salivary Amylase Teeth	No Amylase 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 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 in a paper. Think clearly and do not get lost in all the information. 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 mixture (%)	<u>Manure (%)</u>		
Moisture	8	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

Solution and explanation:

The formula: **Digestibility % = $\frac{\text{DM intake (kg) } - \text{ DM excreted (kg) }}{\text{DM intake (kg) }} \times 100$**

DM intake (kg)

DM = Dry material intake... thus you must get rid of the moisture.

Decide with which **figures** you want to work and take care **not to get confused**

$$8\% \text{ of } 7\text{kg} = 8/100 \times 7 = 0.56\text{kg}$$

Thus : Total feed intake = 7 kg – **moisture** which is **8 %**

$$8/100 \times 7\text{kg} = 0,56\text{kg}$$

$$7\text{kg} - 0,56\text{kg} = \mathbf{6,44 \text{ kg}}$$

Mass of manure excreted = 2kg – moisture (4%)

$$4/100 \times 2\text{kg} = 0.08\text{kg}$$

$$2\text{kg} - 0.08\text{kg} = \mathbf{1,92\text{kg}}$$

Or

$$92\% \text{ of } 7 \text{ kg} = 92/100 \times 7 = \mathbf{6.44 \text{ kg}} \quad \text{and} \quad 96\% \text{ of } 4 = 96/100 \times 4 = \mathbf{1.92 \text{ kg}}$$

Note: In this case it is always important to **subtract the moisture content** (get rid of **the influence of moisture on the mass**)

Thus: **Digestibility % = $\frac{\text{DM intake (kg) } - \text{ DM excreted (kg) }}{\text{DM intake (kg) }} \times 100$**

DM intake (kg)

$$= \frac{6.44 - 1.92}{6.44} \times 100 \checkmark$$

$$6.44$$

$$= \frac{4,52}{6,44} \times 100 \checkmark = \mathbf{70,18\% \checkmark \checkmark}$$

$$6,44$$



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)= $\frac{1}{\% \text{ Digestible non nitrogen substances}} \times \% \text{ Digestible protein}$ 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 maintenance	For growth	Milk production	For reproduction	For fattening
NR between 1:6 and 1:8	NR 1:5 or less	NR 1:5 or less	NR less than 1:5	NR 1:9- 1:10
Protein needed for the replacement of tissue	Lots of protein needed of high biological value	Lots of protein needed of high biological value	Lots of protein needed of high biological value	Protein only for maintenance
Carbohydrates, fats and vitamins only for maintenance	Carbohydrates, fats and vitamins only for maintenance	Sufficient carbohydrates and fats for maintenance and production	Carbohydrates, fats and vitamins for maintenance. An increase needed to support last third of pregnancy	Carbohydrates and fats needed in large quantities
Minerals only for the replacement of losses	Sufficient minerals and vitamins for growth	Sufficient minerals and vitamins	Sufficient minerals and vitamins	Minerals and vitamins for maintenance

	Example of Nutritive ratio question:	
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	<p>A feed contains total digestible nutrients of 80% and a digestible protein of 8%</p> <p>1. Calculate the nutritive ratio of this feed. (3)</p> <p>2. How would you describe the nutritive ratio of the above feed? (1)</p> <p>3. Indicate the use of this feed. Explain your answer (3)</p>	
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	<p>The formula:</p> <p style="text-align: right;">This is non nitrogen substances, therefore the protein component must be subtracted</p> <p>Nutritive ratio (NR) = $\frac{1: \% \text{ Digestible non nitrogen substances}}{\% \text{ Digestible protein}}$</p> <p>Thus $\frac{80 - 8}{8} = \frac{72}{8} = 9$✓</p> <p>The nutritive ratio is the 1: 9✓✓</p> <p>2. The nutritive ratio of this feed is wide✓</p> <p>3. This feed would be used for fattening✓, because the it contains relatively few digestible proteins✓ and a relatively higher proportion of other digestible nutrients such as carbohydrates and fats✓</p>	<p>(3)</p> <p>(1)</p> <p>(3)</p>
--	--	----------------------------------

(c)	<p>The Pearson square method:</p> <p>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.</p>	
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Example:

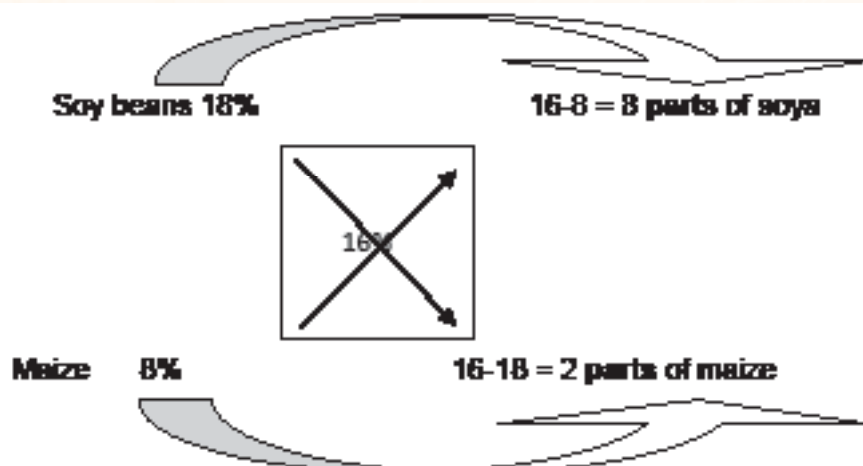
A farmer produces his own maize and soybeans on his farm. In an attempt to save on feed costs he decides to mix his own feed ration to meet the Digestible protein (DP) needs of his dairy cows. He needs a DP of 16% for the cows. Maize contain a DP of 8% and Soy beans a DP of 18%


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 by the **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 $2/10 \times 200 = 40\text{kg}$ of maize


For the Soya it is $8/10 \times 200 = 160\text{kg}$ 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***
- 



Examples (to achieve Extra 20% in the exam)

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 $240\text{Kg} \times 90\% = 216 \text{ Kg DM}$

Excretion:

Moisture is 60%

Thus $100\% - 60\% = 40\%$

Excreta is then $14\text{kg} \times 40\% = 5.6\text{Kg DM}$

Thus Coefficient of digestibility = $\frac{\text{DM Intake (kg)} - \text{DM Excreted(kg)}}{\text{DM Intake (kg)}}$

$$\begin{aligned} & \text{DM Intake (kg)} \\ &= \frac{216 \text{ kg} - 5.6\text{kg}}{216} \quad \checkmark \\ &= 0.97 \times 100 \quad \checkmark \\ &= \underline{97\%} \quad \checkmark\checkmark \end{aligned}$$

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) = $216 \times 12\% = 25.92 \text{ kg DM}$

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

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

$$= \frac{25.92 - 0.448}{25.92} \quad \checkmark$$

$$= 0.98 \times 100 \quad \checkmark$$

$$= \underline{98\%} \quad \checkmark \checkmark \quad (4)$$

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

3.2

Topic 2: Animal Reproduction

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.

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:


The important terms and concepts in Animal Reproduction are listed in the following table:


N0	CONCEPT	DEFINITION
	Abortion	<ul style="list-style-type: none"> Termination of pregnancy before the normal pregnancy period has elapsed
	AI	<ul style="list-style-type: none"> The process whereby sperm is placed into a female's uterus/ cervix by artificial means rather than natural mating
	Ampulla	<ul style="list-style-type: none"> Site for fertilisation
	Anoestrus	<ul style="list-style-type: none"> A sexually mature, non-pregnant cow shows no signs of oestrus
	Calving	<ul style="list-style-type: none"> Ejection of a calf at the end of pregnancy period
	Cervix	<ul style="list-style-type: none"> A firm tube-like structure found between the uterus and the vagina
	Clitoris	<ul style="list-style-type: none"> Small elongated erectile organ at the anterior part of the vulva
	Colostrum	<ul style="list-style-type: none"> Yellow milk secreted during the first 3 days after calving
	Cryptochydism	<ul style="list-style-type: none"> A condition whereby the testes remain in the abdominal cavity and do not move down to the scrotum
	Dry period	<ul style="list-style-type: none"> Period from the end of lactation until the mother has another offspring
	Dystocia	<ul style="list-style-type: none"> Condition of prolonged & difficult parturition

	Ejaculation	<ul style="list-style-type: none"> • Release of semen into the vagina during copulation
	Embryonic transfer/ transplant	<ul style="list-style-type: none"> • Removal of a fertilised ovum from the uterus of a superior cow & transferring it to the uterus of the inferior cow
	Embryo	<ul style="list-style-type: none"> • A developing animal formed from a fertilised ovum
	Epididymis	<ul style="list-style-type: none"> • A single, narrow, coiled tube that transports sperm from testes to the vas deferens
	Fallopian tubes/ oviducts	<ul style="list-style-type: none"> • A pair of coiled tubes that extend from the ovaries to the uterus
	Fertilisation	<ul style="list-style-type: none"> • Fusion of an ovum and a sperm cell to form a zygote
	Fertility <ul style="list-style-type: none"> ▪ Infertility ▪ Sterility 	<ul style="list-style-type: none"> • Ability to produce offspring • Inability to produce offspring • Permanent loss of fertility
	Foetus	<ul style="list-style-type: none"> • An unborn animal in the later stages of development
	Freemartin	<ul style="list-style-type: none"> • A heifer(female calf) born as a twin with a bull calf
	FSH	<ul style="list-style-type: none"> • A female hormone produced by the pituitary gland which stimulate the development of follicles in the ovaries
	Gametogenesis <ul style="list-style-type: none"> ▪ Oogenesis/ ovogenesis ▪ Spermatogenesis 	<ul style="list-style-type: none"> • Formation of gametes • Formation of a mature ovum from a primary oocyte • Formation of spermatozoa in the testes
	Hypoplasia	<ul style="list-style-type: none"> • Incomplete development of the reproductive organs
	Implantation	<ul style="list-style-type: none"> • Attachment of the embryo onto the uterus
	Impotence	<ul style="list-style-type: none"> • Inability to copulate in male animals
	Lactation	<ul style="list-style-type: none"> • Secretion of milk from the mammary glands
	LH	<ul style="list-style-type: none"> • A female hormone responsible for the rapture of the Graafian follicle to release a mature ovum
	Libido	<ul style="list-style-type: none"> • Lack of sex urge
	Maceration	<ul style="list-style-type: none"> • A condition where a foetus dies and its tissues soften & decay due to excessive moisture



