INTERNATIONAL SECONDARY CERTIFICATE EXAMINATION
NOVEMBER 2023

AGRICULTURAL SCIENCES

MARKING GUIDELINES

Time: 3 hours 300 marks

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

SECTION A

QUESTION 1

1.1 **Change the underlined term to make the statement true.**

1.1.1 Skilled labour

1.1.2 Employer

1.1.3 Family responsibility leave

1.1.4 Assets

1.1.5 Production risk

1.2 **Match column B with column A.**

1.2.1 C / Organic O

1.2.2 D / Humic A

1.2.3 A / Melanic A

1.2.4 E / Vertic A

1.2.5 B / Orthic A

1.3 **Identify the different types of fruit in Column A according to the way in which they develop. Choose from the following options: simple; compound; multiple; accessory.**

1.3.1 Accessory

1.3.2 Simple

1.3.3 Simple

1.3.4 Simple

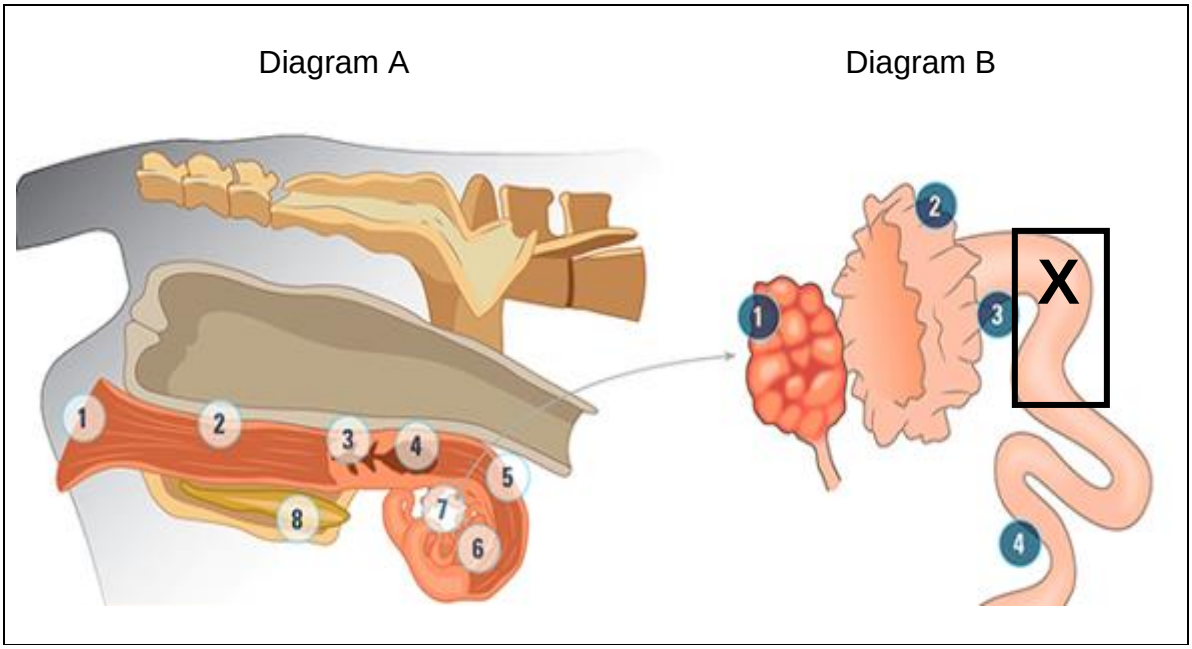
1.3.5 Multiple

1.3.6 Compound

1.4 1.4.1 **Number from Diagram A which corresponds with the statement in the table below.**

STATEMENT	ANSWER
As the animal approaches oestrus the vulva will develop a swollen moist appearance.	1
Site where semen should be deposited during artificial insemination.	4
Its primary function is to protect the uterus from the external environment.	3
Serves as the copulation organ in females.	2
Produces hormones and oocytes through the entire oestrus cycle.	7

1.4.2 **Clearly indicate with an 'X' where fertilisation will occur on Diagram B.**



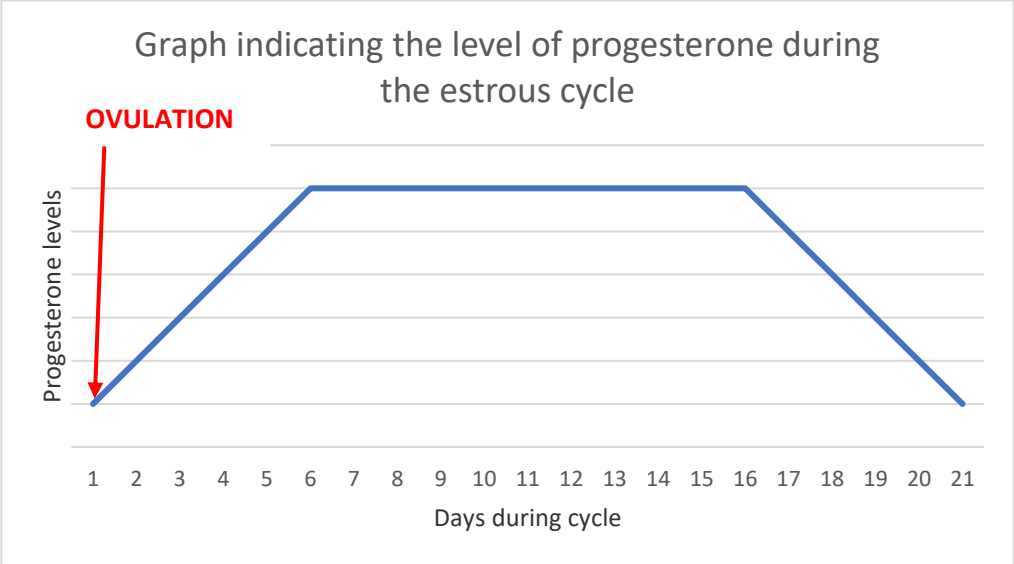
'X' to be placed on Diagram B in the region of the ampulla (number 3). (Allow placement anywhere in the indicated box).

