How to Pass

KCSE

AGRICULTURE

Questions & Answers

Ngatia A

Form 3 & 4

How to Pass Agriculture

Secondary: Revision

Questions & answers

Form 3 and 4

Ngatia A

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Mission statement-
To motivate people so that they achieve the success, they desire.

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Introduction

This book is intended to assist students preparing for examination in secondary schools.

The questions in this book were carefully crafted to ensure that they cater for the individual needs of every student.

Model answers are provided to all questions in the book.

All levels of testing were considered when preparing the questions i.e. knowledge, comprehension, application, analysis and synthesis.

The book is written by highly experienced authors who have written several books.

Great care was taken to ensure that all details in the syllabus were captured in the questions in order to enable students have thorough and effective revision.

TO THE STUDENT

While studying the conventional course books, it is better for you to test your understanding by questions. This book attempts to provide you with the test questions required.

I advise you to answer the questions before checking the model answers included in this book, so that learning will be more effective.

I hope you will make better use of this book.

Work harder and good luck in your examination.

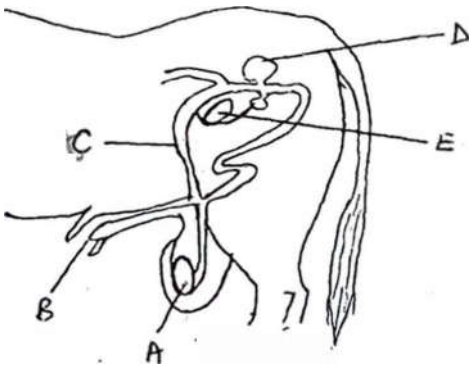
CHAPTER 01
Questions on Livestock Production III (Selection and Breeding)

1. Define the term reproduction, lmk

2. What is sexual reproduction? lmk

3. (a) Name five structures that make the male reproductive system. 2 mks
   (b) For each of the structures named in (a) above give the functions. 2 mks

4. The diagram below represents a certain system in an animal.



   (i) Name the system illustrated, lmk
   (ii) Name the structures labeled A - E. 2 $^{1}/_{2}$ mks

5. Give the functions of the following:
   (i) Oestrogen. lmk
   (ii) Ovary. lmk

6. Define the term ovulation. 2mks

7. What is gestation period? 2mks

8. Give the gestation periods of the following animals. 4mks
   (a) Cow
   (b) Sow
   (c) Ewe/goat
   (d) Rabbit.

9. Which hormone is used to maintain the foetus in the uterus? lmk

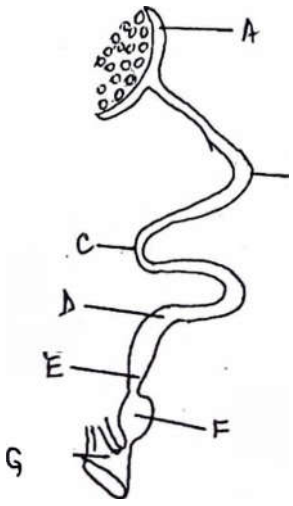
10. Define the term parturition, lmk

11. List five signs that an animal shows when it is about to give birth. $2^{1}/_{2}$ mks

12. What is malpresentation (Breech)? lmk

13. List down the functions of the following parts in a hen.
   (i) Funnel -
   (ii) Magnum
   (iii) Isthmus.

14. The diagram below illustrates the reproductive system of a hen. Study it and answer the questions that follow.



(a) Label parts A - G. $3^1/_2$ mks
(b) State three functions of part labeled E. 3mks

15. How long does the process of egg formation take?

16. Define the term selection. 2mks

17. What is gene frequency? lmk

18. What is heritability? lmk

19. List three ways in which selection affects a character. 3mks

20. (a) Give ten factors to consider when selecting a breeding stock. 5mks
(b) (i) Mention three methods of selection.
(ii) State four advantages of contemporary comparison. 4mks

21. Define the term breeding. 2mks

22. Give five reasons for breeding. 5mks

23. Define the following terms. 4mks
(i) Recessive
(ii) Dominant
(iii) Heterosis
(iv) Epistasis.

24. (a) List two systems of breeding. 2mks
(b) Give the meaning of each system named in (a) above. 2mks

25. List five reasons for inbreeding. 5mks

26. What is prepotency. 2mks

27. Name two systems of inbreeding. 2mks

28. Outline four disadvantages of inbreeding. 4mks

29. Give reasons for out breeding. 3mks

30. List three systems of out breeding and for each give its meaning. 3mks

31. What is oestrus cycle? lmk

32. Outline the signs of heat in a cow. $3^1/_2$ mks

33. What are the signs of heat in pigs? 3mks

34. Give six signs of heat in rabbits. 3mks

35. Name three methods of service in livestock. 3mks

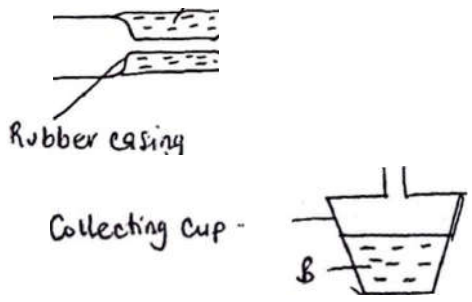
36. List three advantages of natural mating. 3mks

37. What are the disadvantages of natural mating? 3mks

38. What is artificial insemination? 2mks

39. What name is given to the plastic straws where semen is stored? $^1/_2$ mk

40. Study the diagram below and answer the questions that follow:



(a) What does the diagram represent?
(b) Name the liquids represented by A and B.

41. Outline the advantages of artificial insemination. lOmks

42. List four disadvantages of artificial insemination. 4mks

43. What is embryo transplant? 2mks

44. Give the advantages of embryo transplant. 5mks

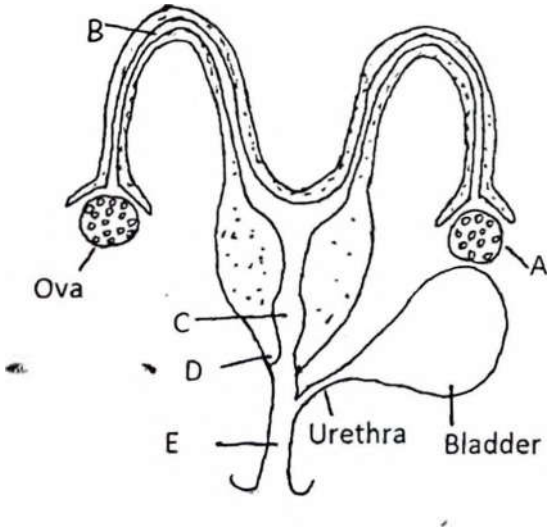
45. State the disadvantages of embryo transplant. 3mks

46. What are the signs of parturition in cattle? 7mks

47. Give four signs of parturition in pigs (sow). 4mks

48. List two signs of birth in rabbits (doe). 2mks

49. Study the diagram below and answer the questions that follow:

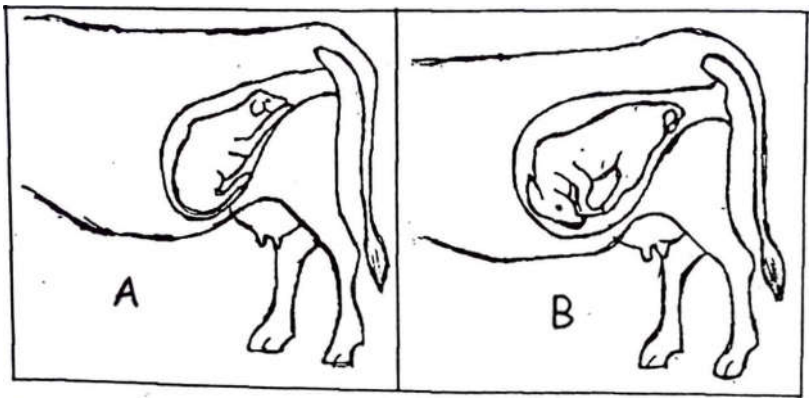


(a) Label parts A, B, C, D and E. $2^1/_2$ mks
(b) Give two functions of structure labelled A. 2mks

50. Name the hormone whose role is to maintain the foetus in the uterus. lmk

51. .What is meant by gestation period? 2mks

52. The diagrams below show the presentation of the calf during birth.



(i) Identify presentations labeled A and B. 2mks
(ii) What would be the effect if birth occurred as in B?

CHAPTER 02
Answers on
Livestock Production III
(Selection and Breeding)

1. Reproduction is the process by which new off springs are produced.

2. Sexual reproduction involves the fusion of the male and female gametes.

3. Testes
   Epididymis
   Sperm ducts.
   Accessory glands (seminal vesicles and prostrates gland)
   Penis
   (b) Testes - produce sperms
   Epididymis - stores sperms
   Sperm ducts - carry sperms to the urethra.
   Seminal vesicles - produce semen.
   Prostrate gland - produce a fluid that neutralizes urine.
   Penis - introduces sperms into the vagina of a cow.

4. (i) Reproductive system of a bull.
   (ii) A - Testes
   B - Penis
   C - Sperm duct
   D - Seminal vesicle
   E - Prostrate gland

5. (i) Oestrogen - It induces oestrus (heat period) cycle.
   (ii) Ovary - produces ova.

6. Ovulation is the release and movement of the ovum down to the uterus.

7. Gestation period - the period between fertilization of the ova and the expulsion of the foetus through the vulva.

8. Cow: 270 - 285 days
Sow: 113 - 117 days
Ewe/goat: 150 days
Rabbit: 28 - 32 days.

9. Progesterone.

10. Parturition is the act of giving birth.

11. - Distended udder.
- swollen vulva with a thick mucus discharge.
- loose and slackened pelvic girdle.
- visible pin bones.
- general restlessness.

12. Breech - is any other presentation where the hind legs come out first.

13. (i) Funnel - fertilization takes place here.
Chalazae is added here.
(ii) Magnum - addition of albumen.
(iii) Isthmus - addition of shell membranes.
Addition of water, mineral salts and vitamins.

14. (a) A - Funnel /infundibulum
B- Oviduct
C - Magnum
D - Isthmus
E - Uterus / shell gland.
F - Vagina
G - cloaca/vent
(b) - Addition of shell
- Addition of shell pigments
- Addition of albumen is completed.

15. 24-26 hours

16. It is the process of allowing certain animals to be parents of future generations while culling the others.

17. It is the occurrence of genes that carry the desired/ desirable characteristics.

18. Heritability is the likelihood of a particular trait to be transmitted to the offspring.

19. -The heritability of the character.
    - The intensity with which selection is done.
    - The interval between generations.
    - Kind of selection being practiced.

20. (a) - Age
    - Health
    - Adaptability
    - Level of performance
    - Body conformation
    - Prolificacy
    - Physical fitness
    - Temperament/behaviour
    - Mothering ability
    - Quality of products.

    (b) (i) - Mass selection
    - Progeny testing.
    - Contemporary comparison

    (ii) - It is possible to compare animals of different age groups.
    It eliminates differences brought about by the environment.
    It is possible to make direct comparison of bulls.
    It is accurate.

21. (a) It is the process of mating selected males and females to produce offspring of the required characteristics.

22. - To expand the inherited potential of the animal.
To introduce new genes making the animal better.
To overcome production problems created by the environment.
To satisfy the consumers taste.
For economic reasons

23. - Recessive - hidden/masked/suppressed character.
Dominant - a character that suppresses others.
Heterosis - improved performance.
Epistasis - a combination of genes which individually could be undesirable or inferior.

24. (a) - Inbreeding
Outbreeding.

(b) (i) Inbreeding - this is the mating of animals that are closely related.
Outbreeding - mating of animals that are not related.

25. To increase genetic uniformity.
To fix the required characteristics in new breeds.
To increase phenotypic uniformity.
To get proven sires.
Used in animals of high prepotency.

26. Ability of an animal to pass desirable characteristics to the offspring.

27. Close breeding
Line breeding

28. Can bring loss of hybrid vigour.
May lead to decline in fertility (species extinction)
Reduces performance.
- Leads to high rate of pre-natal mortality.

29. - To introduce new genes in an existing herd.
- To exploit heterosis.
- To establish a new breed or a grade animal.

30. - Outcrossing - mating unrelated animals of the same breed.
- Crossbreeding - mating two animals from different breeds.
- Upgrading/Grading up - mating a female of low grade with a pure sire.

31. Oestrus cycle - Heat period.

32. - Restlessness ^
- Mounting on otfiers and when mounted it stands still.
- Slight rise in body temperature.
- Milk yield drops slightly in a lactating cow.
- Vulva swells and becomes reddish.
- Clear mucus from the vagina.
- Bellowing/mooing frequently.

33. - Restlessness
Frequent urination
Swelling and reddening of vulva
Clear/slimy mucus discharge from vulva.
Frequent mounting on others.
Responds positively to the riding test.

34. - Restlessness
- Frequent urination
- Swollen vulva
- Doe throws itself on its sides.
- Doe rubs herself on walls or hard objects.
- Doe tries to contact others by peeping through the walls.

35. - Natural mating.
- Artificial insemination.
- Embryo transplant.

36. - It is more accurate as the male can detect when the female is on heat.
- It is less laborious as there is no need of checking the animal for signs of heat.
- Useful when heat periods of females cannot easily be detected.

37. - Inbreeding is not controlled.
- Possible to transmit breeding diseases and parasites.
- Males require extra pasture.
- Large males can injure small females.
- A lot of semen is wasted.
- It is cumbersome and expensive to transport a bull.