Mating	<ul style="list-style-type: none"> A physical act whereby a male and a female animal come together and copulate for breeding purpose
Multiple births	<ul style="list-style-type: none"> More than one offspring is born from a single gestation
Mummification	<ul style="list-style-type: none"> A condition where a foetus dries up and becomes hardened
Nuclear transfer/ cloning	<ul style="list-style-type: none"> A process that produces an identical copy of biological material
Oestrogen	<ul style="list-style-type: none"> A female hormone responsible for onset of behavioural oestrus
Oestrus	<ul style="list-style-type: none"> A period when a female is receptive of a male & allows mating
Oestrus cycle	<ul style="list-style-type: none"> A 21 day period which a follicle develops into a mature ovum
Oocyte	<ul style="list-style-type: none"> An immature ovum that into a follicle
Ovary	<ul style="list-style-type: none"> Primary sex organ of a female
Ovulation	<ul style="list-style-type: none"> A release of a ripe ovum from an ovary
Ovum	<ul style="list-style-type: none"> Female gamete
Oxytocin	<ul style="list-style-type: none"> A female hormone responsible for the release of milk A female hormone responsible for muscular contractions during ejection of a foetus
Parturition	<ul style="list-style-type: none"> Normal ending of pregnancy Process of ejection of a foetus & placenta at the end of gestation period
Penis	<ul style="list-style-type: none"> A male organ of copulation
Placenta	<ul style="list-style-type: none"> An organ that attaches an embryo to the uterine wall
Pregnancy/ gestation	<ul style="list-style-type: none"> A period that begins with fertilised ovum and ends with birth
Progesterone	<ul style="list-style-type: none"> A female hormone secreted by the corpus luteum to maintain pregnancy
Prolactin	<ul style="list-style-type: none"> A female hormone responsible for production of milk
Prostate gland	<ul style="list-style-type: none"> A gland that lies in the form of a ring around the urethra in males
Reproduction	<ul style="list-style-type: none"> Production of offspring





Scrotum	<ul style="list-style-type: none"> • A sac that houses and protects the testes
Semen	<ul style="list-style-type: none"> • A mixture of sperm & fluids from the seminal vesicle, prostate gland & Cowper's gland
Sperm	<ul style="list-style-type: none"> • Male gamete
Superovulation	<ul style="list-style-type: none"> • Treating a female with hormones in order to produce many ova at the same time
Synchronisation of oestrus	<ul style="list-style-type: none"> • A treatment of a large number of animals with hormones so that they all reach oestrus at the same period
Testis	<ul style="list-style-type: none"> • Primary sex organ of a male animal
Testosterone	<ul style="list-style-type: none"> • A male hormone responsible for male characteristics
Umbilical cord	<ul style="list-style-type: none"> • A tube-like structure that connects an embryo to the placenta of a mother
Uterus	<ul style="list-style-type: none"> • An organ where a developing embryo is implanted
Vagina	<ul style="list-style-type: none"> • A female mating organ/ a birth canal
Vulva	<ul style="list-style-type: none"> • External opening of the vagina

Reproduction: The Male's (♂) Role

- ❖ Produce ample quantities of semen
 - (sperm cells & seminal fluids)
- ❖ Find the receptive female
 - Must have the desire (LIBIDO)
- ❖ Mount and serve
 - Must have the ability to mate and deliver

ANIMAL REPRODUCTION (MALES)

Male reproductive system : Organs & Functions

- ❖ Testes(2)
 - Produce spermcells for fertilization
 - Produce the hormone: Testosterone , masculine appearance and behaviour
- ❖ Epididymus
 - Storage and maturaton site for sperm cells :

Secondary male reproduction organs

- Vesicular glands
- Vas deferens
- Prostate
- Bulbo-urethral glands (Cowper's glands)
- Penis
- Prepuce

Male hormones important for reproduction:

Testosterone- Responsible for manly behaviour, manly physical features and sex drive in male animals

Reproduction: The female's role (♀)

- Development and release of the ovum
- Oestrus: permit mating – standing heat
- Development of the embryo
- Nourish the foetus
- Parturition
- Lactation (milk production)

Animal reproduction

Female

The female reproduction system: organs & functions:

- ❖ Ovaries
 - Produce the ova in the follicle
 - Produce estrogen & progesterone

Secondary production organs

- ❖ Fallopian tubes
- ❖ Uterus
- ❖ Cervix
- ❖ Vagina

The oestrus cycle

To understand the interaction of the hormones during the oestrus cycle is important the you first know and understand the functions of the relevant hormone

- ❖ Luteinising hormone (LH)
 - Produced by the Pituitary gland
 - Causes Ovulation
 - Important for the function and development of the Corpus Luteum
 - ❖ Oestrogen
 - Produced by the Ovaries
 - Promotes growth and development of the uterus
 - Responsible for oestrus behaviour
 - Triggers release of LH
 - ❖ Progesterone
 - Released by the Corpus luteum
 - Maintains pregnancy
 - Prevent releasing of Gonadotrophic releasing hormone (GnRH)
- No GnRH > No FSH > No Estrogeen> No LH

3.2.2	Example of a multiple choice question:		
	In Section A of every question paper, Question 1.1 consists of Multiple choice questions. They cover all the topics in that paper and normally 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 following 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) of your choice in the ANSWER BOOK.		
	1.1.1	Twins developing from two different ova and fertilised by two different spermatozoa:	

	A	Freemartin	(2)
	B	Monozygotic	
	C	Dizygotic	
	D	Maceration	



Tips on how to answer multiple choice questions:

- Know what each multiple choice question is asking. In the case of 1.1.1 above, this question is based on **fertilisation and development of twins**.
- Evaluate each answer to the multiple choice question. A **Freemartin** is a heifer (female calf) born as a twin with a bull calf. **Monozygotic** twins derived from single egg. **Dizygotic** twins derived from two ova and fertilised by two sperm cells. **Maceration** is the softening of tissues after death especially in the stillborn animal.
- Eliminate each clearly wrong answer- in this case: **Freemartin**, **Monozygotic** and **Maceration**. **Dizygotic** is the only correct answer.
- It is clear that when answering a multiple choice question the following are involved: i) **Knowing what each question is asking**. ii) **Evaluating each answer**. iii) **Eliminating all wrong answers**.
- However it is critical to study all the chapters for this question.



Note: **Calculations** can also be asked in multiple choice questions!

Never leave a multiple choice question unanswered!

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**)

- Farm animals are mammals. You are a mammal too. What happens to you when it is cold?
- 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.**
- 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:

NO	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.

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 commercial farming	- usually involves large numbers of animals
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 subsistence farming	- involves a small number of animals.
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
1.2.1	A	Modified environment	Intensive production system
	B	Feeding closely monitored	

	Answer: Both A and B			
	How to answer this type of question:			
	<ul style="list-style-type: none"> ➤ 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: <ul style="list-style-type: none"> ✓ Know what each description/item is about ✓ Evaluate each item/description in column A ✓ Select the best item/description from column A 			

	 <p>This question focuses mainly on the knowledge and understanding of terms and concepts in all the topics</p>			
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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 *Farmer's Weekly*, 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)

Heaters


(2)

5.3 Discuss the necessity of a subsidy (money given by government) to assist the farmers in the passage above.

(2)

	Answer to the question:	
--	--------------------------------	--

5.1	The answer to question 5.1 requires that the candidate 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	<p>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.</p> <p>Shelters could take the form of planting trees, building kraals or concrete wall structures covered with roofing sheets.</p> <p>Animals exposed to unfavourable weather conditions tend to use up more energy, particularly at very low temperatures.</p>	
-----	---	--

	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

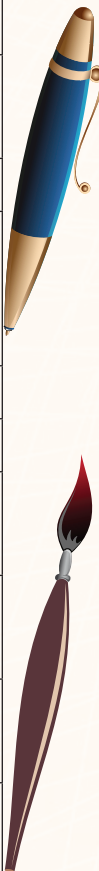
Note: These shelters are used to protect animals against unfavourable weather conditions (effect of factors on animal production)


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.

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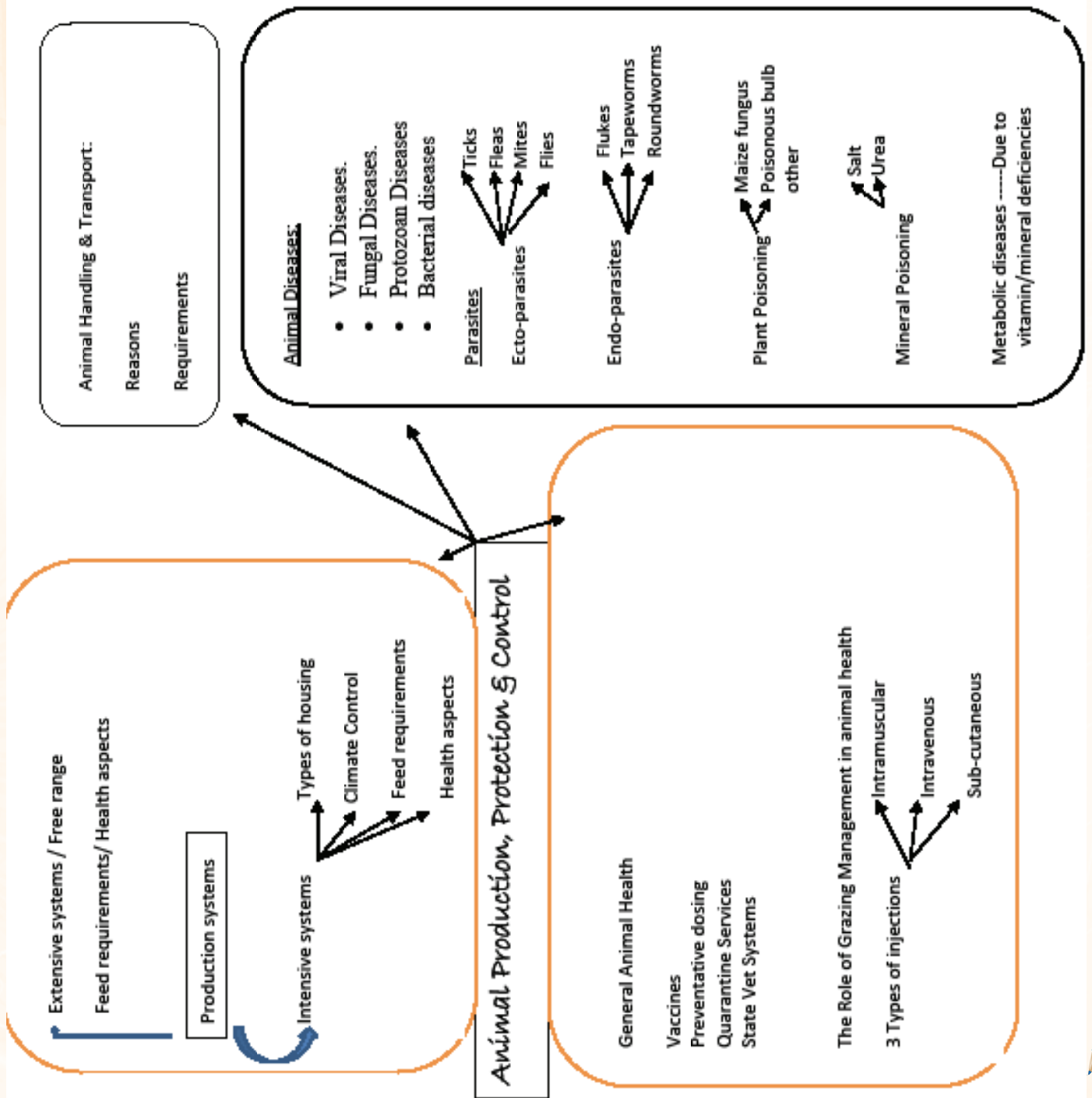


N0	CONCEPT	DEFINITION
	Animal pests	- are organisms that live in or on the body of an animal or share the same environment as the farm animal
	Antibiotics	- are chemical compounds used to kill bacterial and fungal infections
	Antibodies	-protein substances produced by white blood cells in response to specific foreign antigens
	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 regularly and can be predicted
	Epidermic	- is a widespread occurrence of a disease that spread rapidly through an area.
	External parasites (ectoparasites)	- are parasites that attack the body surface of animal.
	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 transmit 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 single 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.