1.5 **Provide the missing labels (A to F) for the following diagram.**

A: Oogenesis / Ovigenesis
B: Oogonium / Oogonia / Stem cell
C: Primary oocyte
D: Secondary oocyte
E: Meiosis II
F: Ovum / Egg cell

1.6 **Convert the information from the diagram into a line graph to indicate the secretion of progesterone throughout the oestrus cycle. Clearly show when ovulation occurs on the graph.**

Line graph:



Use the following key on student's graph when marking according to allocated marks:

- H: Suitable **heading** for graph (Refer to both variables)
- L: **Line graph** drawn
- A: **Axis labelled** – *x*-axis *y*-axis
- S: Correct **scale on *x*-axis** – (number of days indicated correctly/ 21 days)
- P: **Plotting** – line indicating levels rising until ± day 6
  – then at stable level until ± day 16
  – line indicating decreasing levels until end of cycle
- O: **Ovulation** indicated correctly on graph

1.7 **Indicate whether the description in COLUMN B relates to A only, B only, both A and B, or none of the answers in COLUMN A. Make a cross (X) in the appropriate block next to the question number (1.7.1–1.7.6)**

1.7.1 A

1.7.2 B

1.7.3 B

1.7.4 None

1.7.5 A

1.7.6 A and B

1.8 **Potential benefits and risks of genetically modified crops. Identify the potential benefit or risk of genetically modified crops that you will associate with each illustration.**

COLUMN B Potential benefit/risk
1.8.1 Health risk **OR** unknown health issues might scare people into believing that it might cause cancer, loss of effective immune system. (Risk)(Any one)
1.8.2 Heat resistance **OR** economic benefit/environmental benefit **OR** yields are increased due to improved protection against stress caused by environment. (Benefit)(Any one)
1.8.3 Pest/insect resistance **OR** economic benefit/environmental benefit **OR** farmers can use less pesticides/insecticides. GM crops are better protected against pests. (Benefit)(Any one)
1.8.4 Environmental risk **OR** insect/pest resistant crops can potentially cause development of harmful pest resistant plants/'super weeds'. Toxic effect of insect/pest resistant plants can also kill beneficial insects such as bees. Long-term effect on ecosystems not yet well established. (Risk)(Any one)

* NOTE: Only need to identify possible benefit or risk, but marks can be allocated if benefit or risk is explained.

SECTION B

QUESTION 2

2.1 2.1.1 **Specific type of farming**

Precision farming

2.1.2 **Definition of precision farming.**

- Makes use of technology (computers/GPS/remote sensing devices)
- To maximise output (production)
- to measure correct environmental conditions (temperature, moisture, pest outbreaks, etc.)
- that provides information in fine detail/precise information
- allows for farmer to make informed decision/take precaution.

2.1.3 **Information from the extract to explain three principal aims of precision farming.**

- To maximise output
  example: higher crop yield/increased production/increased food security/more profit
- while minimising input
  example: saves time (receives confirmation of whether seed is genuine within seconds) greater precision in terms of inventory management text is free (cost already part of label cost)
- to apply targeted action
  example: actionable information to farmer is provided/farmer can make informed decisions (receives confirmation of whether seed is genuine within seconds/farmers can find out about illegal practices of agrodealers)

*** NOTE**: three principles – 3 marks
three examples from extract information – 3 marks

2.1.4 **THREE reasons why the use of scratch-off seed label would benefit the farmer.**

- Expect good yields at the end of the season.
- Improved food security.
- Marked decline in the incidences of counterfeit seed being sold in.
- Smallholder farmers more confident in investing in certified seed.
- Greater inventory management.
- Farmers can find out about illegal practices of agrodealers.
- Confirming that seed is genuine.
- Confirming variety in package.
- Confirming the seed company.
- Confirming the date of testing.
- Text is free as cost is incorporated in cost of label.

(Any 3)

2.1.5 **TWO key determinants of crop yield for farmers all over the world.**

- Seed genetics
- Seed quality

2.1.6 (a) **What does the term 'demand' refer to?**

The amount/quantity of economic goods/ products/services that a group of consumers wants to purchase at a given price.

(b) **What does the term 'supply' refer to?**

Various quantities of a product that are produced or offered by the sellers at varying prices.