38. Artificial insemination is the introduction of semen into the female reproductive tract by hand using syringes or tubes.

39. Payets.

40. (a) Artificial vagina.
(b) A - warm water
B - Collected semen.

41. - Semen of one superior bull can be used to serve many cows.
- Controls transmission of breeding diseases and parasites.
- Heavy bulls that can injure cows can produce semen to serve cows.
- Prevents large bulls from injuring small cows.
- It reduces the expenses of keeping a bull.
- A small scale farmer can have the cows served at a very low cost.
- Semen can be stored for along time.
- Easy to control breeding.
- Easy to control inbreeding.
- It eliminates dangerous bulls from the farm.
- It is a useful research tool.

42. - Easy to spread harmful characteristics.
    - Require skilled labour.
    - Low chances of conception since semen can die.
    - Requires more labour than natural services.

43. A technology where ova are harvested from high quality animals and fertilized in test tubes and the embryos implanted into a foster mother.

44. - Improves performance.
    - Stimulates milk production.
    - A highly productive female can be spread over a large area to benefit many farmers.
    - Easier to transport embryos in test tubes than the whole animal.
    - Embryos can be stored for long periods awaiting availability of a recipient female.

45. - The technology is expensive.
    - Requires trained personnel to handle and administer.
    - Requires special equipment for fertilization and storage of the embryos.

46. - Restlessness.
    - Swollen vulva.
    - Clear mucus discharge from vulva.
    - Slackening of pelvic muscles/relaxing of hip muscles.
    - Full and distended udder.
    - Thick milky fluid from teats.
    - Water bag appears and burst before calving.

47. - Restlessness.
    - Reddening/swelling of vulva.
    - Udder becomes full with a milky fluid.
    - Sow builds a nest by collecting some beddings at one corner of the pen.

48. - Builds a nest by plucking hair from her belly.
    - Goes off feed.

49. (a) A - Ovary.
        B - Fallopian tube/oviduct.
        C - Uterus
        D - Cervix of uterus
        E - Vagina.

    (b) - Produce ova
        - Produce hormones.

50. Progesterone

51. Gestation period - This is the period between fertilization of the ova and the expulsion of the foetus through the vulva.

52. (i) A - Normal position of calf at birth.
        B - Breech position / malpresentation.
    (ii) - Can cause death of calf and cow if not corrected.

CHAPTER 03
Questions on Livestock Production IV (Livestock Rearing Practices)

1. Define the following terms.
   (i) Flushing. lmk
   (ii) Steaming up. lmk
   (iii) Creep feeding.

2. State the importance of flushing. 3mks

3. Give the importance of steaming up. 3mks

4. What is vaccination? 2mks

5. Give four ways of giving vaccines. 4mks

6. List four main groups of vaccines. 2mks

7. List six properties of a good vaccine. 3mks

8. What precautions should be taken when handling vaccines? 4mks

9. Other than vaccination list five other methods of parasite and disease control. 5mks

10. What are the reasons for hoof trimming? 3mks

11. What is docking? lmk

12. Give three reasons for docking. 3mks

13. List four tools used for docking. 2mks

14. What are breeding practices? 2mks

15. List three breeding practices carried out on animals and for each give the meaning. 6mks

16. Give five reasons why identification is done in animals. 5mks

17. Give five methods used in identifying animals in the farm. 5mks

18. Identify the method of identification below. $^1/_2$ mk

19. Give two reasons for carrying out debeaking. 2mks

20. What is culling? 2mks

21. List eight reasons for culling livestock.

22. What reasons would necessitate culling in poultry. $2^1/_2$ mks

23. Give four reasons for dehorning. 4mks

24. List five methods of dehorning livestock. 5mks

25. Define the following terms.
    (i) Shearing. 2mks
    (ii) Castration. 2mks

26. Why are male animals castrated? 4mks

27. (a) List two methods of castrating animals. 2mks
(b) Name the tools used in the methods named above.
3mks

28. What is caponisation? 2mks

29. State three ways of carrying out caponisation.
3mks

30. Complete the table below. 5mks

Animal	Parturition term used.
Cattle	
Pigs	
Sheep	
Goats	
rabbits	

31. State two lambing management. 2mks

32. Give reasons why bees are kept. 4mks

33. List three importance of honey. 3mks

34. (i) Mention two types of bees. 2mks
(ii) For each of the bees named in c(i) above give the characteristics.

35. Give the functions of the following types of bees.
(i) Queen. 2mks
(ii) Drone 2mks
(iii) Worker bees 6mks

36. What is an apiary? lmk

37. What is apiculture? lmk

38. Give five factors that should be considered when siting an apiary. 5mks

39. List four types of bee hives. 4mks

40. Give the advantages of the Kenya Top Bar hive. 7mks

41. What is stocking the hive? 2mks

42. List two methods of stocking the hive. 2mks

43. Mention 4 materials collected by bees. 4mks

44. What are the reasons for feeding bees? 3mks

45. List three methods of processing honey. 3mks

46. Mention four uses of honey. 4mks

47. State the factors that determine the quality of honey. 4mks

48. Define the term aquaculture. 2mks

49. State the importance of fish farming. 4mks

50. Name the common species of fish farmed in Kenya and for each give an example. 2mks

51. What are the requirements of a fish farm? 3mks

52. Describe the procedure for establishing a fish pond. 5mks

53. What is a fingerling? lmk

54. Distinguish between cropping and harvesting in fish farming. 2mks

55. Outline the advantages of using seine nets over the hook and line method. 3mks

56. Outline the practices carried out on a pond after draining it. 5mks

57. Write five practices carried out on fish before preservation.

5mks

58. Give four methods of preserving fish.

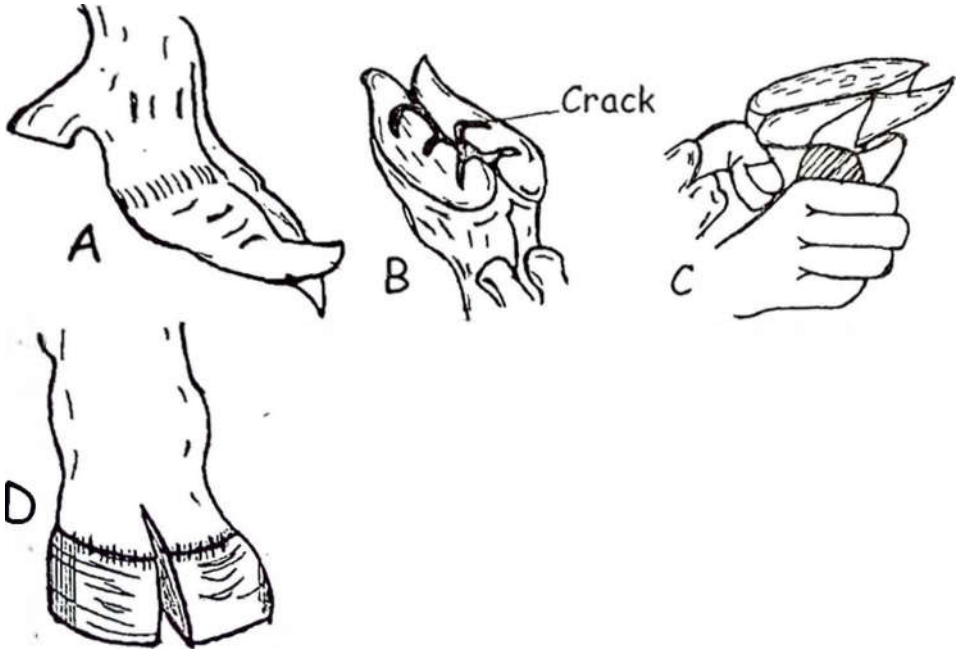
59. Describe the procedure for harvesting fish.

60. List two methods of cropping.

61. Define the term hoof trimming, lmk

62. Give four effects of overgrown hooves in livestock. 2mks

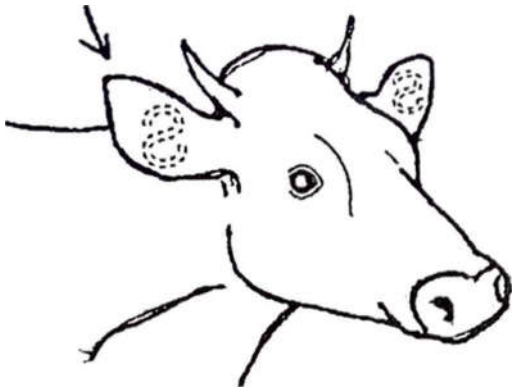
63. The diagrams below show different conditions of hooves of an animal; study them and answer the questions that follow.



(i) Identify the conditions labeled A, B, C, D. 4mks
(ii) Name three tools that can be used to carry out hoof trimming. 1 Vfe mks

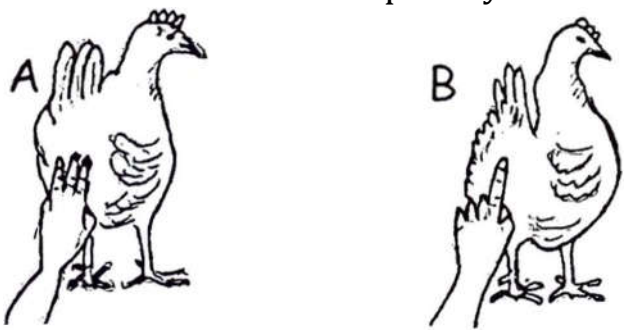
64. State one precaution that should be taken when carrying out hoof trimming.

65. The diagram below is a method used in identifying livestock in the farm.



(a) Name the method.
(b) Describe the method named in (a) above.

66. The photographs below are methods used to identify certain characteristic in poultry.

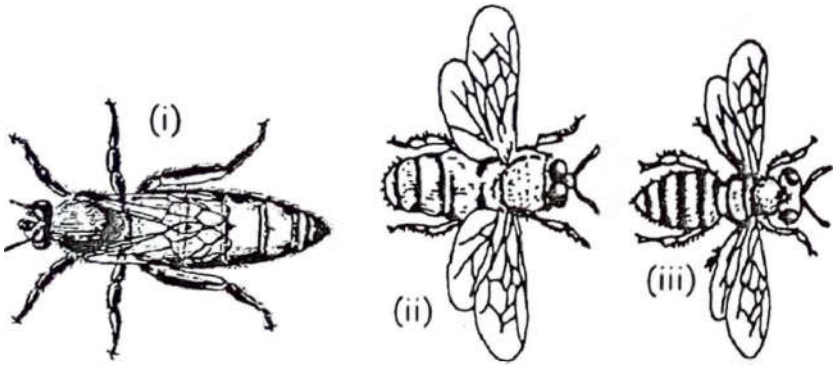


(i) Identify the characteristic, lmk
(ii) Name the characteristic labeled A and B and give reasons for your answer. 4mks

67. Describe the life cycle of a bee. 4mks

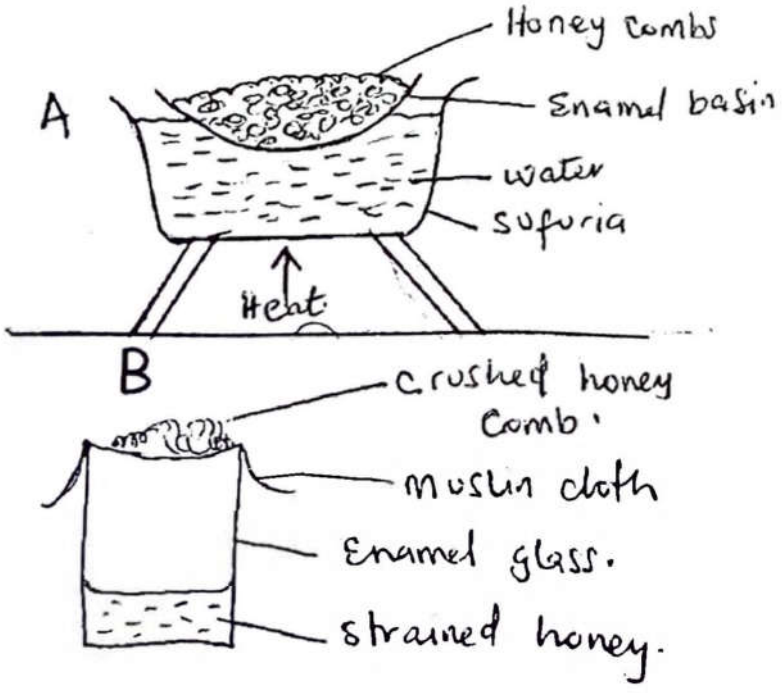
68. What is a brood? lmk

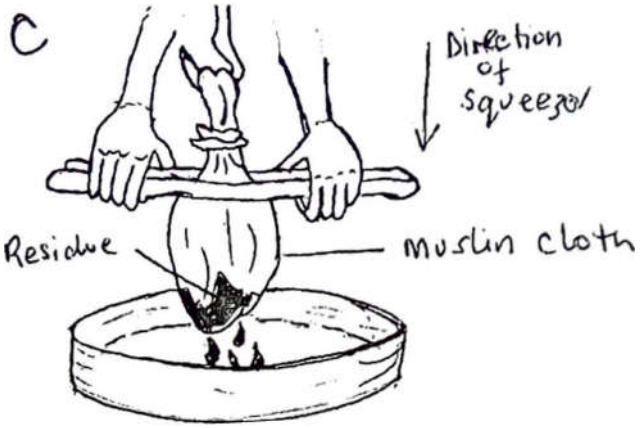
69. The diagram below are types of bees. Study them and answer the questions that follow.