Respiratory rate	- is the number of breaths that the animal takes in one minute
Rotational grazing	- involves moving animals between different grazing camps so as to achieve veld management objectives.
Shelter	- is a place giving temporary protection from bad weather or predators, includes, simple shelters, open and closed housing, sheds, holding pens and crushes.
Sustained treatment	- is when medication is given on continuous basis
Tapeworms	- are flat animal that live in the intestine of animal
Vaccination	- is the injection of a single substance into an animal to prevent a specific disease
Vectors	- are insects or ticks, that carry the disease organism from infected to healthy animals.
Viruses	- 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 ...

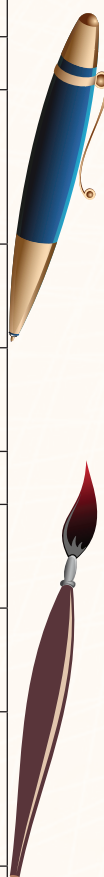
3.4.1 Terminology


In Basic Genetics it is very important to know the genetics terms in order to be able to do most of the questions. The following is 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 <ul style="list-style-type: none"> • Co-dominance • Incomplete dominance 	- an allele that masks the effect of another & is expressed in the appearance of an individual - type of inheritance where both alleles are dominant and fully expressed in the phenotype - 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




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 genetically different 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	<ul style="list-style-type: none"> - an allele that is masked by the presence of a dominant allele and only appears in the phenotype if the organism is homozygous
	Selection <ul style="list-style-type: none"> • Mass selection • Pedigree selection • Family selection • Progeny selection 	<ul style="list-style-type: none"> - the choice of individuals to be used for breeding - 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 - 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 <ul style="list-style-type: none"> • Continuous variation • Discontinuous variation 	<ul style="list-style-type: none"> - differences between individuals of the same species - type of variation in which the characteristic can take on a complete range of forms from one extreme to the other - type of variation that has a few clear cut forms with no forms in between



Every characteristic is presented by 2 alleles

Mendel's law of Dominance
 Complete dominance
 Incomplete dominance
 Co-dominance

Mendel's Laws
 Mendel's law of Segregation (during meiosis)

Mendel's law of Independent assortment (Dihybrid Cross)

Genetics

The Dominant allele is written in a capital letter (B)
 The recessive allele is written in a small letter (b)

Monohybrid cross

This is a cross where there will be tested for ONE characteristic only.

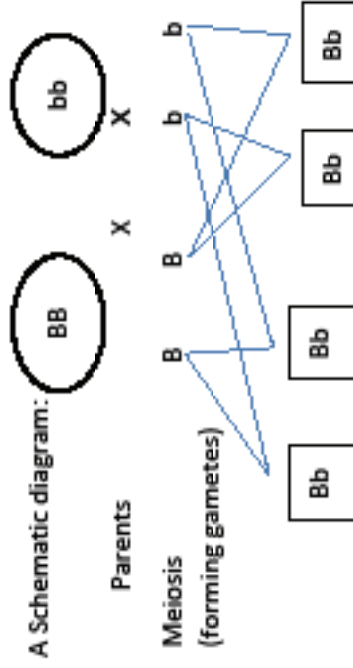
This can be done either in a Punnet square

Alleles

	b	b
b	bb	Bb
B	Bb	Bb

Or







A Schematic diagram :



Examples of Basic Genetics questions:

You are expected to be able to make **monohybrid and di-hybrid crosses** with which you can earn easy marks. After writing down this sequence (pattern) of how a cross takes place between male 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- **heterozygous** for purple (B b)

		 pollen ♂	
		B	b
 pistil ♀	B	 BB	 Bb
	b	 Bb	 bb

✓✓ for gametes of parents (2)

✓✓ for correct offspring (2)

	<p>Examples of questions that could be asked from the above example:</p> <ul style="list-style-type: none"> ➤ Indicate the genotype of both the parents, Answer: Male (pollen) Bb✓ and female (pistil) Bb✓ ➤ Indicate the phenotype of both parents 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) ➤ Indicate the percentage of the a) Genotype b) phenotype of the off spring Answer a) 25:50:25 % (3 ✓) b) 75:25% (2✓) 	<p>(2)</p> <p>(2)</p> <p>(5)</p> <p>(2)</p>
	<p>Example 2: A Homozygous Purple flower (BB) x Heterozygous Purple Flower (Bb)</p> <ul style="list-style-type: none"> ➤ Draw a Punnet square to indicate the result of a cross between the above parents. 	

Answer: Parent (BB) x Parent (Bb)

✓✓ for gametes of parents(2)

✓✓ for correct offspring(2)

Meiosis:

Parent (BB)

	B (gametes)	B
B	BB	BB
b	Bb	Bb

Parent (Bb)

Genotype ratio of offspring : 1(BB):1(Bb) or
%50(BB): 50 (Bb)

Phenotype of offspring: 100% Purple:

(2)

(1)

Example 3

- In which case will you get a **white flower**?

Answer: Only where the two **recessive genes** are both present in the offspring

Thus it must also be present in both parents.eg

(Bb X Bb) or (Bb X bb) or (bb X bb)

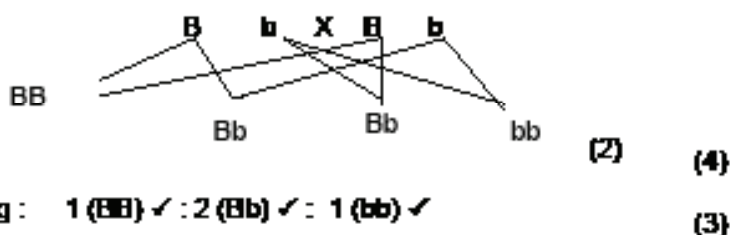
Schematic diagram: Parents: (2n)

Bb x Bb

✓✓ for gametes of parents (2)

Meiosis(form gametes) (n)

Offspring :



Phenotype ratio of the offspring; 3 (Purple) ✓ : 1 (White) ✓

3.5

PAPER 2 Topic 2: Agricultural Management – Production factors



See the Mind 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 statement	-shows the money coming and going-out 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 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.		
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	- includes all the things that the farmer has to pay.		
Organisation	- is the bringing together of all parts of an activity for production.		
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		
Soil	-is an area of land with its inherent characteristics, including its resources and characteristics		
Undercapitalisation	-is when less than required capital is employed in a business		

Soil:

Functions:

Provides space/ medium for plant to grow

Source of raw materials & minerals

Provides food

Economic characteristics:

Limited

Subject to law of diminishing returns

Indestructible but degradable

Difference in production capacity

How to increase productivity:

Adapting production systems

Supply water

Consolidation of uneconomic farm units

Problems relating to soil as production factor:

Law of diminishing returns

Physical condition of the soil

Soil limits the number of farming practices

Labour

seasonal, casual

Types : Permanent, temporary

Skilled, unskilled & Managers

Increasing productivity:

Management, supervision

Planning, remuneration, training

Adequate living conditions

Problems relating to labour as a

production factor

Scarcity, lack of training

Productivity competition with industry

Capital

Creation of capital: Own savings

Credit, increase in production

Categories of credit:

Fixed- fences, buildings, dams

Moveable- livestock, implements

Floating (working) feeds, seeds, fertilizer, salaries

Problems relating to capital

Scarcity, Risks involved

Over- capitalization, Under- capitalization

High interest rates

Agricultural Management:

Production factors

Management

Steps in Management:

Set goals, Plan, Organize

Direct, Control.

Success of the manager depend on

his/her skills

Planning- what, why & how must be done.