2.1.7 **Refer to the definitions of *demand* and *supply* in Question 2.1.6 to explain why '… *the demand for seed of improved varieties often outstrips the supply* ' creates a problem for farmers.**

- Farmers increasingly recognise the value of good quality seed varieties, therefore the demand increases.
- In Africa, seed quality is often substandard./There is not enough seed of improved varieties available for the farmers to buy.
- This creates opportunities for seed counterfeiters to sell fake seeds.

2.2 2.2.1 **Does the following image of an agribusiness chain represent an example of a demand chain or a supply chain?**

Supply chain

2.2.2 **Provide a reason for your answer in Question 2.2.1.**

- It serves as link between producer, processor, and marketer. (Dairy farm – dairy hub – dairy processor)
- Allow buyers and sellers who are separated by time and space to pass product from one member of chain to the next.
- Technology and advanced techniques are used by producers and processers (milking, cooling services).
- It includes purchasing, manufacturing and distribution (transport).

(Any two)

2.2.3 **Name THREE factors that can hamper the marketing chain of dairy products.**

- Perishability
- Bulkiness in relation to value (certain products require more space for transport and storage).
- Standardisation (variation in quality).
- Wide distribution of production areas./Poor accessibility.
- Marketing through intermediaries.

(Any three)

2.2.4 **Discuss TWO ways to streamline and improve the agribusiness chain.**

- Improve infrastructure of farm and public roads. This prevents deterioration of products.
- Have cooling facilities on the farm. It prevents product from spoiling and prolongs freshness.
- Improve shelf life. It prevents product from spoiling and prolongs freshness.
- High-quality packing materials prevents further damage and improves marketing price.
- Transport produce in cooler containers to prevent spoilage.
- Reduce transport costs combine loads to meet market demand.
- Use transport companies with reliable drivers to prevent loss of produce because of accidents.
- Utilise agricultural extension servicesto support emerging farmers.

(Any two discussed)

2.3 2.3.1 **Identify the process represented in the image.**

Cloning / Nuclear transfer

2.3.2 **Provide labels for the parts labelled A, B and C.**

A (Mild) electric shock
B Remove nucleus/empty ovum
C The cloned embryo is implanted into the uterus of sheep 3

2.3.3 **Will Offspring X have the same genetic material as Sheep 1, Sheep 2, or Sheep 3?**

Sheep 1

2.3.4 **Provide a reason for your answer in Question 2.3.3.**

- The nucleus that contains the genetic material is taken from Sheep 1.
- The nucleus is removed from ovum (taken from Sheep 2.)/The ovum (from Sheep 2) is empty./Ovum (from Sheep 2) contains no genetic material.
- The cloned embryo is placed in uterus (of Sheep 3.)/No transfer of genetic material from Sheep 3.

2.4 **Name the THREE types of soil degradation and provide an example of each.**

- Physical degradation
  Example: Overgrazing Monoculture Cultivating marginal land Bad cultivation methods Wetland loss or damage
- Biological degradation
  Example: Starving the soil, fields laying fallow (uncultivated) Monocropping Intensive farming. Loss of beneficial soil organisms
- Chemical degradation
  Example: Salination Acidification Waterlogging

(*One mark each for type, one mark each for example)

2.5 **Land is needed for all production. Name THREE economic characteristics of land as a production factor.**

- Land is not produced, it was created.
- Amount of land is finite/is not increasing.
- Land cannot be used up/wear out/depreciate/spoil/get used up.
- Components of land can be consumed/used up/become infertile/ diminishing returns.
- Demand for land and therefore its price tends to rise over time.
- Land is reusable to certain extent.
- Land is vital to life and economic activity.

(Any 3)

QUESTION 3

3.1 3.1.1 **Identify the problem when factors such as greenhouse gases have a negative impact on the environment.**

Agricultural pollution/air pollution.

3.1.2 **Greenhouse gas produced by ruminants that may increase the problem.**

Methane

3.1.3 **State TWO possible control measures to reduce the gas produced by ruminants as a byproduct.**

Change livestock feeding practices to reduce methane production.
Improve livestock manure management.

3.2 3.2.1 **Explain why the environmental impact of dairy production increases with the proportion of non-producing cows.**

- These cows cannot contribute to milk yield as they are dry cows/ growing heifers/'retired' cows.
- They will still graze/feed on pasture and produce greenhouse gases/methane.
- Keeping non-producing cows out on pasture would add a huge quantity of greenhouse gases to the carbon footprint per litre of milk produced./Carbon footprint and resource use per litre is negatively correlated with milk production.

(Any two explained)

3.2.2 **Provide and explain TWO possible reasons for the low milk yield in sub-Saharan Africa.**

- Farmers in sub-Saharan Africa are mostly small/subsistence farmers. The low yields may be due to hand-milking operation.
- Mechanisation, which will increase milk yield is expensive/not available to most farmers in sub-Saharan Africa.
- It is expensive to change livestock feeding practices to reduce greenhouse gases emitted for non-producing cows.
- Farmers may not have the means of selling non-producing cows due to remote areas/lack of transport.
- Environmental conditions such as hot climatic conditions. Inadequate nutrition. Lack of food and water.

(Any two well explained answers)
*** NOTE:** Accept other possible well explained answers.