(a) Identify the bees labeled (i), (ii) and (iii). 3mks
(b) How long does it take to produce the bees labeled above? $1^1/_2$ mks

70. The diagrams below are methods used in processing honey. Use them to answer the questions that follow.





(a) Identify the methods labeled A B C . 3mks

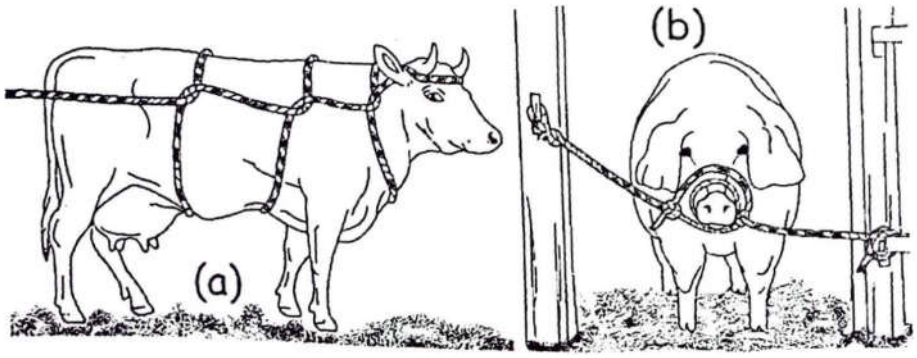
(b) (i) Describe the procedure used in the method named in C above. 3mks

(ii) Give the advantage of the method labeled C. lmk

71. Name four tools that can be used to handle animals appropriately. 4mks

72. The diagrams below are methods used while handling different animals.

Name the methods labeled (a) and (b).



CHAPTER 04
Answers on
Livestock Production IV
(Livestock Rearing Practices)

1. (a) (i) Flushing - Giving the animal a high plane of nutritional feed around service time.
   (ii) Steaming up - It is the practice of providing extra feed of high nutritive value to an animal during the last weeks of gestation.
   (iii) Creep feeding - this is the feeding of young animals from birth to weaning.

2. Importance of flushing.
   - Increases conception rate; due to higher ovulation.
   - Facilitates implantation of the zygote.
   - Increases lambing percentage in sheep and increases chances of multiple birth.

3. Importance of steaming up
   Provides nutrients for maximum foetal growth.
   Helps build up energy for parturition.
   Ensures birth of a healthy animals
   Promotes good health of the mother.
   Increased and maintains high iftilk yield after Hirth.

4. Vaccination - is the process of introducing actfcre disease causing organisms reduced in strength or virulent into an animals body.

5. - Injections
   - Orally / by mouth
   - Inhalation/through nose
   - Through cloaca

6. - Live virulent vaccines.
   - Live attenuated vaccines.
   - Killed / dead vaccines.
   - Toxoids.

7. **Properties of a good vaccine.**
   The immunity it produces should be as good as natural immunity.
   Should have a long keeping life/long shelf life.
   Easy to administer.
   Should have no side effect
   Should be compatible with other vaccines.
   A single dose should produce life long immunity.

8. **Care in handling vaccines.**
   Should be kept under freezing temperatures i.e. (-20°C to 4°C)
   Vaccinating equipments should be sterilized.
   Correct dosage should be given.
   The route of administration should be correct.

9. - Deworming
   Hoof trimming
   Docking
   Dipping and spraying
   Dusting

10. - To facilitate easy movement.
    To control foot rot disease.
    To prevent the ram from injuring the ewe during tupping

11. Docking is the removal of tail or dock.

12. **Reasons for docking.**
    To facilitate tupping or mating.
    To give good fat distribution throughout the body.
    To prevent blowfly infestation.

13. - Elastrator and rubber ring.
Burdizzo and knife
Knife
Hot iron

14. These are practices which are carried out to enhance successful breeding in animals.

15. Breeding practices include:
(i) Crutching and ringing.
- Crutching is the practice of cutting wool around the external reproductive organs of female sheep to facilitate mating and prevent infection.
- Ringing is the practice of trimming wool around the sheath of the penis to facilitate mating.

(ii) Tupping and serving.
Tupping - mating in goats and sheep
Serving - mating in cattle and pigs.

(iii) Raddling.
It is the practice of fitting the rams with breeding chutes which are painted in different colours.

16. - For selection and breeding
For disease control and treatment.
For feeding.
- For record keeping.
For culling.

17. - Branding
- Ear tagging
Ear notching
Tattooing
Neck strap or chain.

18. Ear notching.

19. - To control cannibalism.
- To control egg eating.

20. - Culling is the removal of unproductive animals from a breeding herd so as to leave high quality and productive animals.

21. - Poor health.
- Age
- Poor production.
- Physical deformities.
- Hereditary defects.
- Not capable of producing young ones.
- To avoid inbreeding.
- Poor mothering ability.

22. - Skin colour changing from white to yellow.
- Shriveled combs, wattles and vent.
- When width between pelvic bones become narrow
- When eyes become dull
- When breast becomes hard.

23. - To prevent cattle from inflicting injuries on others.
- To make the animal docile and easy to handle.
- For easy transportation and feeding (occupy small space)
- Prevents destruction of farm structures.

24. Methods of dehorning.
Use of caustic potash stick (potassium hydroxide)
Use of disbudding iron.
Use of dehorning saw /wire
Use of rubber ring and elastrator
Use of dehorning collodion.

25. (i) Shearing is the cutting of wool from all over the body of a wool breed of sheep.
(ii) Castration is the rendering unserviceable the testicles of a male animal, depriving it of its reproductive power, inhibiting secondary sexual characteristics, growth and function.

26. Reasons for castration.
- To control breeding diseases e.g. brucellosis, virginities etc.
- To control breeding.
- For faster growth rates.
~ To increase quality of meat by removing unpleasant smell especially in goats.

27. (a) - Closed method
- Open method.

(b) **Closed method**
Use of elastrator and rubber ring.
Use of burdizzo.

Open method,
use of knife
use of scalpel

28. Caponisation is the act of making male birds lose their characteristics, hence they no longer crow, fight and their combs and wattles become smaller.

29. - Use of hormone called stilbestrol
- implanting pellets of female sex hormone
- Surgically using the open method.

30.

Animal	Parturition term used.
Cattle	Calving/calving down
Pigs	Furrowing/furrowing down
Sheep	Lambing / Lambing down
Goats	Kidding /kidding down
Rabbits	Kindling/kindling down

31. (i) Drift lambing - All the pregnant ewes are put together in one paddock and then separated as they lamb down.

(ii) Pen lambing - Ewes are separated and kept in individual pens when they show signs of lambing.

32. Reasons for keeping bees.
- Production of honey.
- A source of income from selling honey and beeswax.
- They require little capital and land to keep
- Bees are good pollinators for many crops.

33. Importance of honey:
- Honey is a high energy feed.
- Honey is a sweetener for beverage and soft drink.
- Honey is medicinal (used to dress fresh wounds.)

34. (i) - African wild bee
- European bee.

(ii) Characteristics of the African Wild bee.
Well adapted to local weather.
Has high flying power (can fly for long distances)
More active in search of food water and protection of hive.
Fairly resistant to diseases e.g. acarive and American foul brood disease.
It is vicious if manhandled.

Characteristics of European bee.
More gentle
Larger than African bee.
Less active
Less vicious
Susceptible to diseases that attack bees.

35. (i) Functions of the queen.
Lay fertile eggs.
Keeping the colony together by production of a pheromone called queen substance for identificatioi

(ii) Functions of the drones.
To fertilize the queen.
To control temperature / cool the hive.

(iii) Functions of the worker bees.

Feed the queen, drones and brood.
Protect the hive from intruders.
Collect nectar, pollen, resins, gums and water.
Build combs and seal cracks on hive.
Clean the hive
Make honey and beeswax.

36. An Apiary is a place where beehives are laid.

37. Apiculture - Keeping bees (bee farming)

38. - Availability of water
Availability of flowers.
A sheltered place.
A place free from noise and disturbances.
Away from human beings and livestock.

39. Types of bee hives.
Log hive
Box hive
Kenya Top Bar hive
Langstroth hive.

40. - Top bar can be removed for inspection of combs.
Honey combs can be removed without disturbing the brood.
Honey is of high quality.
More wax is harvested.
The hive is easy to construct and repair.
The hive is cheap to build.
It does not require expensive equipment to harvest honey.
- A queen excluder can be used in the hive.

41. What is meant by stocking the hive.
- This is the act of encouraging bees to enter the empty hive/putting bees in a hive.

42. - Use of swarm net
- Use of a catcher box.

43. - Nectar
- Pollen
Propolis
- Water

44. - To maintain the colony
To encourage multiplication.
To supplement what bees get from flowers.

45. - Use of heat to melt honey
- Crushing and straining
- U sing a centrifugal extractor

46. - To manufacture creams, ointments, candles, shoe and floor polish.
To make teeth impressions for filling and **replacement** in dentistry.
In laboratories, it is used in the dissection of small insects.
To make pill coatings in pharmaceuticals.

47. - Type of plants from which nectar was obtained.
- Maturity stage of honey.
- Method of harvesting.
- - Method of processing honey.

48. Define the term aquaculture.
- The artificial rearing of fish in ponds/fish farming.

49. - Supplies cheap and good source of protein.
Requires little land.
Makes fish available nearby.
Source of income for fish farmers.

50. (i) - Fresh warm water fish e.g. tilapia, carps, Nile perch, black bass.
(ii) - Fresh cold water fish e.g trut.

51. - Water supply
- Slope of land
- Soil.

52. - Site selection
Site marking
Clearing the land
Digging the pond.
Constructing.

53. A fingerling is a young one of a fish.

54. Cropping is the removal of fish of marketable size from the pond.
Harvesting is the removal of all the fish from a pond,

55. - Only the marketable size are caught.
Fish are not injured.
Large number of fish are cropped.

56. - Repairing the dyke / any structure on it.
- Cleaning the pond and removing foreign materials.
- Planting grass where necessary.
- Removing undesirable vegetation.
- Removing the silt.

57. - Cleaning the fish to remove mud and worms.
Remove scale and slime.
- Open the fish on the side to remove gut and intestines.
(gutting)
Cleaning the abdominal cavity.
Keeping fish in open containers.

58. - Freezing
- Salting

- Sun drying
- Smoking

59. - Close the inlet.
Cropping
Open the outlet
Use a scoop net to catch fingerlings.
Drain all the water for the pond to dry.

60. - Hook and line
- Use of nets (seine nets)

61. Hoof trimming is the cutting back of overgrown hooves.

62. - Encourage accumulation of dung and dry grass.
Causes cracking of hooves.
Bleeding of hooves.
Rotting of the skin.

63. (i) A - Overgrown hooves.
B - Overgrown hoof showing cracking.
C - Hoof trimming.
D - A trimmed hoof.
(ii) - Trimming knife.
- Hoof cutter.
- Hoof rasp.

64. The tools should be sterilized before trimming each hoof.

65. (a) Tattooing
(b) Tattoos are shapes, numbers or letters that are made on the skin with a permanent ink or dye.

66. (i) Characteristic of a good and bad layers.
(ii) A - Good layer.
Reason - 2 - 3 fingers can fit between the pelvic bones.
B - Bad layer - 2 fingers can hardly fit between the pelvic bones.

*.

67. - fertilized queen moves from one cell to another laying an egg in each.
Eggs hatch after three days in the warmth and moisture generated by a cluster of worker bees.
The larvae are fed by nurse bees on special pulp (a mixture of pollen and honey)
The larvae moults into a pupa after two days.
The pupa becomes a young bee after ten days and emerges from the cocoon.

68. A brood is made up of eggs, larvae and pupa.

69. (a) (i) Queen bee.
(ii) Drone bee
(iii) Worker bee.

70. - Queen - fifteen (15) days.
- Drone - twenty four (24) days.
- Worker bee - twenty one (21) days.

71. (a) A - Heat method.
B - Straining honey.
C - Crushing and straining honey.

(b) (i) - Crush and strain the honey combs using a muslin cloth into the enamel basin.
- Remove the scum formed using a wooden spoon.
- Put honey in a suitable container that is air tight.

(ii) Produces highest quality honey.

71. - Ropes
- Halters.
- Lead stick
- Bull rings.