Steps in planning

Formulates aims and objectives

Organize the information

Consider unchangeable variables

Draws up plan of action

Control/ Evaluate plan

Motivation

Decision making – Analyze & evaluate plans

Control- requires realistic standards-

qualitative and quantitative

Efficient control is economical& simple

Leads to corrective action

3.6 PAPER 2 Topic : Agricultural Management – Management and Marketing

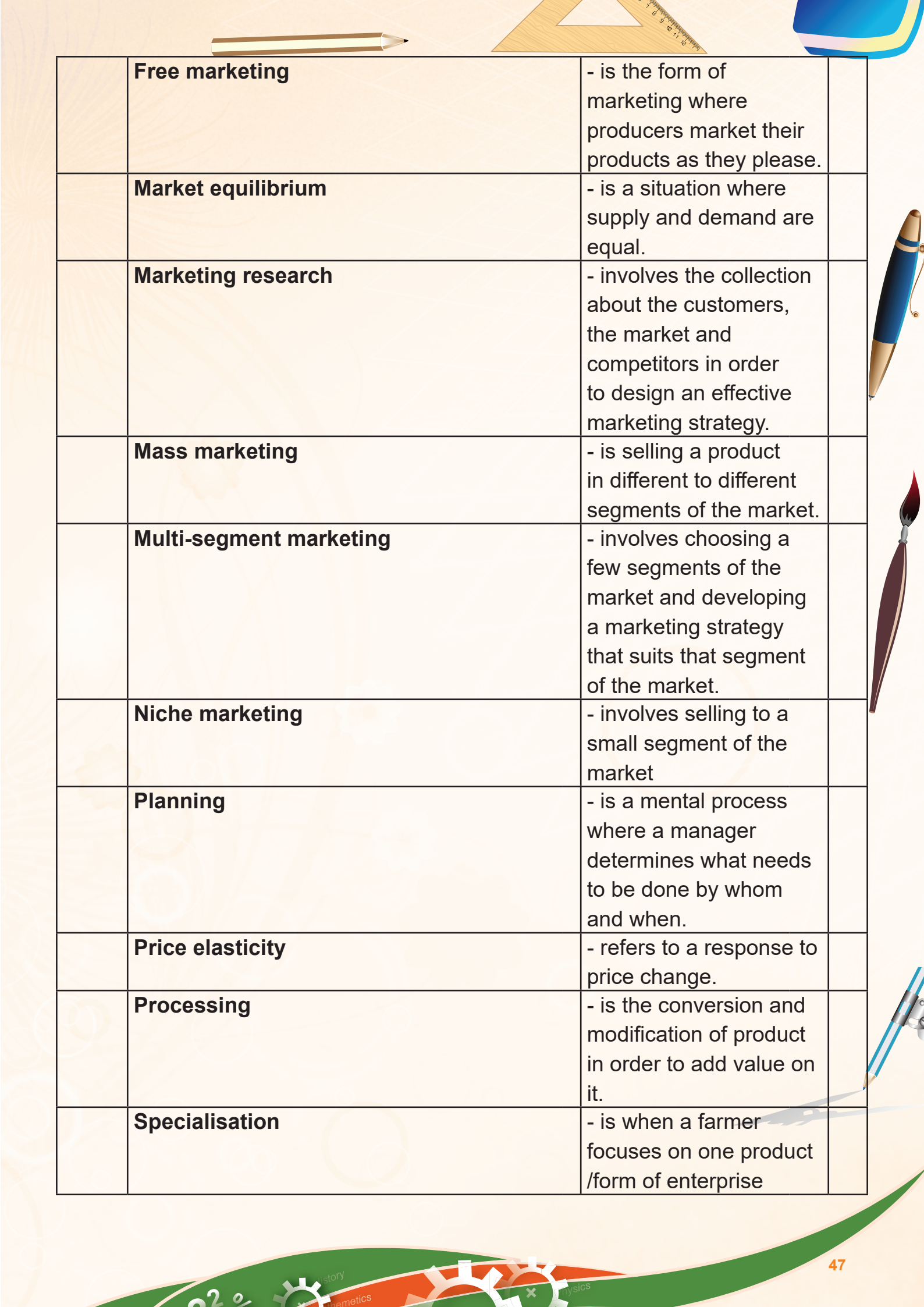


Did you know? A mind map is a diagram in which information is represented visually, usually with a central idea placed in the middle and associated ideas arranged around it. One can draw mind maps on every topic or sub-topic in Agricultural Sciences. See the Mind map of Management and Marketing on page ...

3.6.1 Terminology

Study the terms on Management and Marketing found in the following table:

N0	CONCEPT	DEFINITION	
	A business plan	- is a plan of how the business will operate	
	A ceiling price	- is the highest price of a product in the market.	
	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.	



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	



Marketing of agricultural products

Channels of free marketing – direct sales

Advantages – Cash immediately available, no middle man which can lead to better prices

Disadvantages: - Fluctuations in price

Perishability of products, Farmer 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

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

Establishment of price

Price is determined by supply and demand

Demand: quantity of a product which can be bought at a certain time.

Factors which determine demand:

Price of the product, preferences of the consumer, Income of the consumers

Number of consumers, price of the competitive products

Usefulness of the product.

Supply: the amount of a product

available for sale at a given time

Market equilibrium: when supply and demand are at the same level

Agricultural Marketing

Factors that determine supply:

Seasonality, profit margin, stability of the product

Period of production

Marketing:

Factors which hampers marketing:

Perishability

Standardization

Seasonal fluctuations

Locality restrictions

Long term production

Large volumes low unit value

Middle men usually required

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 (rand per bag)	Quantity of potatoes (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. 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. Answer: Seasonal fluctuations, increase in production price, over supply of potatoes on the market	(2)
--	-------	--	-----

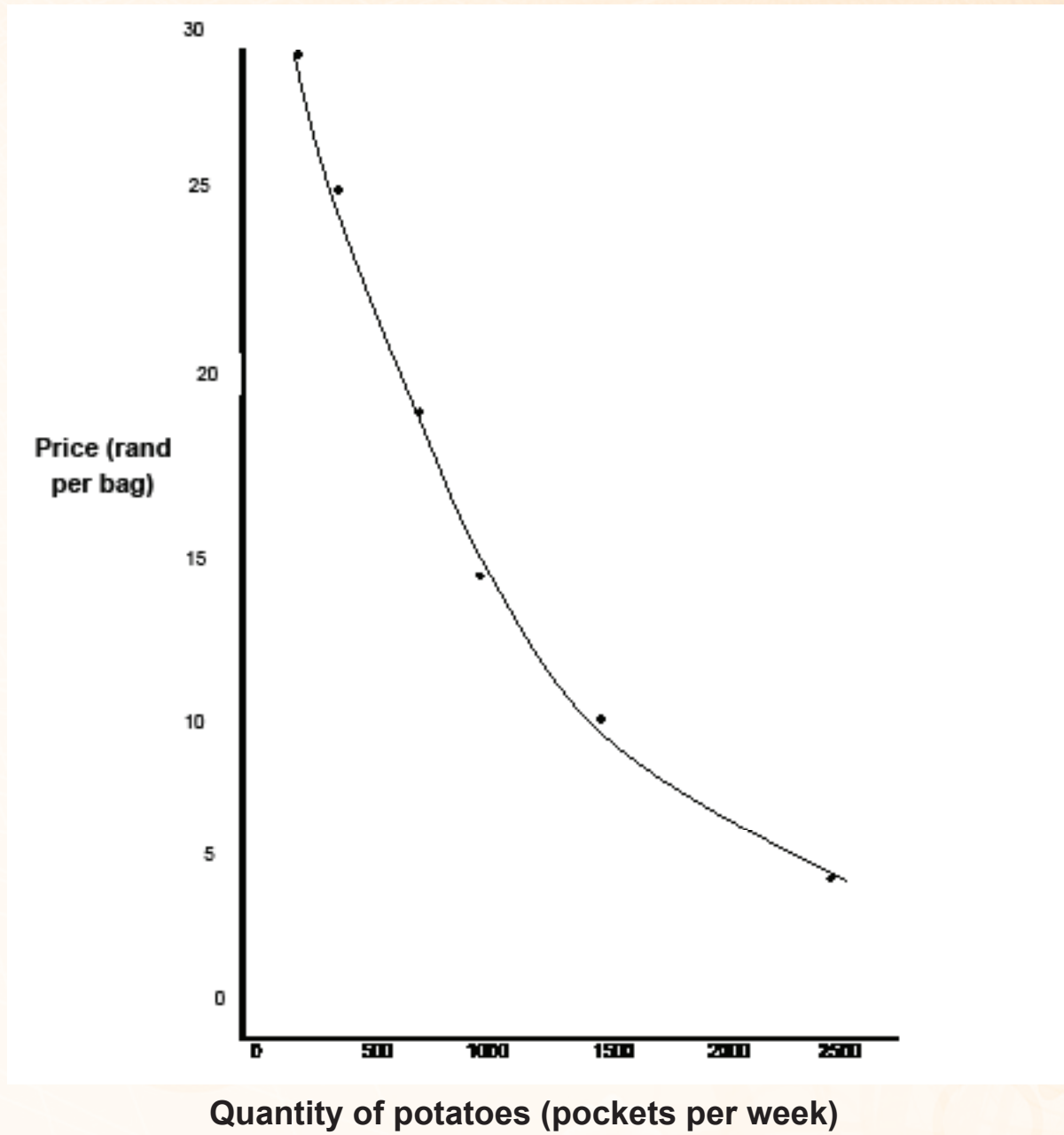
To draw a graph from the presented data follow the steps:

- ❖ 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 note 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



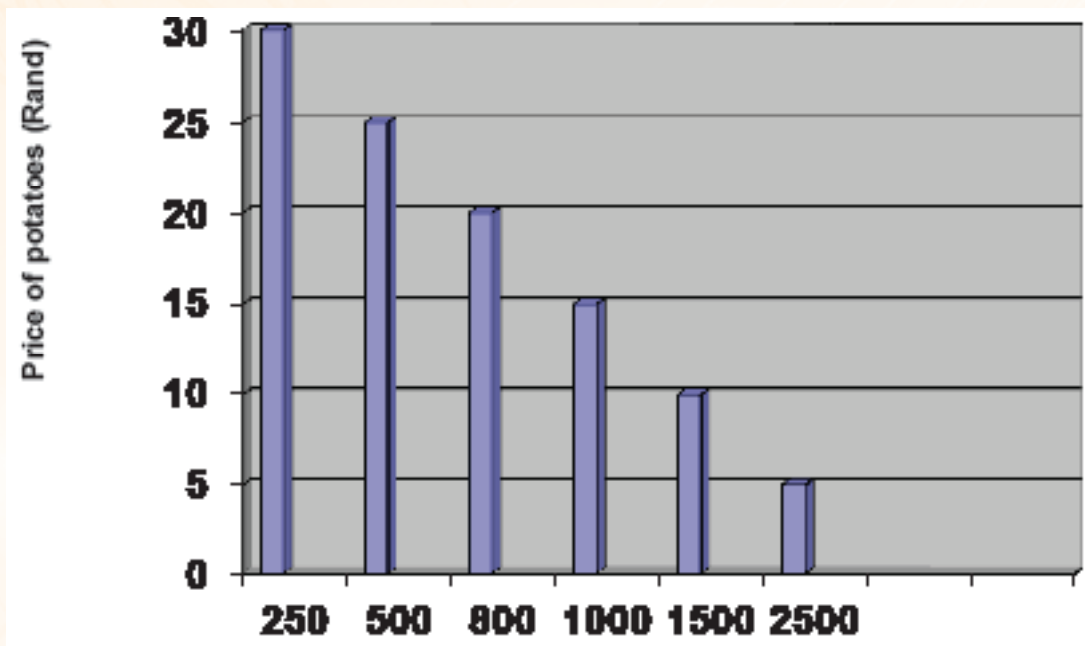
A line graph



From the same data a bar graph can also be drawn and plotted:

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

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



Quantity of potatoes sold (pockets /week)



Note: A graph can be asked under any topic such as **Animal Nutrition** as the following example(Paper 1 March 2016)

Example 2: The table below shows the temperature requirements of different farm animals.

FARM ANIMAL	LOWER CRITICAL TEMPERATURE (°C)	OPTIMUM TEMPERATURE (°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)

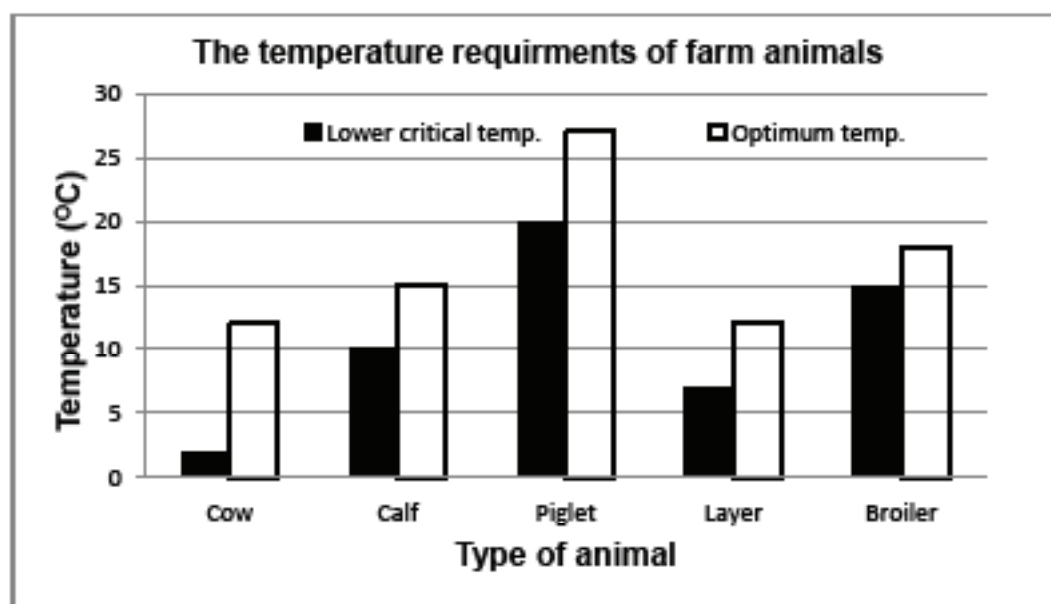
3.5.2 Which farm animal in the graph has the highest optimum temperature requirement?