3.3 3.3.1 **State whether the following statements are TRUE or FALSE.**

A True
B True
C False
D False
E False
F False

3.3.2 **Briefly explain the difference between *infertility* and *sterility*.**

Infertility: It may be temporary/not permanent of nature.
(compulsory mark)
Cow/bull is unable to reproduce/produce offspring.
Cow cannot produce viable egg cell.
Bull cannot produce viable sperm.
Cow/bull is of no use for reproductive purposes.
(Any 1 other if compulsory mark is awarded)

Sterility: Complete and permanent inability to reproduce.
(Compulsory mark)
Cow/bull is unable to reproduce/produce offspring.
Cow cannot produce viable egg cell. Bull cannot produce viable sperm.
Cow/bull is of no use for reproductive purposes.
(Any 1 other if compulsory mark is awarded)

3.3.3 **Explain how to administer a subcutaneous injection.**

- Administered directly into the connecting tissue beneath the skin.
- Use a needle size 16–18 gauge.
- Administered in a place where the skin fits loosely.
- Administered halfway up the neck/in front of the shoulder/over the ribs well behind the shoulder.
- The equipment/skin must be sterilised before administration.
- Needle is stabbed into injection site with syringe attached.
- Avoid blood vessels/joints/nerves/organs/cavities.
- Afterwards skin is massaged to facilitate distribution.

(Any 5)

3.3.4 **Explain the economic implications of a disease such as vibriosis.**

- Banning of export of animals/animal products has detrimental financial impact.
- International trade decreases.
- Negatively impacts food security.
- Decreased production causes loss of income.
- Loss of income has impact on job security.
- It reduces quality of the produce.
- Prices of produce will decrease due to lower quality.
- Costs to control/prevent/treat animals are high which increases costs of production.

(Any 5)

3.4 3.4.1 **What is meant by the term transgenic crop?**

Where genes are transferred/modified from one organism to another (foreign DNA) through genetic engineering/modification techniques.

3.4.2 **Analyse the diagram representing the process of producing transgenic crops and briefly explain the steps/stages (1–3) that the scientist will follow when genetically modifying this crop.**

(1. Gene identification)
- Find and isolate (extract) gene with desired genetic characteristics./ Mapping of genes takes place.
- Scientist makes copies of isolated gene.

(2. Gene delivery)
- Transfer the desired genes to plant's own genes.
- Can make use of different options to transfer genes – 'gene gun', a soil bacteria or material called protoplast.
- Gene insertion/transformation/recombination takes place.

(3. Gene expression)
- Check genetically modified tissue and create new plant using tissue.
- Check that inserted genes function as expected.
- Check that inserted gene appears in plant's progeny (seeds).

(Any 8)

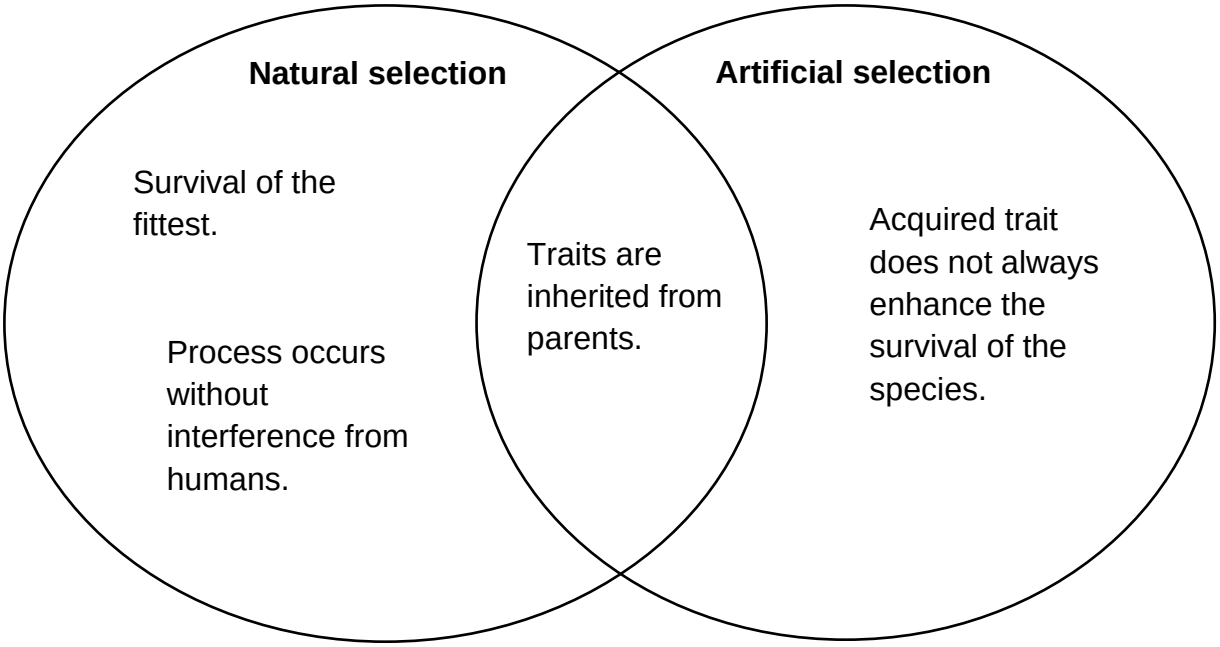
3.4.3 **Gene silencing and gene splicing are two techniques that can be used for genetic modification. Which of these two techniques (gene silencing or gene splicing) will be the fitting technique for producing a transgenic crop? Explain your answer.**

Method: Gene splicing

Reason:
- Transgenic means that it is foreign DNA/DNA from another organism.
- Restriction enzymes are used to cut and remove desired gene of interest from chromosome.
- Plasmid is cut with restriction enzymes.
- Gene is inserted with another enzyme (ligase).