72. A - casting of cattle.
B - securing of pig.

CHAPTER 05
Questions on Farm Structures

1. Define a farm structure. lmk

2. Give any five examples of farm structures. $2^1/_2$ mks

3. State four factors that one should consider when planning for a farm structure. 4mks

4. Outline the factors to consider when siting farm structures. $4^1/_2$ mks

5. List ten materials used in construction of farm structures. 5mks

6. Define the term seasoning as used in timber treatment. lmk

7. Why is seasoning done? $1^1/_2$ mks

8. List two methods of treating timber. 2mks

9. Give three methods of chemical treatment. 3mks

10. What factors should one consider when selecting construction materials? 3 $^1/_2$ mks

11. Give five uses of farm buildings. $2^1/_2$ mks

12. Mention three parts of a building. $1^1/_2$ mks

13. What is a crush? lmk

14. Mention ten uses of a crush.

15. What factors should one consider when siting a crush? 3mks

16. List ten parts of a plunge dip. 5mks

17. State four maintenance practices of a plunge dip.

18. Give the advantages of a plunge dip. 3mks

19. What are the disadvantages of a plunge dip? 3mks

20. Illustrate the parts of a spray race. $2^1/_2$ mks

21. State the advantages of a spray race. 5mks

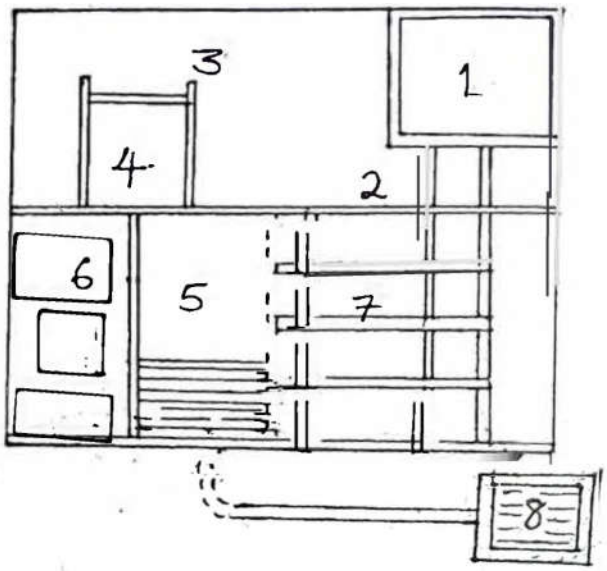
22. List the disadvantages of a spray race. 4mks

23. How can a spray race be maintained? 4mks

24. Describe the parts of a milk shed. 10 mks

25. What are the maintenance practices of a milk shed?

26. Below is a layout diagram of a zero grazing unit. Use it to answer the questions that follow.



(a) Name the parts 1 - 8 . 8mks

(b) State the uses of the parts labeled above. 8mks

27. State the structural requirements of a calf pen. 7mks

28. Outline the maintenance practices on a calf pen. 5mks

29. State four poultry houses. 2mks

30. What are the structural requirements of a deep litter house? 7mks

31. What are coops in poultry farming? lmk

32. Describe the parts of piggery unit. l0mks

33. Give the structural requirements of a pig house. 4 mks

34. What are the maintenance practices of a pig's house? 4mks

35. Name two types of rabbit houses. 2mks

36. State three structural requirements of a rabbit hutch. 3mks

37. Outline five factors to consider when siting a fish pond. 5mks

38. List the maintenance practices carried out on a fish pond. 5mks

39. Write four factors to consider when siting bee hives. 4mks

40. Name five constructions materials a farmer may require to construct a bee hive. $2^1/_2$ mks

41. What is a silo? 2mks

42. Name three types of silos. $1^1/_2$ mks

43. List three types of farm stores. $1\ ^1/_2$ mks

44. What are the structural requirements of a farm store? 5mks

45. State three maintenance practices of store. $1^1/_2$ mks

46. Distinguish between a grain silo and Cyprus bin. 2mks

47. What are the structural requirements of a grain silo and a Cyprus bin? 4mks

48. Give four maintenance practices carried out on silos and Cyprus bins. 4mks

49. What is a fence? lmk

50. Outline the uses of a fence. 9mks

51. Name two main categories of fences. 2mks

52. State the advantages of live fences. 7mks

53. Give the disadvantages of live fences. 5mks

54. List seven types of dead fences. 7mks

55. Outline four maintenance practices of a wire fence. 4mks

56. What is a green house? lmk

57. What materials are used in the construction of a green house? 2mks

58. Give one importance of a green house, lmk

59. How would a fanner maintain a green house? 3mks

60. What is a nursery bed? lmk

61. Give three types of nursery structures. 3mks

62. List five factors that should be considered when siting a nursery structure. 5mks

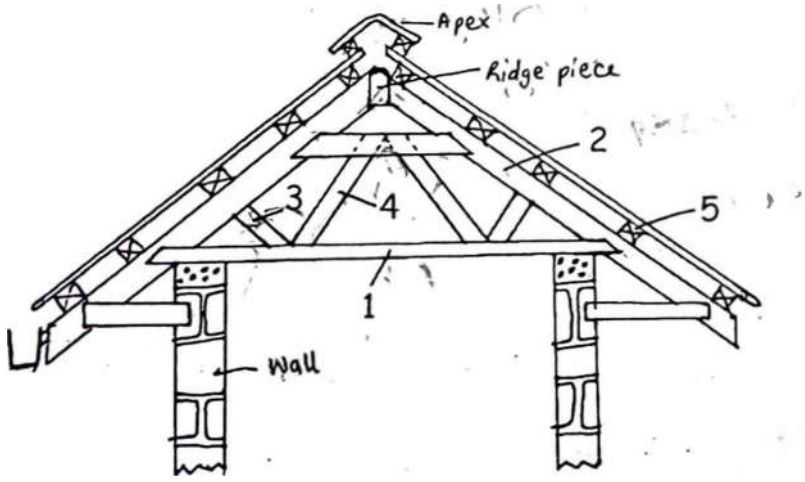
63. Give the advantages of using concrete during construction of farm structures. 5mks

64. Describe the procedure used in establishing the foundation of a permanent farm building. 7mks

65. List the main components of a truss. $1^{1}/_{2}$ mks

66. Give two materials that can be used to make a truss.

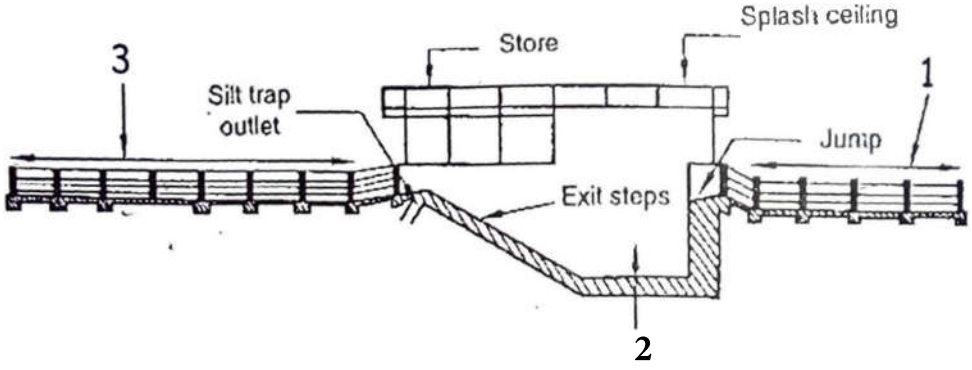
67. The diagram below shows parts of a roof. Use it to answer the questions that follow.



(i) Name the parts labeled 1 - 5. 2 $^{1}/_{2}$ mks
(ii) Where are purlins positioned. lmk

68. Name two types of dips. 2mks

69. The following diagram is a type of a dip.

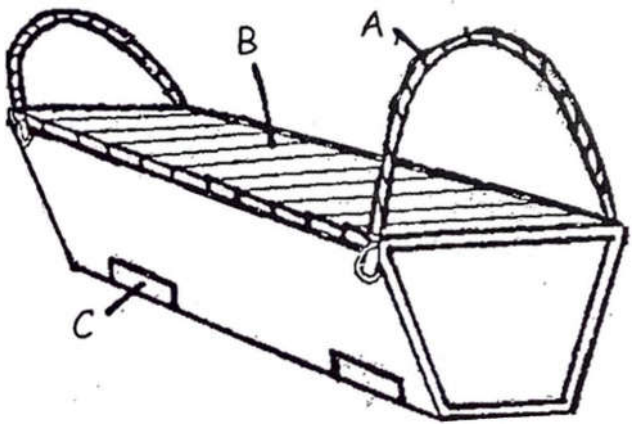


(i) Identify the type of dip shown in the diagram above, lmk

(ii) Name the parts labeled 1 - 3 . $1\frac{1}{2}$ mks

(iii) Give the uses of the parts named in (ii) above. 3mks

The diagram below is a type of a farm structure. Use it to answer the questions that follow.



(a) Identify the structure, lmk

(b) What is the use of a queen excluder in hive?

(c) Label the parts A B and C.

CHAPTER 06
Answers on Farm Structures

1. A farm structure is any physical structure found on the farm.

2. - Fences
   Crushes
   dips
   Stores
   calf pens
   Sheep pens
   Farm houses.
   Poultry houses.

3. - The various farm activities to be carried out
   - Size of the enterprise.
   - Potential for expansion.
   - Accessibility.

4. - Location of homestead
   Accessibility.
   Security
   Drainage
   Direction of prevailing wind.
   Relationship between the structures.
   Farmers tastes and preferences.
   Proximity to amenities e.g. electricity, water etc.
   Topography of the area.

5. - Stones
   Concrete blocks
   Concrete
   Mad blocks
   Bricks
   Bamboo and sisal poles
   - metals - Plastics.
   - Timber
   - Thatch
   - Tiles

6. Seasoning is the process of drying timber.

7. To prevent warping; rotting; prevent fungal and insect attack.

Drying
- Chemical treatment.

- Sap displacement method.
- Pressure/vacuum treatment.
- Hot and cold soaking.

10. - Availability of the materials
Cost of the materials
Suitability of materials
Suitability to prevailing weather conditions.
Durability of the materials
Strength of materials.
Workability of the materials.

11. - They protect the farmer and livestock from predators.
They help to control livestock diseases and parasites.
They provide shelter against exteme weather conditions.
They provide storage of farm produce and other inputs.
They increase efficiency of production and management in the farm.

12. - Foundation
- Walls
- The roof

13. - A crush is a narrow fenced passage in which livestock movement can be controlled.

14. - Spraying livestock against external parasites.
- Identifying animals
- Vaccination.
- Administering prophylactic drugs.
- Treating sick animals
- Dehorning.
Pregnancy test

- Artificial insemination.
- Taking body temperatures.
- Hoof trimming.
- Milking.

15. - Topography
- Accessibility
- Maintenance.

16. - Animal holding yard.
Footbath
The jump
Dip tank
Draining race
Drying yard
silt trap outlet
Dip tank shelter
Water tank
Waste pit.

17. - Broken timber rails should be replaced.
- Clean the dip tank regularly
- Repair cracks in the dip
- Maintain the roof to prevent leakage.

18. - Animals are completely immersed /effective in tick control
- Suitable for large herds of cattle.
- Low operational cost.

19. - Cannot be used for heavy, pregnant or sick animals.
- Animals may swallow some dip wash leading to death.
- Initial capital is high/expensive to construct.

20. - Sidewalls
Spray pipe system
- Drainage pipe
- The pump / reservoir
Pressure gauge.

21. - Suitable for pregnant and sick animals.
No wastage of acaricide since it is recycled.
Requires small amount of acaricide.
Animals cannot swallow the acaricide wash.
Spraying is faster.
Less labour is required.

22. - Has a high operational cost.
Requires highly skilled labour to operate and maintain,
Not economical with a large herd.
Nozzles tend to clog with dirt in the wash.

23. - Replace broken rails.
- Repair worn out floors.
- Clean sump regularly removing all sediments.
- Clean blocked nozzles.

24. (i) Milk stalls - A place where animals stand and are restrained for milking.
(ii) Feed store - Used for storing feed, and keeping feed records.
(iii) Calf Pens- constructed near the milking shed to ensure that milk is given to calves immediately after milking.
(iv) Milk recording room - Has weighing balance and a recording board for recording milk yields.
(v) Milk store - for keeping milk under low temperatures before being transported to the factory-

25. - Clean the milk shed thoroughly
- Fill the potholes.
- Replace broken rails
- Service the milking machines regularly.
Keep the cooling system in good working condition.

26. (a) 1. The store.
2. The milking stall
3. The fodder chopping area
4. The calf pen.
5. The walking area
6. The water and feed trough
7. Cubicle for cows
8. The manure storage.

(b) (1) Store - keeping dairy equipments e.g. buckets, weighing balance etc.
(2) Milking stall - used for restraining cows during milking.
(3) Fodder chopping area/feed preparation area- used for preparing feed rations /chopping fodder.
(4) Calf pens - used for rearing calves.
(5) Loafing area / walking area - resting, dunging and exercise area.
(6) Feed and water troughs - for feeding and watering the animals.
(7) Sleeping cubicles used to provide shelter to the animals.
(8) Milk recording room - used to keep individual milk records for the dairy cows.

27. - Concrete floors.
- Adequate space
- Single housing
- Proper lighting.
- Proper drainage
- Draught free
- Leak proof roof

28. - Calf, pen should be kept clean.
- Leaking roof should be repaired.
" Walls should be white washed instead of painting to prevent lead poisoning.
- Calf pen should be dry and warm

Change the litter once a week.

29. Folds
Night shelters and runs.
Deep litter houses.
Coops

30. - Proper ventilation.
- Leak proof roof
Litter on the floor
- Draught free
- Enough space
- Proper drainage
- Battery cage system houses.

31. Coops are special types of cages used for rearing hens while brooding.

32. (i) Feed store - storing pig feed.
(ii) Record room - keeping feed and weight records.
(iii) Pig pens - keeping pigs according to age and sex.
(iv) Furrowing pen - for furrowing and rearing piglets.
(v) Gilts pen - for rearing young female pigs.
(vi) Boars pen. - Houses the breeding pen.
(vii) In - pig pens - Houses pregnant pigs.
(viii) Weaners/fatteners pen - Houses, pigs after weaning
(ix) Running yard - for dunging and basking.
(x) Water troughs / drinking nipples used as watering points for pigs.