(1)

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 Level	Context Word	Key Verbs and their meaning
A	Knowledge	Name - give a list State - write briefly the main points Give - mention or state a list 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
B	Comprehension and Application	Define - Write in detail what can be observed or what can be understood Describe - Write in detail what can be observed or what can be understood 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)

	
<ul style="list-style-type: none"> To strive for at least 40% achievement, answer the following exam questions by writing your answers down in a work book. After that, check your answers in Section 5 to see how well are you prepared. 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! Do not stop until you 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 ...		
-------	--	--	--

A	nutritive ratio and amino acid content.		
B	amino acid content and the ration in which it occurs.		
C	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 ...		
-------	--	--	--

A	heating rods for fermentation of crude fibre.		
B	cooling rods for the synthesis of vitamins.		
C	rods which secrete cellulase to hydrolyse crude fibre.		
D	grinding rods and the drying of feed.		

1.1.3	A deficiency of this mineral causes pica in farm animals:		
-------	---	--	--

A	Cobalt		
B	Zinc		
C	Calcium		
D	Phosphorus		

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

A	Eructation		
B	Regurgitation		
C	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)		
	B	(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)		
	B	(i), (ii) and (iii)		
	C	(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)		
	B	(i), (ii) and (iv)		
	C	(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?		
--	-------	--	--	--

	A	Amnion, allantois and chorion		
	B	Chorion, amnion and allantois		
	C	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?		
--	-------	---	--	--

	A	When the milk yield is at its highest, butterfat is at its lowest.		
	B	The higher the crude fibre content in a feed, the higher the butterfat content.		
	C	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		
	B	8		
	C	12		
	D	18	(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 number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 B only.			
-----	--	--	--	--

COLUMN A			COLUMN B
1.2.1	A:	Copper	Wasting disease
	B:	Cobalt	
1.2.2	A:	80% TDN	A production ration including fish meal which is used for high-producing dairy cows
	B:	4% DP	
1.2.3	A:	Plant poisoning	Excessive salivation
	B:	Urea poisoning	
1.2.4	A:	Cryptorchidism	Condition where female animals are unable to conceive after several attempts at insemination
	B:	Repeat-breeder syndrome	
1.2.5	A:	Oestrus	Regulated by progesterone
	B:	Ovulation	

		(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 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 to detect and record movement (5 x 2)		(10)
-------	--	--	------

1.4	Change the UNDERLINED WORD(S) in each of the following statements to make them TRUE. Write only the answer next to the question 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.		
-------	--	--	--

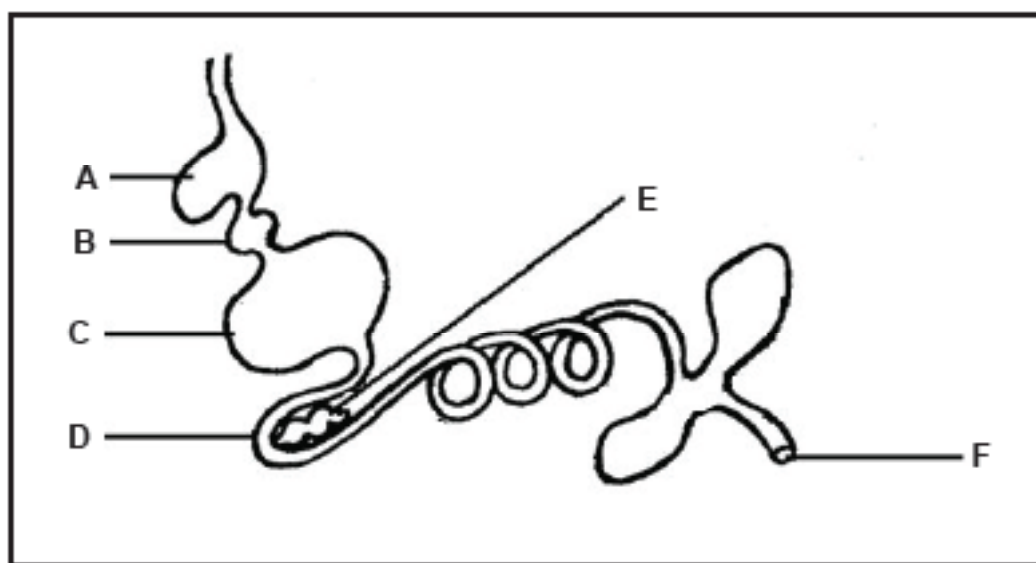
1.4.2	Parakeratosis is caused by a deficiency of <u>copper</u> .		
1.4.3	<u>Feed flow</u> is a method used to work out the exact quantities of two feeds to be included in a feed mixture to supply the required value.		
1.4.4	<u>Tapeworm</u> is an internal parasite that affects the livers of sheep.		
1.4.5	Twin lambs developing from a single zygote, are referred to as <u>freemartin</u> twins. (5 x 1)	(5)	
TOTAL SECTION A:			45

Section B

Question 2

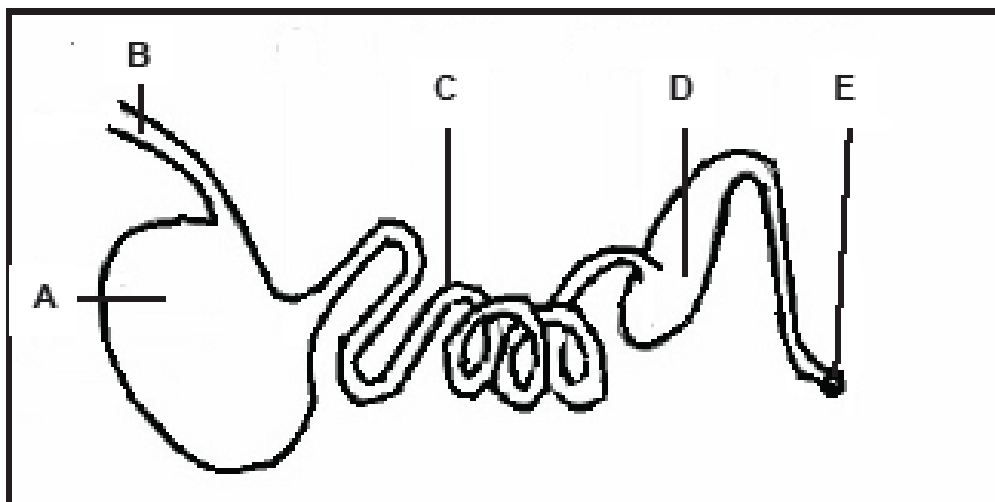
Animal Nutrition

2.1	The diagram below shows the alimentary canal of a farm animal.		
-----	--	--	--



2.1.1	Identify parts A , D and E .	(3)	
2.1.2	Name TWO ways in which part C is adapted to perform its function.	(2)	
2.1.3	Identify part B and estimate the pH of its contents.	(2)	

2.2 The diagram below shows the digestive system of a farm animal.



2.2.1 Identify the type of farm animal shown in the diagram above. (1)

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

2.2.3 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) |

2.2.4 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)
--	-------	---	-----

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

	2.4.1	Use the Pearson square method to balance the ration.	(3)
--	-------	--	-----

	2.4.2	Calculate the percentage of maize to be included in the ration.	(2)
--	-------	---	-----

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

	3.1.1	Draw a bar graph to indicate the live mass of pigs and the 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.		
-----	--	--	--

3.4.1	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 South African animal industry.		(2)
-------	---	--	-----

3.5	Parasites can cause serious economic losses; 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:		
--	--	--	--

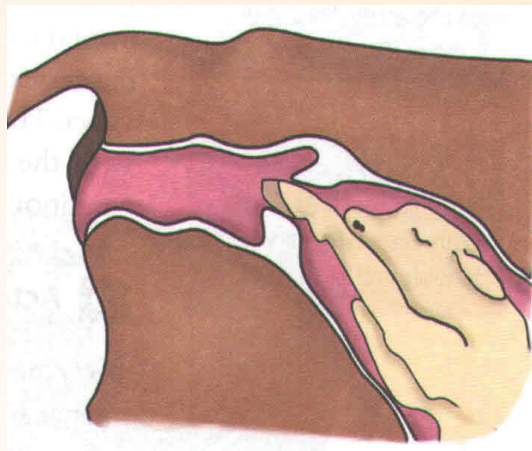
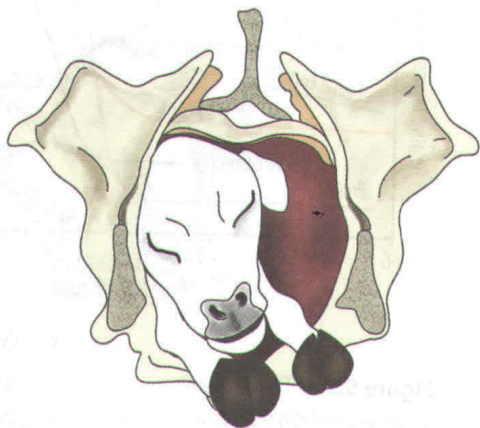
3.5.1	To eradicate round and flat worms		(1)
3.5.2	To treat external parasites such as ticks and mites		(1)
3.5.3	To treat blowfly attacking open wounds		(1)
			(18)

Question 4

Animal Reproduction

Pictures **A** and **B** below represent some stages of parturition in cattle.

4.1



A

B

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)

4.1.4 There 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 (b) Grey	(1) (1)
	4.2.2	State TWO ways in which the quality of semen may be negatively affected.	(2)
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 show, name THREE devices a farmer may use to detect oestrus in a cow.	(3)
	4.4.2	Give FOUR reproductive hormones, in sequential order, that are produced by a cow from gestation to parturition.	(4)
			[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 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	A	B	C	D
--------	--------------	---	---	---

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

A	Standardisation	
B	Grading	
C	Auction	
D	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. | | |
| C | 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.		
-------	--	--	--

- | | | | |
|---|------------------|--|--|
| A | species-crossing | | |
| B | upgrading | | |
| C | 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. | | |
| C | cash flow. | | |
| D | estate duty. | | |




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.		
B	Savings.		
C	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.		