(Any three reasons)

3.5 **Sort the following statements under the correct headings in the Venn diagram (an illustration that uses circles to show the relationships among things).**



QUESTION 4

4.1 **Definition for the term 'fruit setting'.**

The development/formation of (true) fruit from the ovary of flowers.
OR
False/accessory fruit develop/form from other parts (receptacle) of the flower.

4.2 4.2.1 **Numbers of labels from diagram A that are part of the sexual reproductive parts of a flower.**

1, 3, 4, 5, 6
(Award two marks if all numbers of parts are present.
Award 1 mark if any/some numbers are present.)

4.2.2 **Collective name for the part that is made up out of parts 4, 5 and 6 of the flower.**

Carpel/Pistil

4.2.3 **Label the parts from diagram B that are numbered 9, 10 and 11.**

9: Fruit wall/ovary wall
10: Seed
11: Carpel wall

4.2.4 **Flow diagram to indicate the development of seeds/fruit from a fertilised flower (from (A) to (B).**

Fertilised ovary

⇩

Petals wilt

⇩

Embryo develops

⇩

Seed develops from the ovary

⇩

Fruit develops from the ovary/wall of ovary becomes fruit wall/ pericarp

⇩

Fruit ripens/last flower parts fall away

4.2.5 **Explain why the organ that secretes nectar, known as the nectary (diagram A), is important for pollination to occur.**

- The organ secretes (sweet, nutritious) nectar on which the insects feed.
- The sweet scent attracts insects/pollination agents.
- to ensure pollen is transferred between flowers.

(Any two)

4.3 **Describe the germination of a ripe pollen grain on a receptive stigma until fertilisation.**

- After the (ripe) pollen grain is transferred to the (receptive) stigma, the ripe pollen grain germinates.
- The pollen tube grows down the style of the pistil/carpel.
  OR
  The pollen grain moving down the pollen tube contains two nuclei.
- The pollen tube enters the ovary, then the ovule.
  OR
  The pollen tube grows through the micropyle into the germ sac (inner part of ovule that contains ovum).
- The vegetative nucleus disappears/tip of pollen tube bursts open and release male gametes (haploid sperm cells) into germ sac.

4.4 4.4.1 **Explain what the process known as parthenocarpy refers to.**

- Natural or artificial production of fruit
- without the fertilisation of the ovules
- The fruit that form is seedless

4.4.2 **Distinguish between vegetative and stimulative parthenocarpy.**

- Vegetative – plants do not need pollination or other stimulation to produce parthenocarpic fruit.
- Stimulative – pollination/other form of stimulation is necessary for parthenocarpy.

4.5 4.5.1 **Evaluate the two breeding systems (a) and (b) suggested to the young farmer. Use the following subheadings in your discussion:**

Name of each breeding system, two advantages of each system, two disadvantages of each system.

(a) **Crossbreeding in animals** (compulsory mark)

Advantages:

- Makes use of heterosis/hybrid vigour for higher production.
- Progeny is more resistant to diseases.
- Most crossbreeds have more vitality.
- Develop more rapidly and become bigger than parents.
- More economical because mass gain is higher in relation to food intake of purebreds.
- Better adaptability to varying environmental conditions.
- Enables farmer to develop new breeds.

(Any two)

Disadvantages:
- Will not breed pure/crossbreeding destroys homozygosity.
- Requires expert knowledge.
- Progeny of crossbreed is usually poorer than crossbreed itself.

(Any two)

(b) **Upgrading of animals** (compulsory mark)

Advantages:
- Rapid system of breeding.
- No specialised knowledge is needed.
- Deterioration of animal is usually very small.
- Poor recessive characteristics are suppressed in heterozygous animals.
- More cost-effective main investment in single purebred male.
- New breed is gradually brought into new environment/fewer adaptation problems.

(Any two)

Disadvantages:
- Male offspring of first few generations cannot be sold as breeding stock.
- Improvement is relatively slow after fourth generation.
- Offspring can never be 100% pure.
- Male goats must always be purchased from outside to avoid inbreeding.

(Any two)

4.5.2 **List FIVE possible reasons why using a single superior male goat to mate with his own female offspring is not advisable.**

- Decreased variation.
- Undesirable characteristics can be bred into the progeny.
- Lowering in vitality of animals.
- Undesired genes are made homozygous.
- Inbreeding degeneration may appear.
- Expensive system/only outstanding animals are used and deformed progeny are eliminated.
- Only expert can apply with confidence.
- Poor adaptability to environment.
- Have less resistance to diseases.