33. Concrete floors - for easy cleaning.
Free from draught - to prevent pneumonia
Adequate space.
Well drained floor.

34. - The house should be kept clean.
Should be kept dry and warm
Fill holes on the floor using concrete.
Replace broken timber.

35. - The morant cage
The hutch

36. - Should be large enough to allow feeding, exercise and sleeping.
Should be raised 90 - 100 cm above the ground to facilitate drying and allow droppings to fall, as well as preventing predators e.g. rats.
Should be draught free and well drained.

37. - Source of water
- Soil type
- Topography
- Nature of the land
- Construction
- The dam crest.

38. - Planting grass on the wall tops to prevent soil erosion.
Remove weeds growing around.
Proper fencing to keep off fish predators.
Cleaning the pond.
Maintaining good level of water in the pond.

39. - Away from homesteads, pastures and roads.
A sheltered quiet place (Away from noise)
Shaded place / under trees.
Near a wate. source with flowering plants.

40. - Timber
- Corrugated iron sheet.
- Nails
- Wire /ropes
- Posts.

41. Silo - a structure used to prepare and store silage.

42. - The trench silo
Tower silo
Clamp/bunker silo

43. - Produce stores
Silos
Cyprus bins.

44. - Should be vermin poof
- Well ventilated.
- Water proof
- Easy to clean
- Raised to prevent dampness

45. - Clear vegetation around the stores.
Clean and disinfect the store regularly
Repair leaking roofs
Repair/replace broken parts.

46. Grain silo - A farm structure used for bulk storage of grains.
Cyprus bins - pits that are either partially underground or completely underground.

47. - Properly constructed roof to protect the crop from the sun and rain.
- Walls should be plastered with mortar / mud to make them smooth and air tight.
- They should be completely sealed to avoid entry of rodents.
- All inlets and outlets should be made of tight covers and should be easy to lock.

48. - Repair broken parts to prevent leaking.
Seal the cracks in the surface of the walls.
Slash the vegetation around the silo to keep off rodents.
Clean and disinfect at regular intervals.

49. Fence - A structure that enclose design ted a: -as and form physical barriers for animals and humans.

50. - Perimeter fence demarcates the farm from that of neighbours.
They keep off wild animals and other intruders.
Used to separate crop fields from pastures.
Used to separate crop fields from pastures.
Used to divide pasture into paddocks.
Controls movement of animals and people preventing formation of unnecessary paths in the farm.
Controls spread of parasites and diseases by keeping off wild animals.
Help to isolate sick animals from the rest.
Enable the farmer to control breeding.
Provide security to homestead and farm animals.

51. - Live fences.
- Dead fences.

52. - Are cheap and easy to establish.
Tall varieties e.g. Kei apple act as wind breakers.
They have an aesthetic value.
Roots hold soil firmly hence control soil erosion.
Some species e.g. Lantana camara act as livestock feed.
They provide shade to animals.
Act as a source of organic matter and wood fuel when trimmed.
Some species have medicinal value.
Thorny species prevent intruders.

53. - Take many years to grow to make an effective fence.
Cannot be used for paddocking as they occupy a wide area.
Hedges can be hiding places for rodents and thieves.
Laborious and expensive to trim and fill the gaps.
Irregular growth creating gaps for thieves and animals to pass through.

54. - Wire fences.
Barbed wire fence.
Plain wire fences.
Woven wire fences.
Quarry chips; concrete blocks, stones or brick fences.
Electric fences.
Wooden fences.

55. - Straighten loose or sagging wire.
Splice broken wire.
Replace worn out posts.
Replace broken brace posts and droppers.

56. Green house - A structure made of glass or translucent walls and roofs.

57. - Metal/wooden frames.
- Translucent materials e.g. polythene sheets.

58. They create some kind of micro-climate effects which facilitate the production of certain crops out of season.

59. - Repair/replace broken frames.
- Replace torn polythene materials
- Clean dirty polythene sheets.

60. Nursery bed - A small plot of land used for raising seedlings.

61. - Direct nursery beds.
- Seed boxes.
- Vegetative propagation units.

62. - Source of water.
- Soil type
- Sunshine
- Security
- Location in relation to the field where crops are finally established.

63. Structures made of concrete are:
    (i) Strong
    (ii) Durable
    (iii) Resistant to fire.
    (iv) Resistant to insect damage
    (v) Resistant to rotting
    (vi) Resistant to weather elements.

64. - Clear the vegetation
    - Level the site
    - Measure the foundation; peg and then dig to remove loose and disturbed soil.
    - Place concrete in the trench
    - Compact the concrete
    - Lay foundation stone to about 15cm above the ground level.
    - Place a damp proof course (PVC) sheet on top of the foundation to reduce termite and moisture rising up the wall.

65. - Tie/beam
    - Two rafters.
    - Struts.

66. - Wood
    - Steel bars.

67. (i) 1. Cross tie/beam
        2. Rafter.
        3 Strut
        4. Tie.
        5. Purlin.

    (ii) Horizontally on rafters.

68. - Machakos dip
    - Plunge dip.

69. (i) Plunge dip

(ii) 1. - Foot bath
2. - Dipping tank.
3. - draining race.

(iii) - Foot bath - To wash the feet of the animals before they get into the dip wash.
- Dipping tank - contains dip wash (acaricide).
- Draining race - drains back the dip wash back to the dip tank.

70. (a) Kenya Top Bar Hive (KTBH)

(b) - To separate honey from the brood.
- Increases the quality of the honey.

(c) A - Wire loops
B - Top bars.
C - Entrance.

CHAPTER 07
Questions on Agricultural Economics II (Land Tenure and Land Reform)

1. Define the term land tenure. 2mks

2. List two main categories of tenure systems. 2mks

3. Give two forms of collective land tenure system. 2mks

4. Outline the advantages of communal land tenure system. 5mks

5. List the disadvantages of communal land tenure system. 5mks

6. What is cooperative land tenure system? 2mks

7. Give the advantages and disadvantages of cooperative land tenure system. 6mks

8. Giving an example, describe state ownership of land. 2mks

9. What are the advantages of state ownership of land? 2mks

10. Give two disadvantages of state ownership of land. 2mks

11. Define individual land tenure system. lmk

12. Give three forms of individual land tenure system. 3mks

13. Give the advantages of individual owner operator.

14. State the disadvantages of individual owner operator.
4mks

15. Describe landlordism and tenancy. 2mks

16. List five advantages of landlordism and tenancy.
$2^1/_2$ mks

17. Mention four disadvantages of landlordism and tenancy.
2mks

18. What is concession as used in land tenure system? 2mks

19. Give three advantages of concession or company. 3mks

20. State the disadvantages of concession or company. 4mks

21. Distinguish between land fragmentation and land subdivision. 2mks

22. Outline the factors that may cause fragmentation and subdivision of land. 5m

23. Write down the effects of land fragmentation and subdivision. l0 mks

24. What is land reform? 2mks

25. List four land reform programmes. 2mks

26. Define land tenure reform. 2mks

27. Outline six objectives of land tenure reforms. 6mks

28. Give five examples of land tenure reforms.

$2^1/2$ mks

29. Define land consolidation. 2mks

30. Give ten advantages of land consolidation.

l0mks

31. What is land adjudication? 2mks

32. Give seven information contained in the land register and the title deed. 3^ mks

33. List five advantages of having a title deed.

$2^1/_2$mks

34. Distinguish between settlement and resettlement. 2mks

35. Outline the objectives of land redistribution. 4mks

36. List the objectives of the million acre scheme. 6mks

37. Mention five conditions required for the success of settlement schemes 5 mks

CHAPTER 08
Answers on
Agricultural Economics II (Land Tenure and Land Reform)

1. **Land tenure** - this is the possession of right to the use of land.
   It also refers to the rules and conditions governing the ownership of land by an individual or group of people in a specific area. (Right to use land)

2. - Collective land tenure system.
Individual land tenure system.

3. - Communal land tenure system.
Cooperative land tenure system.
State ownership of land (Government land)

4. **Advantages of communal land tenure system.**
The problem of landlessness does not exist.
Land cannot be easily fragmented.
Allows for free movement ol livestock.
Land is left to rest to allow pasture to regenerate.
There are no land disputes.

5. Disadvantages of communal land tenure system.
- No individual has responsibility of taking care of the land/developing it as land belongs to everybody.
- Farmers have no incentives to manage and develop land.
- Poor yields.

- Poor stock breeding programme.
- Difficult to control pests and diseases.
- Farmers have no security e.g. title deeds that can be used to obtain loans for developing land.
- Causes soil erosion and land degradation due to overstocking / overgrazing.

6. **Cooperative land tenure system** - It is a system where land is owned by a group of people on cooperative basis.

7. **Advantages of cooperative land tenure system.**
   - There are no land disputes.
   - Labour is well utilized.
   - Profit is distributed according to the number of shares.
   - Large membership increases resources.
   - There is effective farm mechanization.

   Disadvantages of cooperative tenure system.
   - Poor management and embezzlement of funds lead to inefficiency in the system.
   - Individual members cannot obtain loans as the title deed is in the name of the cooperative.

8. **State ownership of land** - The land is owned by the whole state i.e. government land e.g. ADC farms in Kenya (Agricultural Development Corporation farms).

9. Advantages of state ownership of land.
   - Income generation for the state.
   - Provides employment opportunities.
   - Gives refuge to squatters.

10. Disadvantages of state ownership of land.

System is non-competitive hence low quality production.

There is no motivation for workers as for individual ownership.

11. Individual land tenure system — Land is owned by an individual who either operates or leaves it to another person.

12. - Individual owner operator.

Landlordism and Tenancy.

Concession or company.

13. **Advantages of individual owner operator.**

Provides incentives in farming/conservation and improvement of land.

A title deed acts as security to obtain agricultural credits/loans.

The owner has an incentive for long term investment in the land.

The owner can sell/give away the whole or part of land.

14. Disadvantages of individual owner operator.

- Increase in government costs for extension services.
  Land can be sold in case the loan obtained is not repaid.
- It encourages inequality in land ownership hence poor resource distribution.
- It encourages land fragmentation.

15. **Landlordism and Tenancy** - This is a system of tenure where the landlord transfers the right to use land by a tenant at a payment.

16. Advantages of landlordism.

- Landlords get income after renting land.
- Idle land is put into agricultural use hence increase production.
- The landless can rent land and earn a livelihood.

* The system reduces land disputes.

- It ensures equitable distribution of land as a natural resource.

17. **Disadvantages of landlordism and tenancy.**

Tenants may lack incentives on the land in case there is no written agreement.

Tenants may not make expensive long term investments in case the lease period is short.

Landlords may overcharge the tenants since land rates are not fixed by the government.

There is no land improvement eg. Soil conservation measures when lease periods are short.

18. **Concession** - This is an agreement between the company and the government on the use of land for specified number of years.

19. **Advantages of concession or company.**

Good economic results due to high efficiency in land use and management.

The system provides employment to citizens.

Generate income to the government through payment of taxes.

20. **Disadvantages of concession or company.**

- Companies may engage in monopolistic practices.
- Big losses may be incurred due to management inefficiency.
- Foreign ownership limits the benefits to employment and paying taxes to the government e.g. Delmonte.
- Labour and social problems which affect economic performance.

21. - **Land fragmentation** - This is a situation where a single farmer owns several parcels of land scattered over a wide area.

Land subdivision - This is the partitioning of a piece of land into small portions.

22. Factors causing fragmentation and subdivision of land.

Shifting cultivation.

Traditional system e.g. inheritance.

Population pressure on a limited area of land.

Accumulation of land holdings by money lenders from debt defaulters.

23. - Time is wasted while travelling from one holding to another.
- Difficult to control weeds and pests.
- Difficult to follow a sound farm plan.
- Difficult to supervise the scattered plots.
- It is difficult to control livestock parasites and diseases.
- Soil conservation measures are difficult to carry out.
- Impossible to control grazing due to size and shape of the holdings.

Grazing is restricted in one area leading to overgrazing hence soil erosion and degradation.

- Difficult to offer agricultural extension services.
- Poor agricultural productivity.
- Leads to low standards of living.

24. **Land Reform** - It is any organized action designed to improve the structure of land tenure and land use or Integrated programmes to bring about more effective control and use of land.

25. - Land tenure reform.
- Land consolidation.
- Land adjudication and registration.
- Settlement and resettlement.

26. Land tenure reform - these are programmes aimed at altering the land tenure legislation to enhance efficient utilization of land.

27. **Objectives of land tenure reform.**
- To encourage conservation and land improvement.
- To increase land and labour productivity.
- To encourage commercial instead of Subsistence farming.
- To ensure meaningful self employment in rural areas.
- Encourage farmers to invest more by providing security of tenure. - To achieve farming flexibility hence meet national and market demands.
- To achieve effective utilization of national land resources e.g. settlement on unused land and introduce irrigation schemes.

28. Improvement of land tenure legislation.
Consolidate fragmented holdings.
Tenancy reform.
Redistribution of land.
Formal registration of individual land titles.

29. **Land consolidation** - bringing together fragmented pieces of land under one holding.

30. **Advantages of land consolidation.**
- Proper land supervision.
- Economic use of time.
- Saves transportation costs.
- Agricultural extension services available.
- Provides sound farm planning and adoption of crop rotation programmes.
- Land improvement and soil conservation measures undertaken.
- There is construction of permanent structures e.g. fences and buildings.
- Encourages economical operations of activities.
- Registration gives the farmer legal ownership and title deed can be used to obtain loans.
- It enhances weed, pest and disease control.