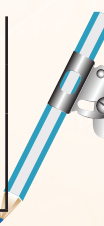
1.1.8	The type of capital that is regarded as a permanent and durable asset is...	
-------	---	--

A	wages for workers.		
B	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.		
B	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 Budget plan
B Strategic income plan
C Year plan
D Cash flow

(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:


COLUMN A		COLUMN B
A	Capital	Amount paid for money borrowed.
B	Interest	

Answer:


The statement refers to:			
A only	B only	A and B	None
A	B	C	D

COLUMN A			COLUMN B
1.2.1	A	Recessive	A characteristic that is only expressed when in the homozygous state
	B	Dominant	
1.2.2	A	Stability of the product	This factor(s) affects demand.
	B	Price of the product	
1.2.3	A	Unemployment	Repercussions of sudden mechanisation
	B	Self-employment	
1.2.4	A	Diversification	A farmer has a number of different production enterprises to spread the risk.
	B	Flexibility	
1.2.5	A	Discontinuous variation	Variation within a population in which there is a range of intermediate phenotypes.
	B	Continuous variation	

(5 x 2) (10)




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)		



1.4	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 <u>mutant genes</u> .	
1.4.3	The product <u>sale</u> is the result of the interaction of supply and demand on a market.	
1.4.4	<u>Line breeding</u> 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)
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	TOTAL SECTION A:	[45]
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Section B

Question 2

2.1	With guinea fowls the gene for black colour (B) is dominant over the 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-generation.	(4)
	2.1.2	Indicate the Genotype ratio and the Phenotype ratio of the offspring	(4)
	2.1.3	One of the white offspring from the F1-generation was crossed with its heterozygotic black parent. Use a Punnet 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	<p>The owner of a horse stud farm is breeding specifically for grey horses. He crosses a black stallion with a white mare.</p> <p>Of the first four year's offspring all are grey.</p>	
-----	--	--

2.3.1	Indicate the genotype for both parents	(2)
2.3.2	Present the above mentioned cross in a schematic diagram	(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 passage above.	(1)
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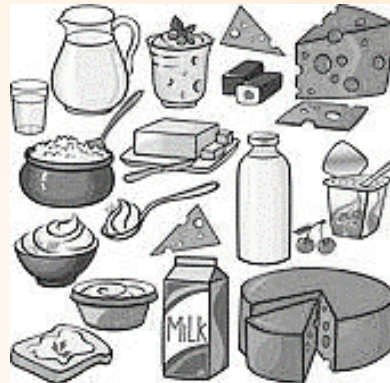
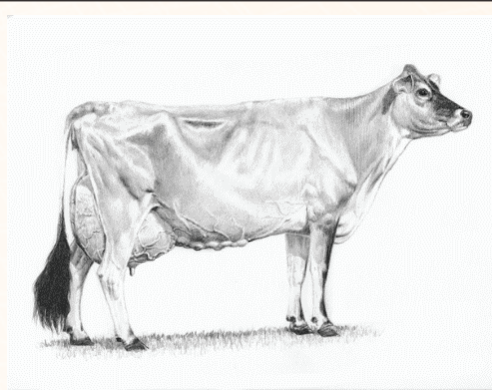
2.4.3	Identify THREE animal production characteristics in the passage that were used for selection by these people.	(3)
-------	---	-----

2.4.4	<p>Indicate how the following aspects were used by the people in the passage above to improve the phenotype of the animals:</p> <p>(a) Genetic variation</p> <p>(b) Environmental variation</p>	<p>(1)</p> <p>(1)</p> <p>[]</p>
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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 '*market*'.

(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.

INPUT

PRODUCTION

PROCESSING &
DISTRIBUTION

MARKETING

CONSUMER



3.2.1 Name TWO advantages of sustainable agricultural marketing.

(2)

	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 ✓✓

(10 x 2)

(20)



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

TOTAL SECTION A:	45
-------------------------	-----------

Section B

Question 2

Animal Nutrition

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

2.1.2	Ways in which structure C is adapted <ul style="list-style-type: none"> Thick, muscular walls for grinding feed ✓ Presence of small stones for grinding feed ✓ 	(2)
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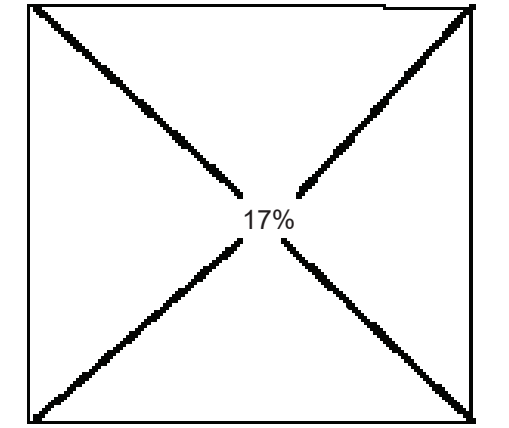
2.1.3	Identification of structure B and estimation of pH <ul style="list-style-type: none"> Proventriculus/true stomach/glandular stomach ✓ pH less than 7/acidic ✓ 	(2)
-------	--	-----

2.3	Digestibility co-efficiency	
-----	------------------------------------	--

2.3.1	<p>Calculation: $8\% (0,08) \times 30 \text{ kg} = 2,4 \text{ kg}$</p> <p>Dry material: $30 \text{ kg} - 2,4 \text{ kg} = 27,6 \text{ kg} \checkmark$</p> <p>DC = $\frac{\text{Dry material intake (kg)} - \text{Dry mass of manure(kg)}}{100} \checkmark$</p> <p style="text-align: right;">Dry material intake (kg) 1</p> <p style="text-align: center;"> $= \frac{27,6 \text{ kg} - 12 \text{ kg}}{27,6 \text{ kg}} \times \frac{100}{1} \checkmark$ </p> <p style="text-align: center;"> $= 56,5/57 \checkmark \% \checkmark$ </p>	(5)
-------	---	-----

2.3.2	Processes to improve digestibility of feeds <ul style="list-style-type: none"> 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 ✓ Soaking ✓ Popping and micronising ✓ Mixing of complementary feeds ✓ 	(Any 3)	(3)
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2.4	Pearson square		
-----	-----------------------	--	--

2.4.1	Calculation: Maize 9% 27/27 parts ✓ <div style="text-align: center;">  </div> Peanut oilcake 44% 8/8 parts ✓		(3)
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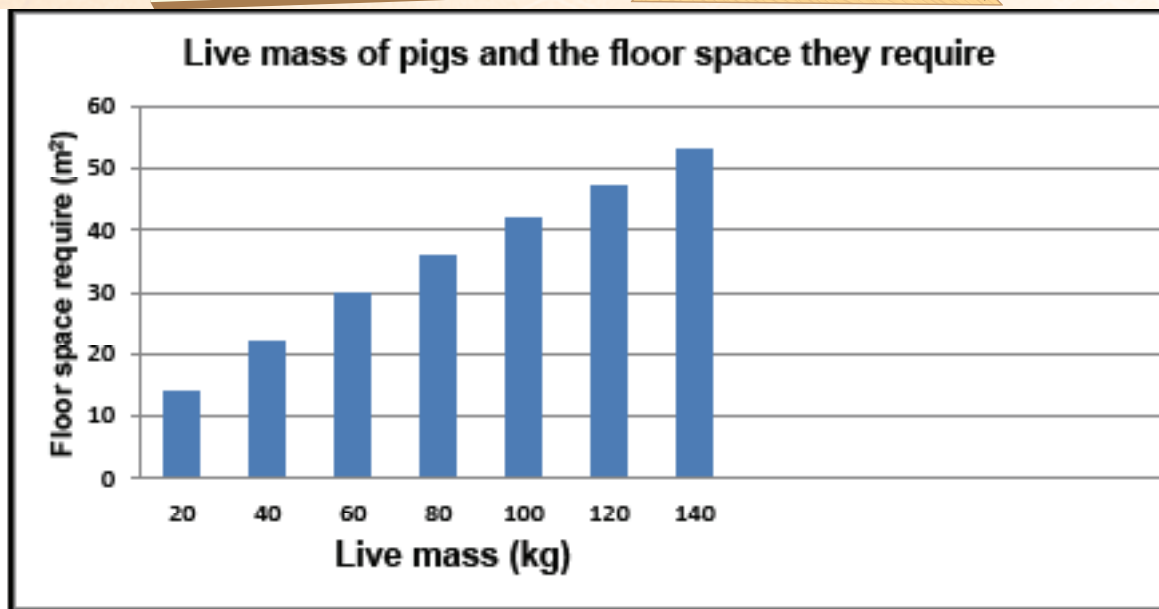
2.4.2	Maize percentage to be included in the ration $27 \div 35 \times 100$ ✓ $= 77,14/77\%$ ✓		(2) (20)
-------	---	--	-------------

Question 3

Animal Production, Protection and Control

3.1 Floor space required by pigs

3.1.1 Bar graph



Criteria/rubric/marketing guidelines

- Correct heading ✓
- X-axis – correct calibrations and labelled (Live mass) ✓
- Y-axis – correct calibrations and labelled (Floor space required) ✓
- Both units are correct unit (m^2/kg) ✓
- Bar graph ✓
- Accuracy ✓

(6)

3.1.2 Trend between floor space required and live mass

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

(2)

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 <ul style="list-style-type: none"> • Veterinary research to improve vaccines/diagnostic/new products ✓ • Surveillance/control/preventing diseases ✓ • Producing disease/blood vaccines ✓ 	(3)
-------	---	-----

3.4.2	Purpose of a quarantine station <ul style="list-style-type: none"> To isolate/detain animals and ✓ prevent diseases/pests entering/spreading in the country ✓ 	(2)
-------	--	-----

3.4.3	Other roles the state play to protect the animal industry <ul style="list-style-type: none"> Animal health schemes ✓ Duties of owners of animals ✓ Import bans ✓ Importation of vaccines ✓ Movement permits ✓ 	(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	Embryo development	
-----	---------------------------	--

4.1.1	Stages of parturition as in pictures A and B <p>A - Ejection/expulsion ✓</p> <p>B - Preparatory ✓</p>	(2)
-------	--	-----

	4.1.2	Incorrect posture of the calf <ul style="list-style-type: none"> Picture B/B ✓ Reason <ul style="list-style-type: none"> Retention of one leg towards the vulva/second leg is folded back ✓ 	(1)
			(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 <ul style="list-style-type: none"> 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 ✓ | (1) |
| (b) Presence of old blood/infection ✓ | (1) |



4.2.2 TWO negative effects on quality of semen

- Poor nutrition ✓
 - Severe environmental conditions/temperature ✓
 - Age ✓
 - Diseases ✓
- (Any 2)

(2)