(Any 5)

4.6 4.6.1 **Discuss the following THREE problems associated with labour in agriculture that is evident from the extract.**

Workers' rights:
Workers have four fundamental rights:

- The right to join unions and bargain collectively – due to tobacco farms in remote areas the workers might not have access to these unions/limiting access to assistance, defences against labour rights abuses.
- Elimination of forced labour – people trafficking is a problem.
- Ending of child labour – child labour has increased exponentially over the course of the past four years.
- Reduction of discriminatory hiring – will rather use child labour which takes away opportunities from labourers that are at working age.

Social problems:

- Families are not always together. Parents may be away for long periods of time leaving children vulnerable – opening chances of people trafficking and forced child labour.
- Women and children face extra difficulties – usually located in remote areas, limiting access to assistance, defences against labour rights abuses, and protections against people trafficking as well as being paid lower wages.

Lack of training:

- The isolation of the farms is also a roadblock for children to access education and schools.
- A large number of children working on tobacco farms still remain out of school and have not returned to school post-pandemic.
- Some workers (child labourers) might be illiterate.

(Any 2)

4.6.2 **What critically important role must workers' organisations, civil society and trade unions fulfil?**

- Play role in protecting the rights of workers.
- Preventing trafficking for purposes of forced/child labour.
- School feeding programmes.
- Provide scholarships.
- Step up human rights protection across the supply chain.

(Any 2)

QUESTION 5

5.1 **What is meant with the term *asexual reproduction*?**

- Also known as vegetative reproduction
- Different parts of a plant can be used to grow new plants asexually
- Only one parent plant is needed
- Offspring has a copy of parent plant's genetics/no genetic variation will occur

(Any two)

5.2 5.2.1 (a) **Identify the specific type of asexual propagation of mango used in the procedure.**

Grafting

(b) **Describe this specific type of asexual propagation.**

It is the joining of two plants so that they become one plant.
OR
A scion of plant (with desirable characteristics) with several buds is used to propagate a new plant and grafted on a rootstock with well-developed root system.

5.2.2 (a) **What is a *rootstock*?**

A plant that is selected for its root system based on its traits such as resistance to pests and disease or ability to grow in difficult soil conditions.
It should be of suitable variety, healthy, strong, and free of pests.
About 6 months old (which should be at least 25 cm tall) with a stem as thick as a pencil.
(Any 1)

(b) **What is a *scion*?**

A scion is cut from plant with desired properties and must contain several buds.
Collect scion wood when the trees are in active growth with an active, healthy terminal bud.
(Any 1)

5.2.3 **Name TWO other qualities to look for when collecting scion wood, other than it being in active growth (step 1 of collecting scion wood).**

- Must be from highly productive tree.
- From desired variety.
- Must have healthy terminal bud.
- Must produce quality fruit/flowers.
- Free of pests and diseases

(Any 2)

5.2.4 **Complete the steps to be followed in the process under the heading: Join the rootstock and the scion using the tip/wedge technique.**

- Sharpen the bottom into a wedge.
- The top of the rootstock is cut straight across and then notch is cut to fit wedge of scion.
- The scion (sharpened end) is inserted into the (split of the) root stock.
- The cambium must match on both sides.
- Bound tightly with tape/polythene strip.
- Watered well and covered with plastic bag to prevent drying out.

(Any 4 in chronological order)

5.2.5 **Provide any THREE reasons for propagating plants using this technique.**

- An undesirable trait can be corrected.
- Fruit trees can be produced with several varieties/cultivars on one tree.
- Fruit-bearing quality can be improved (by grafting scion with good quality fruit on stronger growing root stock with lower quality fruit.)
- A plant can be produced with different colour flower on the same plant.
- The appearance/form of plant can be changed (especially ornamental, horticultural purposes).
- Scion can be grafted onto better, healthier rootstock with more vigorous root system (better suited to soil/climate).

(Any 3)

5.3 5.3.1 **Identify the type of dominance displayed in the image.**

Co-dominance

5.3.2 **Use the following key: letter 'R' to represent the alleles for red colour and letter 'W' for white colour, if both alleles are equally dominant (50%).**

Provide the genotypes for parent (a) and parent (b).

Parent (a): RR and Parent (b): WW

OR

Parent (a): C^RC^R and Parent (b): C^WC^W

(*alleles presented as superscript over any other letter)

5.3.3 **What percentage of offspring will be roan (mix of red and white)?**

100%

5.4 **In male as well as female cattle being hornless or polled (H) is dominant over having horns (h).**

5.4.1 **Complete Punnett squares and indicate the phenotype as well as the genotype of the offspring in percentages.**

(a) **Heterozygous bull x cow with horns**

Parental Genotype: Hh × hh (both correct)/gametes indicated

	H	h
h	Hh	hh
h	Hh	hh

(Method of Punnett correct)
F1 genotype: 50% Hh and 50% hh
F1 phenotype: 50% Polled/hornless and 50% with horns

(b) **Homozygous polled bull x cow with horns**

Parental Genotype: HH × hh (both correct) / gametes indicated

	H	H
h	Hh	Hh
h	Hh	Hh

(Method of Punnett correct)
F1 genotype: 100% Hh
F1 phenotype: 100% Polled/hornless

5.4.2 **A calf is born with horns but neither of its parents has horns. What are the genotypes of this calf's parents?**

Both parents had the genotype Hh

5.5 5.5.1 **Name the substance that is secreted from the mammary gland at parturition.**

Colostrum

5.5.2 **Explain the importance of the substance identified in Question 5.5.1 to the newborn calf.**

- Provides (passive) immunity in form of antibodies until its own immune system is functioning.
- It is rich in nutrients/supplies nutrition to newborn calf/provides more proteins, vitamins, minerals and fat than normal milk (less lactose).
- It contains growth factors/necessary for growth, functioning and maturation of alimentary canal.