31. Land adjudication - This is the establishment of ownership, measurement, description and recording of land.

32. Title number/Land parcel number /Location.

- Size of land.
- Name and identity of the owner.
- Type of ownership (absolute/leasehold/freehold)
- Conditions of ownership if any.
- Seal and signature of issuing officer.
- Date of registration.

33. **Advantages of a title deed.**

- Can be used to secure credit facilities.
- Minimizes land disputes.
- Encourages farmers to make long term investment and permanent projects.
- The occupant can get extra income by leasing all or part of land.

34. **Settlement** - This refers to occupation of land that was previously unoccupied/planned and controlled transfer of people from one area to another which is uninhabited / sparsely habited.
Resettlement - Process of transferring people from densely populated areas to sparsely populated areas.

35. - To ease population pressure.
To increase agricultural production.
To create employment.
To form tsetse fly consolidated barriers.

36. - To transfer land from white settlers to Africans.
To reduce population pressure in African reserves.
To fettle former European employees and squatters.
To solve unemployment problems.
To increase agricultural production.
To maintain production levels.
To earn foreign exchange from sale of cash crops.

37. - There should be high population pressure in reserves.
Adequate economic incentives to preserve.
The social costs of moving from home community and the discipline imposed on sound agriculture.
Settlers should come from far distances to break traditional society and stay on the scheme.
Settlers should have enough capital.

CHAPTER 09
Questions on oil and Water Conservation

1. Define soil erosion. 2mks

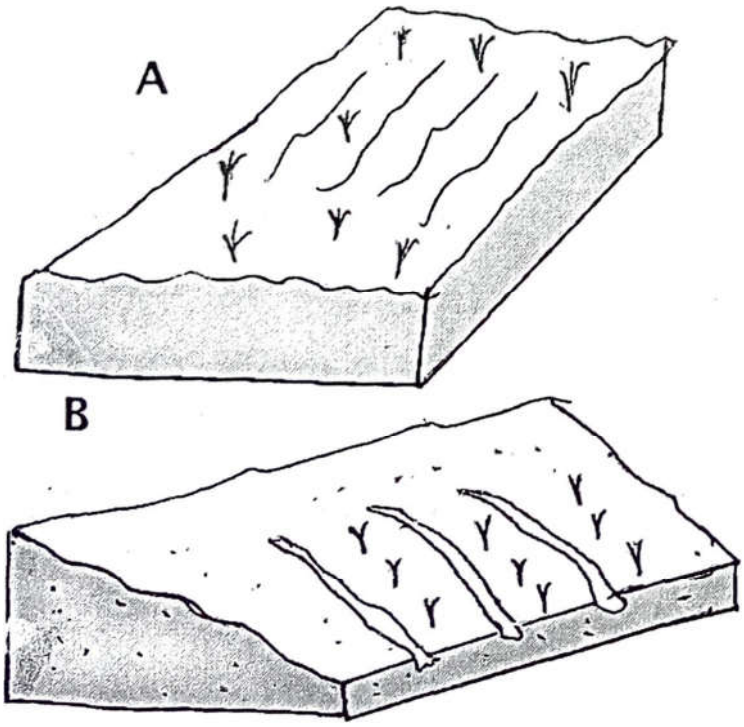
2. Outline factors that influence soil erosion. l mks

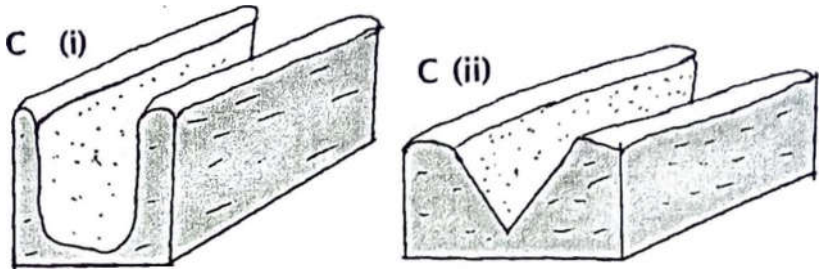
3. List three main types of soil erosion.

4. Give four forms of soil erosion by water and for each give a brief description. 4mks

5. Illustrate the processes through which a gully develops.

6. Study the diagrams below and answer the questions that follow.





(a) Identify the diagrams labeled A, B, C(i) and (ii) 2mks

(b) State how the shapes of diagrams in C(i) and (ii) above occur. lmk

7. Outline the effects of soil erosion. 5mks

8. What is river bank erosion? lmk

9. List three effects of river bank erosion. 3mks

10. How can a farmer control river bank erosion? 4mks

11. Define the term solifluction erosion. 2mks

12. Mention six factors that influence solifluction/Mass wasting. 6mks

13. Define landslides. lmk

14. List five types of landslides. $2^1/_2$ mks

15. Outline the effects of mass wasting / solifluction. ($3^1/_2$ mks)

16. Name two soil conservation measures. 2mks

17. List down nine biological or cultural control measures on soil conservation. $4^1/_2$ mks

18. Define mulching. 2mks

19. Give the uses of mulching in soil and water conservation. 4mks

20. Outline the role of trees in soil and water conservation. 6mks

21. Mention five measures that are used physically or structurally to conserve soil. 5mks

22. List four areas where a cut-off drain discharges its water. 4mks

23. List four types of terraces. 4mks

24. What is water harvesting? lmk

25. List down seven methods used to harvest water. $3^1/_2$ mks

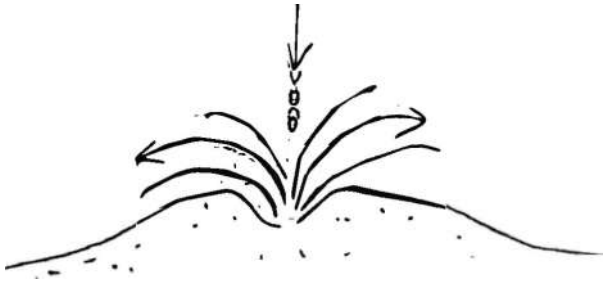
26. Distinguish between a weir and a dam. 2mks

27. What factors determine the source of water catchment areas? 4mks

28. What is a micro-catchment? lmk

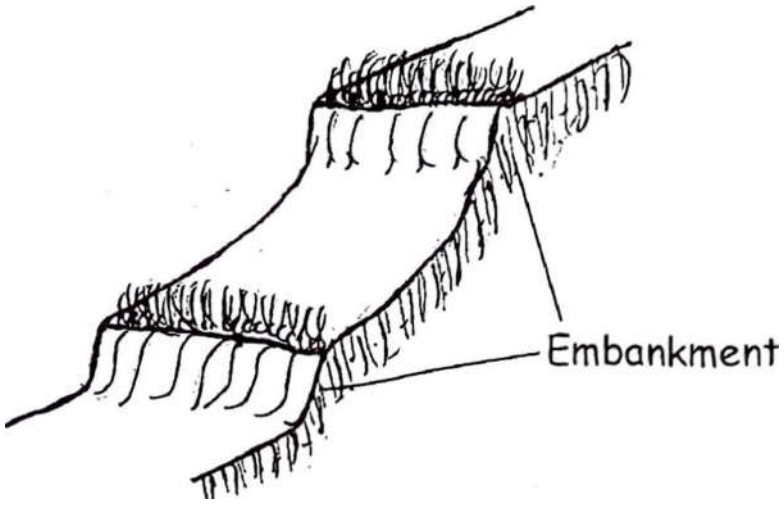
29. Define splash or rain drop erosion. 2mks

30. (a) Identify the type of erosion illustrated by the diagram below. lmk



(b) Give two effects of the type of erosion identified in (b) above. 2mks

31. (i) Identify the type of terrace shown by the diagram below. lmk



(ii) What is the use of the terrace identified above? lmk

CHAPTER 10
Answers on
Soil and Water Conservation

1. Soil erosion - This is the process by which soil is detached removed and carried away from one place to another where it may not be useful.

2. Factors influencing soil erosion:
   Amount and intensity of rainfall.
   Slope of the land (topography).
   Type of soil.
   Soil depth.
   Vegetation cover.
   Overstocking.
   Deforestation.
   Planting annual crops on steep slopes.
   Indiscriminate burning of vegetation before cultivation
   Clean weeding.
   Ploughing up and down the slope.

3. - Soil erosion by water.
   - Soil erosion by wind.
   - Soil erosion through man's activities

4. (i) Splash/Rain drop erosion - This is the soil splash resulting from the impact of water drops directly on soil or thin water surfaces.
   (ii) Sheet erosion - This is the uniform removal of soil in thin layers from flat/gently sloping land.

(iii) Rill erosion - This is the removal of soil by water from small but well defined channels where there is concentration of flowing water down slope.

(iv) Gully erosion - Characterized by deep long ditches made by running water.

5. (i) Movement of water from water shade.
(ii) Channel erosion caused by flowing water.
(iii) Wearing of the sides of the channel.
(iv) Scouring of the floor of the channel by moving water.

6. (a) A - sheet erosion.
B - Rill erosion.
C (i) - U-shaped gully
(ii) - V-shaped gully.

(b) - U-shaped gully - occur where there are resistant materials on gully floor.
- V-shaped gully - are formed as a result of the scouring of the soil by concentrating run off in areas where soil is deep and there are unprotected depressions.

7. - Productive top soil is lost forever.
- Soil microorganisms are carried away.
- Siltation of dams and rivers.
- Sedimentation and siltation in water bodies decreases fish production.
- Excessive surface run off exposes underground water pipes and destroys roads.

8. Riverbank erosion - a type of erosion which occurs along the river bank due to large volume of water, the speed of water and the amount of materials carried by water.

9. - The materials carried by water damage the banks depending on the volume and the speed of water.
   - It widens the river bed hence reduces the potential size of cultivatable land.
   - It causes sedimentation in dams and other water bodies.

10. - Constructing dams to regulate the flow of water. Construction of dykes to control flooding.
   - Planting trees along river banks to hold soil together and reduce erosion.
   - Government regulations i.e. leaving a sizeable strip of land uncultivated along the river bank.

11. Solifluction erosion - This is the gravitational flow of surface materials saturated with water.
It is a process through which the earth flows from steep slopes as a result of heavy rainfall.

12. - . The slope of the land.
The nature of material
Climate.
Vegetation cover.
Human activities.
Forces within the earth's crust.

13. Landslides - This is a sudden rational movement of a mass of soil or rock along a more or less semi-circular slip surface.

14. - Slump / slip
   - Debris slide/earth slide/soil slip
   - Debris fall
   - Rock fall
   - Rock slides.

15. - Causes soil fertility in some areas,
creates lakes.
Damaging property.
Causes loss of life.
Causes soil erosion.
Creates/leaves permanent scars on landscape.
Tourism attraction e.g. weeping stone in Kakamega and Kit Mikai in Seme (Kisumu)

16. - Biological / cultural control measures.
Physical/structural control measures.

17. - Grass strips/filter strips
Cover cropping.
Contour farming.
Mulching.
Cropping systems e.g. Rotational grazing, crop rotation etc.
Strip cropping.
Grassed / vegetated waterways.
Afforestation/reafforestation.
Agroforestry.

18. Mulching - This is the covering of the soil with either organic materials or inorganic materials.

19. - Prevents splash erosion.
Reduces speed of runoff and increase infiltration.
Reduces evaporation.
Increases organic matter in the soil.
Increases water retention capacity.

20. - Protect the soil from raindrops
Provide shade/reduce loss of moisture by evaporation.
Acts as wind breaks.
Roots bind soil particles together.
Leaves decay to supply humus which improves water infiltration rate.

21. - Trash lines / stone line.
Bunds
Cut off drains / diversion ditches.
Terraces
Gabions /Porous dams
Dams and reservoirs.

22. - Into a natural waterway e.g. a river.
Onto a non-erodable stony or rock ground.
Onto a grassland with a well-established grass cover.
Into an artificial waterway.

23. - Broad-based terraces.
- Narrow based terraces.
- Bench terraces
- Fanya-juu terraces.

24. Water harvesting is any watershed manipulation carried out to increase surface runoff.

25. - Weirs.
Dams
Ponds
Roof catchment
Wells
Rock catchments
Micro-catchments.

26. - Weir - It is a barrier constructed across the river to raise the water level and allow water to flow over it.
- Dam - A barrier constructed across a river or a dry valley to collect water and hold large volumes of water.

27. - Rainfall intensity and distribution over a period of time.
Surface area provided for the water catchment.
The gradient of the catchment area.
Retention ditches / level terraces.

28. Micro-catchments - These are micro-environments which have been designed to conserve soil and water around growing crops.

29. Splash / Rain drop erosion - This is the soil splash from the impact of water drops directly on soil particles.

30. (a) Splash /Rain drop erosion.
(b) - Exposes seeds planted shallowly.
- Exposes underlying layers leading to other types of erosion.

31. (i) Bench terrace.
(ii) It slows down surface run-off hence control erosion on slopy areas.