4.4	Mating during oestrus		
-----	------------------------------	--	--

	4.4.1	Devices to detect oestrus in the cow <ul style="list-style-type: none"> Pedometer ✓ Chin-ball marker ✓ Tail-chalking ✓ Kamar heatmount detector ✓ 	(Any 3)	(3)
	4.4.2	Sequential order of FOUR reproductive hormones that are produced by a cow <ul style="list-style-type: none"> Progesterone ✓ Luteotrophic hormone/LTH/prolactin ✓ Relaxin ✓ Oxytocin ✓ 	(Any 4)	(4) (21)
			Section B:	59
			Grand Total:	[104]

 What is your score of Paper 1?			
Marking guideline: Paper 2			

Memorandum:

SECTION A

QUESTION 1.1

1.1.1	A	X	C	D
1.1.2	A	X	C	D
1.1.3	A	X	C	D
1.1.4	A	B	X	D
1.1.5	A	B	X	D
1.1.6	A	X	C	D
1.1.7	A	B	C	X
1.1.8	A	B	X	D
1.1.9	A	B	C	X
1.1.10	X	B	C	D

(10x2) (20)

QUESTION 1.2

1.2.1	A✓✓	B	C	D
1.2.2	A	B	C✓✓	D
1.2.3	A✓✓	B	C	D
1.2.4	A✓✓	B	C	D
1.2.5	A	B✓✓	C	D

(5X 2) (10)

QUESTION 1.3

- 1.3.1 Gene ✓✓
- 1.3.2 Under-capitalization ✓✓
- 1.3.3 Worker's compensation ✓✓
- 1.3.4 Processing/Value adding ✓✓
- 1.3.5 Selection ✓✓

(5 x 2) (10)

Question 1.4

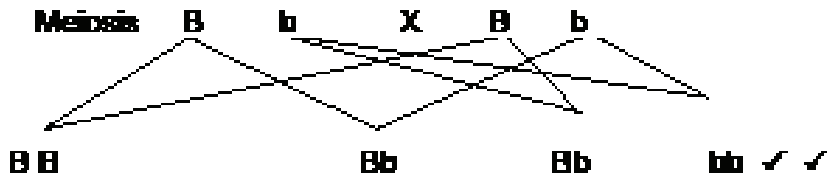
- 1.4.1 Price ✓
- 1.4.2 Lethal genes ✓
- 1.4.3 Price ✓
- 1.4.4 Cross-breeding ✓
- 1.4.5 Allele ✓

(5 x 1) (5)

[45]

Section B

Question 2

2.1											
2.1.1	<p>Parents : Bb ✓ x Bb ✓</p>  <p>(4)</p>										
2.1.2	<p>Genotype ratio : 1(BB): 2 (Bb): 1 (bb) ✓ ✓</p> <p>Phenotype ratio: 3 Black : 1 White ✓ ✓</p>	<p>(2)</p> <p>(2)</p>									
2.1.3	<table border="1" data-bbox="295 869 833 1019"> <tr> <td></td><td>b</td><td>b</td></tr> <tr> <td>B</td><td>Bb</td><td>Bb</td></tr> <tr> <td>b</td><td>bb</td><td>bb</td></tr> </table> <p>✓✓ for gametes of parents</p> <p>✓✓ for correct offspring</p> <p>(4)</p>		b	b	B	Bb	Bb	b	bb	bb	<p>(4)</p> <p>(12)</p>
	b	b									
B	Bb	Bb									
b	bb	bb									


2.2		
-----	--	--

2.2.1	<p>Pure bred means Homozygous black in this case.</p> <p>Therefore:</p> <table border="1" data-bbox="300 1579 1048 1803"> <tr> <td>parents</td><td>BB</td><td>BB ✓</td></tr> <tr> <td>BB</td><td>BB</td><td>BB</td></tr> <tr> <td>BB</td><td>BB</td><td>BB</td></tr> <tr> <td>✓</td><td></td><td></td></tr> </table> <p>Marks: 1✓ for each parent (2)</p> <p>2✓ for correct offspring (2)</p> <p>Homozygous black parents can produce ONLY homozygous black offspring. ✓ (1)</p>	parents	BB	BB ✓	BB	BB	BB	BB	BB	BB	✓			<p>(5)</p>
parents	BB	BB ✓												
BB	BB	BB												
BB	BB	BB												
✓														

2.2.2	<p>Homozygous means the two alleles for the same characteristic is the SAME. ✓ Thus for black BB or bb. ✓</p> <p>Heterozygous means the two alleles for the same characteristic is DIFFERENT. ✓ Thus Bb. ✓</p>	(4) (9)
-------	--	------------

2.3	Horse breeding	
-----	-----------------------	--

2.3.1	BB✓ x bb✓	(2)
-------	-----------	-----

2.3.2		
2.3.3	Incomplete Dominance✓✓	(2)
2.3.4	50% of the offspring will be grey✓✓	(2)
		(10)

2.4	Traditional selection method	
-----	-------------------------------------	--

2.4.1 Define selection

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

2.4.2 Method of selection in the scenario. (1)

- Mass selection ✓

2.4.3 THREE characteristic considered for selection

- Growth ✓
- Health ✓
- Fertility ✓

(3)

2.4.4 Aspects to improve phenotype of animals

(a) **Best** bulls for growth/health/fertility were shared ✓ (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 ✓ for specific goods and services ✓.

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

any 2 (2)

3.1.2

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

any 2 x 2 (4)

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

any 3 (3)

[9]

Question 4

Sustainable agricultural marketing

4.1.1 Create better businesses ✓

Better relationships ✓

Better world ✓

Reduce carbon footprint ✓

any 2 (2)


4.1.2 - Bulkiness in relation to the value

- Perishability
- Seasonal character of production
- Standardisation
- Lack of control over production
- Wide distribution of production areas
- Marketing through intermediary

Any 1 discussed (3)

[5]

	GRAND TOTAL:	98
--	---------------------	-----------

	What is your score of Paper 2?		
Total Paper 1+ Paper 2 =			



Section 5

20% More Exam Practice Questions

Paper 1

Animal Nutrition

2.5 The table below represents the laboratory results of THREE feeds.

FEED	TDN (%)	DP (%)	NR
1	84	12	1 : 6
2	75	15	
3	70	7	1 : 9

2.5.1 Calculate the nutritive ratio (NR) of feed 2.

(3)

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

(1)

2.5.3 Give ONE reason for the answer to QUESTION 2.5.2.

(1)

2.5.4 Refer to the table and identify the cheapest feed.

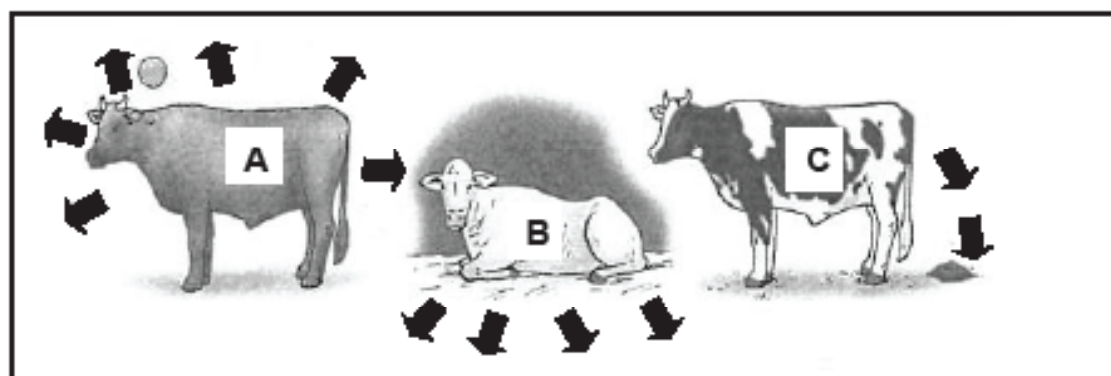
(1)

2.5.5 Motivate the answer to QUESTION 2.5.4.

(1)

[7]

Animal Production, Protection and Control



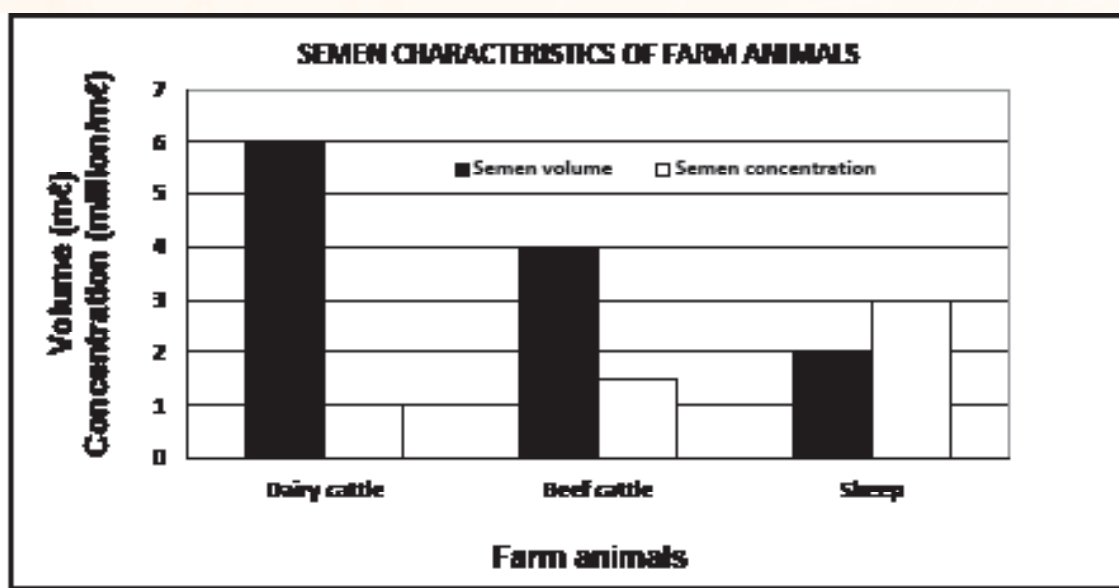
3.2

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]

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 ml 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

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 rand)	10	15	20	25	30
	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 oranges.	(6)
-------	---	-----

2.2.3	Explain why there was a higher demand for oranges in Week 1 than in Week 5.	(2) [11]
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QUESTION 3 : PRODUCTION FACTORS

3.4

The table below indicates a list of capital items and costs for a livestock enterprise.