5.5.3 **Explain what is meant with the term *passive immunity*.**

The calf is born without a functioning immune system.
The calf receives antibodies (passively) produced by mother's immune system to help protect calf until its own immune system is functioning.
(Concept well explained)

5.5.4 **Explain why the first 3 to 4 weeks of the calf's life is seen as a *high-risk period*.**

- Calf might not have received enough colostrum (at least two litres of colostrum within first six hours of birth).
  OR
- Calf does not have own functioning immune system yet and may be more susceptible to diseases.

(Any well explained reason)

5.6 **Analyse the importance of the correct birth position of the calf in the uterus before birth.**

- If calf is in posterior position (breech birth)/not in the anterior position/the rear part of foetus lies towards the cervix may cause calf to suffocate if process takes too long.

- Abnormal positions include:
- The foetus will have to be repositioned or be pulled from the uterus if in the wrong position/the foetus lying on its back/head being turned back or downward/all feet pointing toward the cervix.

- The wrong position may cause serious problems/dystocia resulting in injury/possible death of foetus and/or mother.

5.7 **Explain the importance of the following hormones during the first stage of parturition.**

(a) **Prostaglandin**

- It causes corpus luteum to regress.
- This leads to drop in progesterone levels which stimulate contractions of muscular uterine wall.

(b) **Oxytocin**

- Stimulates uterine wall contractions for expulsion of foetus.
- Stimulating (myoepithelial cells of) mammary gland causing milk ejection.

(c) **Relaxin**

- Stimulates ripening and opening of cervix/relaxation of pelvic ligaments.

SECTION C

QUESTION 6 RUBRIC – Topic: Free marketing channels

Criteria	Mark allocation	Descriptors				
How **farm gate marketing** will provide the farmer, trader, etc. with profit (advantages) AND what to be aware of (disadvantages).	4	**0**	**1**	**2**	**3**	**4**
		Shows no attempt to include **farm gate marketing** in his/her discussion.	Attempts to include **farm gate marketing** in his/her discussion by referring to either a **single** advantage or disadvantage.	Reference to **farm gate marketing** in his/her discussion by referring to **two to three** facts (either advantages or disadvantages).	Reference to **farm gate marketing** in his/her discussion by referring to **four listed** facts (two advantages and two disadvantages).	Writing is **cohesive**. Reference to **farm gate marketing** in his/her discussion by referring to **four well integrated** facts (minimum two advantages and two disadvantages).
How **fresh produce markets** will provide the farmer, trader, etc. with profit (advantages) AND what to be aware of (disadvantages).	4	**0**	**1**	**2**	**3**	**4**
		Shows no attempt to include **fresh produce markets** in his/her discussion.	Attempts to include **fresh produce markets** in his/her discussion by referring to either a **single** advantage or disadvantage.	Reference to **fresh produce markets** in his/her discussion by referring to **two to three** facts (either advantages or disadvantages).	Reference to **fresh produce markets** in his/her discussion by referring to **four listed** facts (two advantages and two disadvantages).	Writing is **cohesive**. Reference to **fresh produce markets** in his/her discussion by referring to **four well integrated** facts (minimum two advantages and two disadvantages).
How **stock sales** will provide the farmer, trader, etc. with profit (advantages) AND what to be aware of (disadvantages).	4	**0**	**1**	**2**	**3**	**4**
		Shows no attempt to include **stock sales** in his/her discussion.	Attempts to include **stock sales** in his/her discussion by referring to either a **single** advantage or disadvantage.	Reference to **stock sales** in his/her discussion by referring to **two to three** facts (either advantages or disadvantages).	Reference to **stock sales** in his/her discussion by referring to **four listed** facts (two advantages and two disadvantages).	Writing is **cohesive**. Reference **stock sales** in his/her discussion by referring to **four well integrated** facts (minimum two advantages and two disadvantages).
How **direct marketing** will provide the farmer, trader, etc. with profit (advantages) AND what to be aware of (disadvantages).	4	**0**	**1**	**2**	**3**	**4**
		Shows no attempt to include **direct marketing** in his/her discussion.	Attempts to include **direct marketing** in his/her discussion by referring to either a **single** advantage or disadvantage.	Reference to **direct marketing** in his/her discussion by referring to **two to three** facts (either advantages or disadvantages).	Reference to **direct marketing** in his/her discussion by referring to **four listed** facts (two advantages and two disadvantages).	Writing is **cohesive**. Reference to **direct marketing** in his/her discussion by referring to **four well integrated** facts (minimum two advantages and two disadvantages).
How **internet marketing** will provide the farmer, trader, etc. with profit (advantages) AND what to be aware of (disadvantages).	4	**0**	**1**	**2**	**3**	**4**
		Shows no attempt to include **internet marketing** in his/her discussion.	Attempts to include **internet marketing** in his/her discussion by referring to either a **single** advantage or disadvantage.	Reference to **internet marketing** in his/her discussion by referring to **two to three** facts (either advantages or disadvantages).	Reference to **internet marketing** in his/her discussion by referring to **four listed** facts (two advantages and two disadvantages).	Writing is **cohesive**. Reference to **internet marketing** in his/her discussion by referring to **four well integrated** facts (minimum two advantages and two disadvantages).