CHAPTER 11
Questions on
Weeds and Weed Control

1. What is a weed? lmk

2. Define Noxious weeds. lmk

3. Give two basis on which weeds are classified and for each give relevant examples.

4. Outline the factors that contribute to the competitive ability of weeds. 6mks

5. State ten harmful effects of weeds. l0 mks

6. Give five benefits of weeds to a farmer. 5mks

7. State four factors that determine the method of weed control a farmer may choose. 4mks

8. Identify five methods of weed control. 5mks

9. What is a herbicide? lmk

10. List five ways in which herbicides kill weeds. $2^1/_2$ mks

11. Give four ways in which herbicides are classified. 4mks

12. List three factors that affect selectivity and effectiveness of herbicides. 3mks

13. Describe how environmental factors affect the effectiveness of a herbicide. lOmks

14. Mention ten plant morphology and anatomy structures that affect selectivity and effectiveness of a herbicide.

15. Outline the safety precautions that a farmer should observe when using chemicals. 12mks

16. List eight advantages of using herbicides. 8mks

17. Give four disadvantages of using herbicides. 4mks

18. State three methods involved in mechanical weed control. 3mks

19. List the advantages of tillage as a method of weed control. 4mks

20. What are the disadvantages of tillage in weed control? 5mks

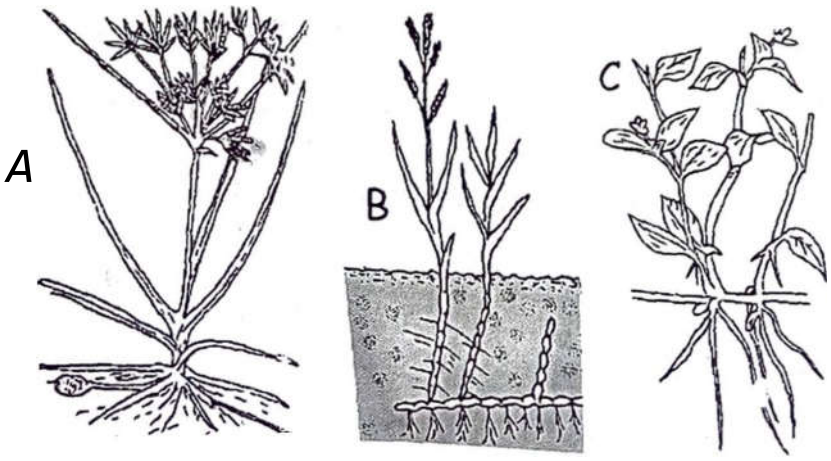
21. Discuss cultural weed control methods. 8mks

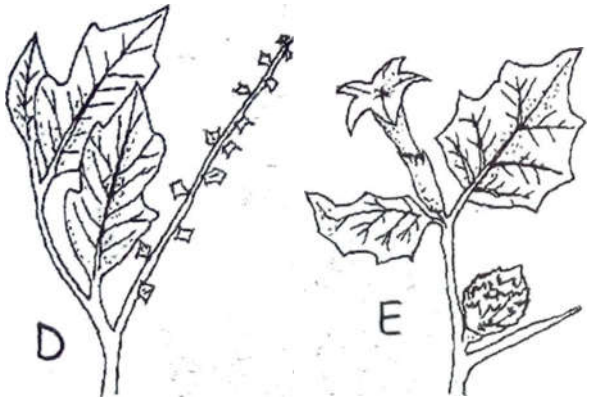
22. What is biological weed control? lmk

23. State three biological methods of weed control. 3mks

24. Describe legislative weed control. 2mks

25. The photographs below are of weeds commonly found in farms. Use them to answer the questions that follow.





(a) . Name the weeds A - E. 5mks

(b) State why it is difficult to control weeds A and B.

lmk

(c) Give one benefit of weed C. lmk

(d) Give one harmful effect of weed E. lmk

(e) Why is it difficult to control weed D? lmk

26. Name the weeds (i) -(vi). 5mks

(i)

(ii)

(iii)

(iv)

(v)

(vi)

CHAPTER 12
Answers on
Weeds and Weed Control

1. Weed - A weed is any plant growing where it is not required and whose economic disadvantages outweigh the advantages.

2. Noxious weed - A weed that is dangerous and its cultivation is prohibited by law e.g. Cannabis sativa.

3. (i) Growth cycle e.g. - annual weeds.
Biennial weeds.
Perennial weeds

(ii) Plant morphology e.g. - Narrow leaved weeds.
- Broad leaved weeds.

4. - Ability to produce large quantities of seeds.
- Weed seeds remain viable in the soil for long awaiting conducive germination conditions.
- Weed seeds are easily dispersed.
- Some weeds have the ability to propagate vegetatively.
- Some weeds have elaborate root system for support and absorption of water and nutrients.
- Some weeds have the ability to survive where nutrient supply is limited.
- Some have a short life cycle.

5. - Weeds compete with crops for nutrients, space light etc. hence reduce crop yields.
   - Some are parasitic to crops e.g. witch weed.
   - Some weeds lower the quality of produce e.g. *Mexican marigold.*
   - Some weeds are poisonous to man and livestock e.g. thorn apple etc.
   - Some weeds act as alternate hosts for insect pests and diseases.
   - Some are allelopathic i.e. produce poisonous substances that suppress growth /germination of crop.
   - Some weeds block irrigation channels.
   - Aquatic weeds e.g. water hyacinth block navigation and affect fishing.
   - Weeds lower the quality of pastures.
   - Some weeds are difficult to handle and control because they irritate e.g. double thorn, stinging nettle.

6. - Some weeds are edible to man and livestock e.g. pigweed, grass weeds etc.
   - Some weeds have medicinal effects e.g. Sodom apple.
   - Weeds act as soil cover hence reduce erosion.
   - Weeds add organic matter to the soil when they decompose.
   - Leguminous weeds fix nitrogen in the soil.

7. - Type of weeds to be controlled.
   Weather condition.
   Capital available.
   The effect on the environment.

8. - Chemical weed control.
   Mechanical weed control.
   Cultural weed control
   Biological weed control
   Legislative weed control.

9. -Herbicide - This is a chemical used to control weeds.

10. -Inhibition of nitrogen metabolism.
    Killing the cells.
    Causing abnormal tissue development.
    Inhibiting photosynthesis.
    Inhibiting respiration.

11. - Formulation.
    Time of application.
    Selectivity.
    Mode of action.

12. - Stage of plant growth.
    - Plant morphology and anatomy.
    - Environmental factors.

13. - Wind - blows away spray wash to unintended plants and reduce chemical concentration.
    - Rain - May dilute /wash away chemicals to non-toxic levels, and may cause leaching of herbicides.
    - Soil - May absorb and retain more herbicides hence more herbicides used.
    - Light - May increase rate of herbicide absorption by increasing rate of photosynthesis which causes faster killing of weeds.
      Light may also decompose herbicides making them less effective.

-Temperature - Increases translocation, hence absorption of more herbicides leading to death of the plant.

14.- Leaf angle
Nature of leaf surface.
Differential height in plants.
Location of growing points.
Difference in root systems
Specialized structures.
Physiological/metabolic factors.
Herbicides characteristics.
Concentration.
Formulation.
Method of application.

15. - Read the instructions and follow them.
Wear protective clothing.
Avoid inhaling the herbicide.
Bath thoroughly after handling chemicals.
Do notblow/suck blocked nozzles.
Avoid herbicide drift to unintended crops.
Avoid drift to animal feeds and water.
Avoid spilling herbicides to unintended areas e.g. pastures and fodder crops.
Proper disposal of leftovers and empty containers.
Do not wash spraying equipments in water sources.
Store chemicals in safe places, out of reach of children.
Thoroughly wash equipments used in spraying herbicides.

16. Herbicides application requires less labour than mechanical cultivation.
- They are better adapted to the control of some bothersome weeds e.g. couch grass.
- Use of herbicides does not disturb roots.
- Uses of herbicides is easier in crops e.g. wheat etc.
- Herbicide application is efficient in both wet and dry conditions compared to mechanical cultivation.
- Herbicide application do not disturb soil hence soil structure is maintained (a way of facilitating minimum tillage).
- Herbicides are more convenient in controlling weeds which can cause injury e.g. double thorn or in crops e.g. sugar cane and sisal.
- It is cheaper than manual / mechanical cultivation.

17. - It requires skilled labour in mixing and application.
- There are many risks to the environment and user.
- Some herbicides have long residual effects which may interfere with future crops.
- Herbicides increase cost of production.

18. - Tillage/cultivation.
- Slashing / mowing.
- Uprooting.

19. - Tillage is cheap hence suitable for small scale farmers.
Tillage opens up soil allowing water infiltration.
Earthing up is done to encourage root growth.
Crop residue is incorporated into the soil.

20. - Destroys soil structure.
- Creates suitable conditions for weeds to germinate.
- Tillage may be laborious and expensive on large scale.
- Excess cultivation may lead to water loss, soil erosion and damage to crop roots.
- Tillage may not effectively control weeds e.g. perennial weeds.

21. - Mulching - Mulch smothers weeds, preventing their growth.
- Cover cropping - smother weeds.
- Crop rotation - some weeds grow well in association with certain crops, hence when rotated they do not germinate.
- Timely planting - allows crops to establish early before weeds hence smothering them.
- Use of clean seed/planting materials - prevents introduction of weeds to the farm land.
- Proper spacing - helps to create little space for weed growth and forming a canopy which suppresses weeds.
- Clean seedbed - starts off the crops on clean bed so that they effectively compete with weeds.
- Flooding - discourages the growth of all non-aquatic weeds.

22. Biological weed control - This is the use of living organisms to control weeds.

23. - Use of livestock e.g. goats to graze and control the growth of weeds in plantation crops e.g. coconuts and cashew nuts.
- Use of certain weed eating fish to control aquatic weeds.
- Moths are used to control cactus in some countries.

24. Legislative weed control - This method involves government laws and acts which prevent the introduction of noxious weeds and spreading of foreign weeds e.g. the noxious weed law that prohibits the growth of Cannabis sativa and quarantine.

25. (a) A - Nut / sedge grass (Cyperus rotundus)
B - Couch grass (Digetaria scalarum)
C - Wandering jew (Commelina benghalensis)
D - Double thorn (Oxygonum sinuatum)
E - Thorn apple (Datura stramonium)
(b) - They have underground structures.
(c) - It provides animals with succulent herbage.
(d) - It is poisonous to man and livestock.
(e) It irritates the workers thus reducing the efficiency in which it is controlled.

26. (i) Abutilon (Abutilon maurianuml
(ii) Blackjack (Bidens pilosal
(iii) Sow thistle (Sonchus oleraceus)
(iv) Chinese lantern (Nicandra physalodesl
(v) Mexican marigold (Tagetes minuta)
(vi) Wild oat (Avena fatual

CHAPTER *13*
Questions on
Crops Pest and Diseases

1. What is a pest? 2mks

2. Outline ten harmful effects of crop pests. l0 mks

3. List seven ways in which pests are classified. $3^1/_2$ mks

4. State two modes of identifying common pests. 2mks

5. Name two types of insect pests. 2mks

6. List three effects of nematodes. 3mks

7. Name six field pests. 3mks

8. Name three storage pests. $1^1/_2$ mks

9. What is integrated pest management? 1 mk

10. Define economic injury level (E.I.L). lmk

11. List five methods of pest control. $2^1/_2$ mks

12. Outline eight physical methods of pest control. 4mks

13. What are cultural methods of pest control? 2mks

14. List the methods used to control pests culturally.$7\ ^1/_2$ mks

15. What is a pesticide? lmk

16. List three ways in which pesticides are classified.

3mks

17. Give six ways in which pesticides are grouped according to their mode of action. 3mks

18. Mention the factors that affect the efficiency of pesticides. 4mks

19. Give two advantages of chemical control. 2mks

20. Outline the disadvantages of chemical control. $2^1/_2$ mks

21. Describe biological pest control. lmk

22. Distinguish between a predator and prey. 2mks

23. Complete the following table. 7mks

Predator	**Target Pest**
Ladybird	
Wasps	
Praying mantis	
Majimoto ants	
Chicken	
Cats	
chameleons	

24. List two disadvantages of biological pest control.

25. Pesticides may be classified according to specific pests they kill. Name four types of pesticides and for each give the pests killed. 4mks

CROP DISEASES AND THEIR CONTROL

26. What is a disease? 2mks

27. List three harmful effects of crop diseases.

28. Give five ways in which crop diseases are classified and identified. 5mks

29. Mention four fungal diseases. 2mks

30. List five symptoms of viral infections in crops.
$2^1/_2$ mks

31. Mention five viral diseases.

32. Give three symptoms of bacterial diseases.
$1\ ^1/_2$ mks

33. Name five examples of bacterial diseases.

34. What symptoms would indicate that a plant is suffering from nutritional disorders. 5mks

35. List four other causes of crop diseases. 4mks

36. Give three control measures employed in disease control.
$1^1/_2$ mks

37. Outline seven cultural measures used in crop disease control. 7mks

38. State three chemical control measures used in disease control. 3mks

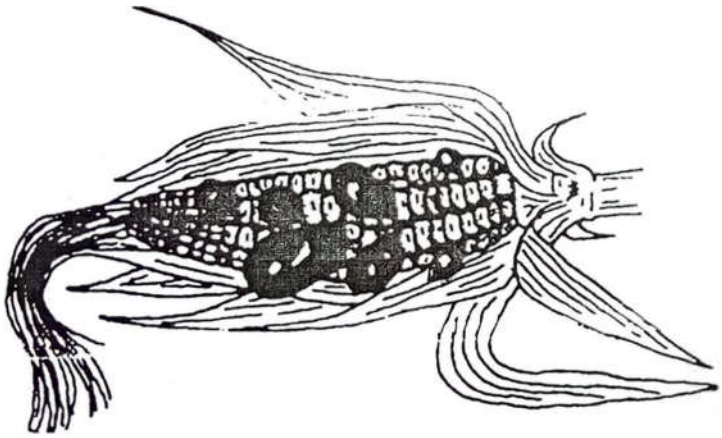
39. The diagrams below illustrate a certain type of field pests.