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:	
--	-------	---	--

		(a) Income	(2)
--	--	------------	-----

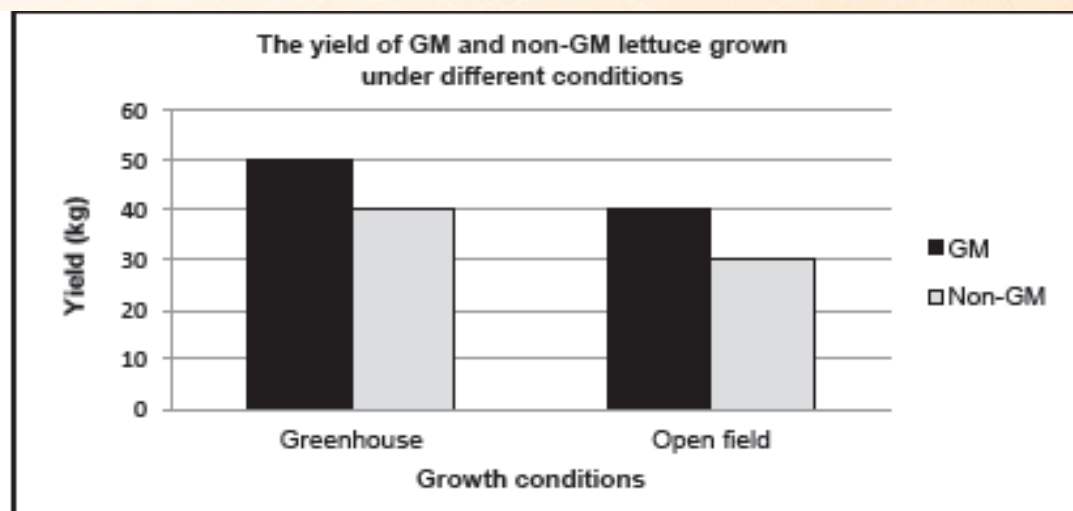
		(b) Variable costs	(2)
--	--	--------------------	-----

		(c) Overhead costs	(2)
--	--	--------------------	-----

	3.4.2	Use a formula to calculate the net income of this enterprise.	(4) [10]
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QUESTION 4: BASIC AGRICULTURAL GENETICS

4.4	GM lettuce with a high yield was produced using a gene from a water 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.		
-----	---	--	--



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)
GRAND TOTAL:		[8]
		[29]

Section 6 Answers to Revision 20% more:

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

Animal Nutrition

2.5	Data representing the laboratory results of THREE feeds		
-----	---	--	--

2.5.1	Calculation of the NR for feed 2 $\text{NR} = 1: \frac{\text{TDN}\% - \text{DP}\%}{\text{DP}\%} \quad \checkmark$ $= 1: \frac{75\% - 15\%}{15\%} \quad \checkmark \quad \text{OR} \quad = 1: \frac{60\%}{15\%} \quad \checkmark$ $\text{NR} = 1: 4 \quad \checkmark$	(3)
-------	---	-----

2.5.2	Identification of the feed (1, 2 or 3) recommended <ul style="list-style-type: none"> Feed 2 \checkmark 	(1)
-------	--	-----

2.5.3	Reason to justify the answer in QUESTION 2.5.2 <ul style="list-style-type: none"> It has a narrower nutritive ratio \checkmark Suggesting a comparatively higher protein necessary for milk production \checkmark 	(1) (Any 1)
-------	--	----------------

2.5.4	The cheapest feed <p>Feed 3 \checkmark</p>	(1)
-------	--	-----

2.5.5	Reason for the answer in QUESTION 2.5.4 <ul style="list-style-type: none"> This feed has a lower protein content \checkmark Feed with lower protein is cheap \checkmark 	(1) (Any 1) [7]
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Animal Production, Protection and Control

3.2	Farm animals losing 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 <ul style="list-style-type: none"> • Convection ✓ • Movement/work ✓ • Production level ✓ • Urination ✓ • Breathing ✓ <div>(Any 2)</div>	(2)
	3.2.3	Signs of heat stress in animals <ul style="list-style-type: none"> • Excessive salivation/drooling ✓ • Drop/decrease in production ✓ • Excessive panting/high respiratory rate/sweating ✓ • Open mouth breathing with tongue hanging out ✓ • Loss of appetite ✓ • Cattle move away from each other ✓ • Restlessness ✓ <div>(Any 2)</div>	(2)
	3.2.4	Management practice to reduce heat in A <ul style="list-style-type: none"> • Provision of shelter/shade/cool area ✓ • Breeding of heat adapting animals ✓ • Use of mechanical cooling systems ✓ • Work calmly with animals ✓ • Access to drinking water ✓ <div>(Any 2)</div>	(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 ✓ (1)

4.1.2 Correlation

Dairy cattle

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

Sheep

- Sheep produce less semen ✓ that is highly concentrated ✓ (2)

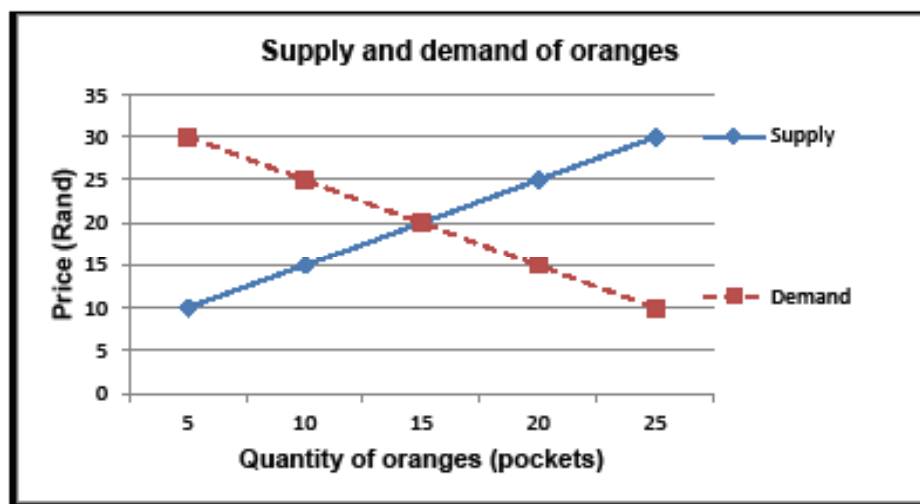
GRAND TOTAL: 21

Paper 2 Answers: to score 20% more marks

MARKING GUIDELINE:

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.2	Demand and supply		
2.2.1	Relationship between price, supply and demand <ul style="list-style-type: none">• The higher the price ✓, the higher the supply ✓ and the lesser the demand ✓ <p style="text-align: center;">OR</p> • The lesser the price ✓, the lesser the supply ✓ and the higher the demand ✓		(3)
2.2.2	Graph on the supply and demand of oranges		



Criteria/rubric/marking guidelines

- Correct heading ✓
- X axis - correctly calibrated and labelled (Quantity of oranges) ✓
- Y axis - correctly calibrated and labelled (Price) ✓
- Correct units (Rand and pockets) ✓
- Accuracy for both graph for demand ✓
- Line graph for supply and demand ✓

(6)

2.2.3 Reason for higher demand

- Price for pocket of oranges was low (R10) in week 1 ✓
- but higher (R30) in week 5 ✓

(2)

[11]

QUESTION 3 : PRODUCTION FACTORS

3.4 Capital and Costs

3.4.1 Classification of items

(a) Income - Cattle sales ✓, sheep sale ✓

(2)

(b) Variable costs - Marketing ✓, grain feed ✓, electricity
telephone bills ✓ (Any 2)

(2)

(c) Overhead costs - Telephone bills ✓, electricity ✓

(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 ✓ <p style="text-align: center;">OR</p> Net income = Income – expenditure ✓ = R191 400 ✓ – R 97 350 ✓ = R 94 050 ✓		
		(4)	[10]

QUESTION 4: BASIC AGRICULTURAL GENETICS

4.4	Genetic modification of lettuce		
4.4.1	Difference in yield of GM lettuce and non-GM lettuce GM lettuce produce better under different conditions ✓ than non- GM plants under the same conditions ✓	(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 <ul style="list-style-type: none"> 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 ✓ <p style="text-align: right;">(Any 3)</p>	(3)	



4.4.4	TWO environmental risks of genetically modified plants <ul style="list-style-type: none">• Creation of herbicide resistant 'superweeds'/harmful pesticide resistant plants ✓• Indiscriminate use of herbicides pollute the environment ✓ Beneficial insects can be killed ✓ <div>GRAND TOTAL :</div>	(Any 2)	(2)	[8]	[29]
-------	--	---------	-----	-----	------



What was your score?






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:



Our message to YOU:

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!



MESSAGE TO GRADE 12 LEARNERS FROM THE BUSINESS STUDIES

Positive thinking involves no negative thinking, instead of thinking of what could go wrong, as a positive thinker you must think about what can go right. As a positive thinker you are going to look for the good in things.

That means you will always try to find something positive about every situation.

LOOK FOR THE BEST

Learn to look for the best in every situation. No matter what you're going through, if you look hard enough and keep the right ATTITUDE, you can FIND, something good about this experience of learning.

Use this guide with the intention of striving for SUCCESS and with the positive ATTITUDE with which we as Business Studies writers have written these notes.

After studying these notes, try to attempt the practice questions given without looking at the answers as well as study previous question papers and notes in other study guides to help you to succeed.

Important Things To Consider when You are Studying:

- ❖ Create a conducive environment for studying.
- ❖ Always target a 100% pass when you study.
- ❖ Know that 100% pass requires, 100% preparation, information and understanding.
- ❖ Use all the resources around you effectively and efficiently.

We wish you the best of luck in your study of Business Studies!!

RESOURCES:

1. Business Studies National Examination Guideline 2015.
2. NSC Business Studies Examination Papers and Memo November 2015, March 2016, November 2016.
3. Combination of National Prescribed LTSM for Business Studies.



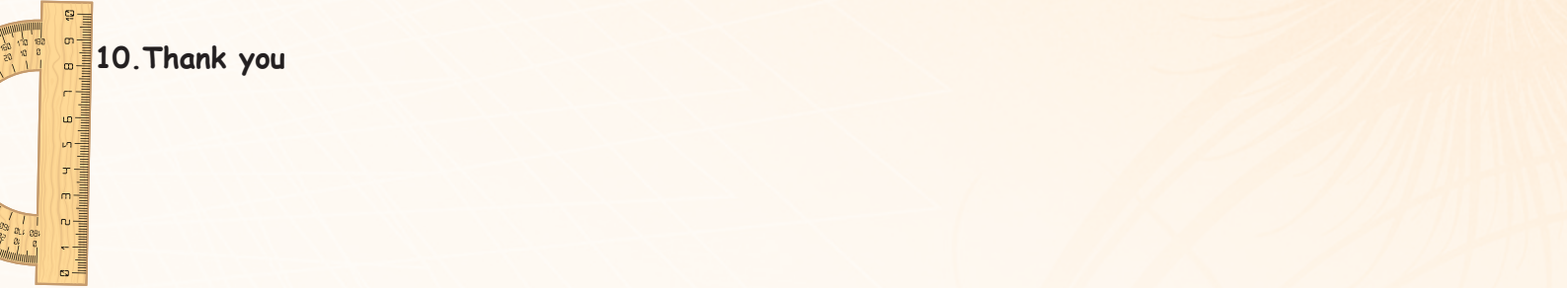
Each developer should write a message of encouragement to the learners



Be funny, be witty, be creative

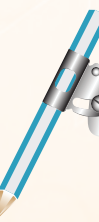
Motivate the learners

Inspire them to want to learn



10.Thank you







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