Marketing must be customer-oriented and must provide the farmer, transporters, trader, and processor with profit.

Discuss the statement by discussing TWO ADVANTAGES and TWO DISADVANTAGES of each of the following main channels of a free market system:

- Farm gate marketing
- Fresh produce markets
- Stock sales
- Direct marketing
- Internet marketing

MARKING GUIDELINES FOR POSSIBLE RELEVANT FACTS:

Note to marker: Channels in free marketing will be discussed. Writing should be a cohesive piece with integrated facts. It should not be a bulleted list with advantages and disadvantages only.

The candidate should indicate the following in his/her discussion:
- How each channel will be customer-oriented and provide the farmer, transporters, trader, and processor with profit (advantages).
- As well as what to be aware of (disadvantages) when choosing a marketing channel.

Farm gate marketing:

Possible facts that may be used for **integration**:
- It is a form of direct marketing.
- Done by farmer at place where product is produced.
- Examples include sale of vegetables, broilers, and animals.
- Most common form of marketing found amongst small-scale producers.

Advantages:

- Producer may obtain higher price without incurring market costs.
- Product will be fresh with little quality loss.
- Products sold at low price.
- No transport costs.
- Type of marketing better suited to small-scale farmer.
- Produce can be sold by farmer; thus, costs are lower. (Any 2 discussed)

Disadvantages:

- Farmer will have to accept local price for product.
- Farmer might not be well located to reach customers. (Any 2 discussed)

Fresh produce markets:

Possible facts that may be used for **integration**:
- Fresh produce markets are set up in larger centres.
- Mainly for sale of flowers, vegetables, and fruit.
- System on most markets has changed from auctioning to sales on commission by market agents.
- Farmer sends produce to agent at the market who endeavours to obtain highest price for farmer.

Advantages:

- Farmers can take advantage of higher prices in times of short supply.
- Market is able to sell large quantities of farmer's produce.
- Farmer can employ services of an agent to perform task of marketing.

(Any 2 discussed)

Disadvantages:

- Market information is important to enable farmer to make correct decisions.
- Prices fluctuate.
- Markets are often far from point of production.
- Time of harvesting is critical to success of crop realising right price.
- Quantity, packaging, and presentation are very important.
- Quantity, packaging, and presentation should conform to accepted grade and packaging standards.
- Farmer needs to be confident that he/she can cover higher marketing costs, including agent's commission. (Any 2 discussed)

Stock sales:

Possible facts that may be used for **integration**:

- Livestock and game are sold on auction at livestock auction yards.
- Some will also provide marketing service to farmers.
- Seller may decide whether or not to accept price offered by buyer.
- Prices received on stock sales are not fixed and will usually reflect supply and demand position.
- Yards are usually located near farms and allows easy access.

Advantages:

- Promotion is done on behalf of the farmer.
- Payment by the buyer is guaranteed.
- Market is larger than local market.
- Small-scale farmers have access to these sales. (Any 2 discussed)

Disadvantages:

- Seller may not get price he/she wants.
- Prices may be lower than market price.
- Small-scale farmers may not have money or transport to take animals to auction sales. (Any 2 discussed)

Direct marketing:

Possible facts that may be used for **integration**:

- Farmer sells directly to retailer.
- Agreements are often made between large producers of perishable goods and large retailers.
- Retailers often flexible in volume and supply demands to ensure good publicity as being supporters of emerging farmers but will not compromise on quality. (Global Gap)

Advantages:

- Marketing margins could be reduced – leads to higher prices for product.
- Volume of sales is guaranteed to farmer. (Any 2 discussed)

Disadvantages:

- Farmer must ensure sufficient produce (high quantity).
- Farmer must ensure sufficient quality.
- If farmer cannot meet needs of retailer, he/she will have to buy in produce to make up quantities required by retailer. (Any 2 discussed)

Internet marketing:

Possible facts that may be used for **integration**:

- Also known as web marketing, online marketing, or e-marketing.
- Products/services are marketed over the internet.
- Includes e-mail and online media.

Advantages:

- It can reach global audience.
- It is very fast.
- Cost is relatively low – cheaper than sending letters.
- Customers have access 24 hours a day.
- Products can be delivered directly to customers, without having to use a courier.
- This form of business is not capital-intensive and does not require large investment. (Any 2 discussed)

Disadvantages:

- Attracting customers may not be easy.
- Online marketing is not free. Costs (website design, maintenance, etc.) needs to be factored into cost providing for service.
- Not all consumers shop online.
- Many people prefer live interaction when they buy.
- Credit card fraud is a real concern for online customers.
- A lot of competition for products.
- Possibility of fraud is a risk. May be difficult to determine identity and credentials of potential customers. (Any 2 discussed)

Total: 300 marks