(i) Identify the field pests above. lmk

(ii) Give two effects of the pest named above. 2mks

(iii) List two symptoms of attacked crops by the pest in (i) above.

40. The photograph below shows a crop produce attacked by a certain disease.



(i) Name the disease, the crop suffered from. lmk

(ii) State four ways in which the disease can be controlled. 4mks

CHAPTER 14
Answers on
Crops Pest and Diseases

1. Pest - This is a living organism that destroys crops directly by causing physical damage to the crop or indirectly by introducing disease causing organisms into the plant.

2. Some unearth planted seeds e.g. squirrels and mice.
Some damage crop roots causing wilting and death e.g. nematodes, termites and moles.
Pests destroy crop leaves reducing the photosynthetic area.
They deprive plant of food e.g. sucking pests.
They lower the quality and quantity of fruits, flowers.
Some destroy the embryo of seeds, lowering their germination potential.
Some pests transmit diseases e.g. Aphids and mealy bugs.
Some eat the growing points causing retarded growth e.g. stalk borers.
Some pests damage the leaf hence lowering the quality and quantity of some crops e.g. kales.
Pests reduce marketability of crop produce by lowering quality e.g. weevils on maize grains.

3. - Mode of feeding
Crops attacked
Stage of development of the pest.
Stage growth of the crop attacked.
Scientific classification.

Level of damage.
Place where they are found/habitat.

4. - Field pests.
Storage pests.

5. - Insects with biting and chewing mouth parts.
Insects with piercing and sucking mouth parts.

6. - They inject toxic substances into the plant, tissues which stimulate abnormal growth.
- Some feed on plant roots causing root stunting; which limits water and mineral uptake by plants.
- They cause wounds in plant tissues through which secondary infections may take place.
- They cause water stress that stop photosynthesis partially or completely.

7. - Insect pests.
- Mites.
- Nematodes.
- Rodents
- Birds
- Large animals

8. - Rodents
- Insects
- Fungi.

9. Integrated pest management (IPM) - This is the combination of both chemical and cultural pest control methods.

10. Economic Injury Level (E.I.L) - This is the pest population that causes damage beyond tolerance.

11. Legislative method /Quarantine.
- Physical measures.
  Cultural methods
  Chemical methods
- Biological methods.

12. - Use of lethal temperature (too hot/too cold)
  Proper drying of produce.
  Flooding.
  Suffocation.
  Physical destruction of pests.
  Use of Scare crows.
  Use of physical barriers.
  Use of electromagnetic radiation.

13. Cultural methods - These are all farming practices employed to alter the environment making it unfavourable for the survival of pests; hence allow crop to escape injury.

14. - Timely planting.
- Timely harvesting.
- Proper tillage.
- Closed season
- Trap cropping.
- Crop rotation.
- Planting resistant crop varieties.
- Field hygiene.
- Alteration of environmental conditions.
- Crop nutrition.
- Destruction of alternative hosts.

- Use of clean planting materials.
- Proper spacing.
- Use of organic manure.
- Irrigation.

15. Pesticide - This is a chemical used to control pests.

16. - Formulation.
    Target pests.
    Mode of action.

17. - Stomach poisons.
    - Systemic poisons.
    - Contact poisons.
    - Suffocants.
    - Antifeedants.
    - Repellants.

18. - Concentration.
    - Timing of application.
    - Weather conditions at the time of application.
    - Persistence.

19. Advantages of chemical control.
    - It is faster compared to other methods.
    - The results are more predictable than other methods.
    - Its effective / efficient.
    - Less laborious.

20. Disadvantages of chemical control.
- Pesticides are expensive.
- Most pesticides are non-selective hence kill useful insects e.g. pollinators and predators.
- Some may develop resistance.
- Most pesticides are toxic to man and livestock.
- Pesticides interfere with the ecosystem.
- Pesticides require care and skills in handling and application.

21. Biological pest control - This involves the use of living organisms to control pests.

22. Predator - This is a living organism that kills another for food.
Prey - It is a living organism that is killed by another for food.

23.

Predator	**Target Pest**
Ladybird	Aphids.
Wasps	Coffee mealy bugs
Praying mantis	Giant looper
Majimoto ants	White scales
Chicken	Cotton stainers
Cats	Moles, rats, mice.
chameleons	Most insects

24. - The process is slow.
The process may not be effective.
Predators may not be readily available.

25. (1) Insecticides - kill insects.
    (2) Nematocides - kill nematodes.
    (3) Rodenticides - kill rodents.
    (4) Fungicides - kill fungi.

26. Disease - This is the alteration in the state of an organism or its parts which interrupts /disturbs its proper performance or functions.
    - It is any deviation from good health.

27. - They lower crop yields.
    They lower the quality of products hence reduce their market value.
    They cause food poisoning and can cause death.

28. - Fungal diseases.
    Viral diseases.
    Bacterial diseases
    Nutritional diseases / disorders.
    Other causes.

29. - Late blight
    Rusts
    Smuts
    Coffee berry disease (CBD)

30. - Leaf chlorosis
    Leaf curling.
    Mosaics
    Malformations
    Rosetting.

31. - Cassava Mosaics ; Greening disease in citrus.
- Brown streak of cassava fruits.
- Potato leaf roll
- Tobacco mosaic
- Ground nut rosette

32. - Wilting even when water is adequate.
- Cankers - localized infections.
- Gall formation in the infected tissues.

33. - Bacterial blight of coffee (BBC)
- Bacterial wilt in potatoes, tomatoes.
- Black arm of cotton.
- Black rot of cabbage.
- Halo blight of beans.

34. - Yellowing of leaves.
Drying of leaves.
Falling of leaves, flowers and fruits.
Stunted growth.
Death in extreme conditions.

35. - Flooding
Chemicals
Poor weather.
Stress

36. - Cultural methods.
Legislative methods.
Chemical methods.

37. - Use of healthy planting materials
Field hygiene
Proper seedbed preparation.
Proper spacing.
Heat treatment
Proper drying of cereals
Use of disease resistant varieties.

38. **Seed dressing** - Application of fungicides before planting seeds.
Seed fumigation - This is the application of fumigants in the soil to control soil borne disease e.g. bacterial wilt.
Spraying - Application of fungicides.

39. (i) Nematodes.
(ii) - Cause wounds in plant tissues leading to secondary infections.
- Causes water stress causing the plant to stop photosynthesizing.

(iii) - Wilting.
- Stunted growth.

40. (i) Maize smut.

(ii) - Hot water treatment on barley and wheat seeds.
- Use of certified seeds.
- Crop rotation.
- Field hygiene.

CHAPTER 15
Questions on
Crop ProductionVI
(Field Practices II)

1. (a) Describe the production of maize under the following subheadings:
   - (i) Ecological requirements.
   - (ii) Land preparation.
   - (iii) Planting.
   - (iv) Weed control.
   - (v) Pests that attack maize.
   - (vi) Diseases that attack maize
   - (vii) Harvesting.
   - (viii) Storage.
   - (ix) Marketing.

2. Discuss production of finger millet under the following subheadings:
   - (i) Ecological requirements.
   - (ii) Land preparation.
   - (iii) Planting.
   - (iv) Weed control.
   - (v) Pests.
   - (vi) Diseases.
   - (vii) Harvesting.
   - (viii) Storage and marketing.

3. Describe the production of Bulrush millet under the following subheadings.
   (i) Ecological requirements.
   (ii) Land preparation.
   (iii) Planting.
   (iv) Weed control.
   (v) Pests.
   (vi) Diseases.
   (vii) Harvesting.
   (viii) Storage and marketing.

4. Discuss the production of sorghum under the following sub headings:
   (i) Uses.
   (ii) Ecological requirements.
   (iii) Varieties.
   (iv) Planting.
   (v) - Pests.
   (vi) Diseases.
   (vii) Harvesting.
   (viii) Storage and marketing.

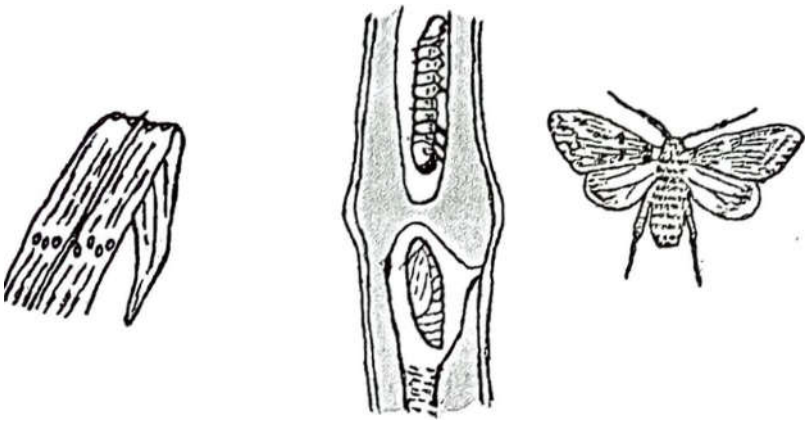
5. Describe the production of beans from ecological requirements to harvesting.

6. Discuss production of rice from land preparation to weed control.

7. Discuss harvesting of:-
   (i) Cotton.
   (ii) Pyrethrum
   (iii) Sugar cane.

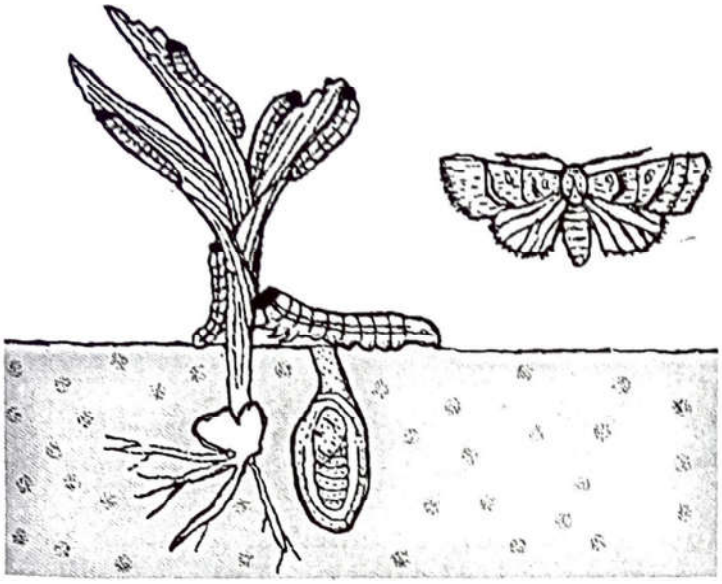
8. Discuss harvesting of:
   (i) Coffee.
   (ii) Tea.

9. Study the diagram below and answer the questions that follow.



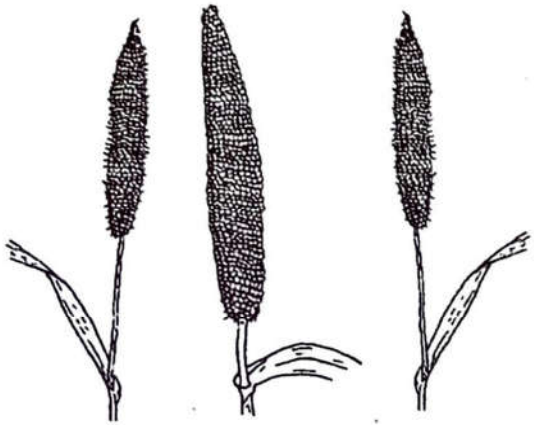
   (a) Name the crop pest above. lmks
   (b) Give two effects / damages caused by the pest named in (a) above. 2mks
   (c) Give four control measures of the pest. 4mks

10. Use the diagram below to answer the questions that follow.



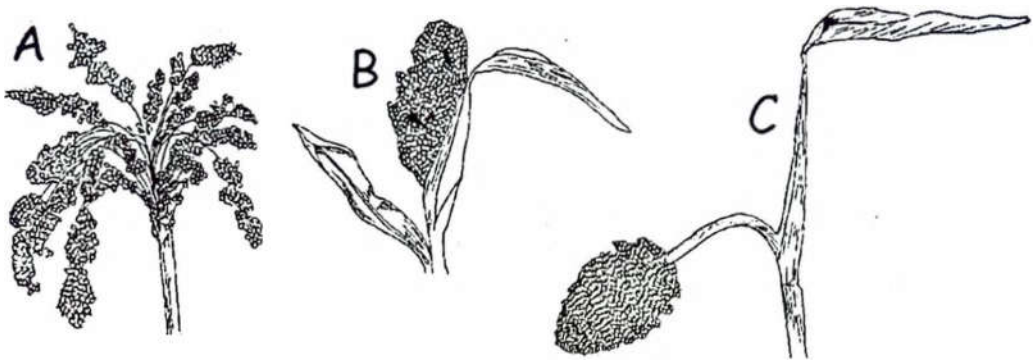
(i) Name the pest above, lmk
(ii) State the damage caused by the pest. lmk
(iii) Which crop is mainly attacked by the pest. lmk
(iv) Give a control measure of this pest.

11. (a) Identify the crop illustrated by the diagram below.



(b) Name three diseases that attack the crop.

12. Use the diagrams below to answer the questions that follow.



(a) Name the sorghum varieties labeled A, B and C. 3mks

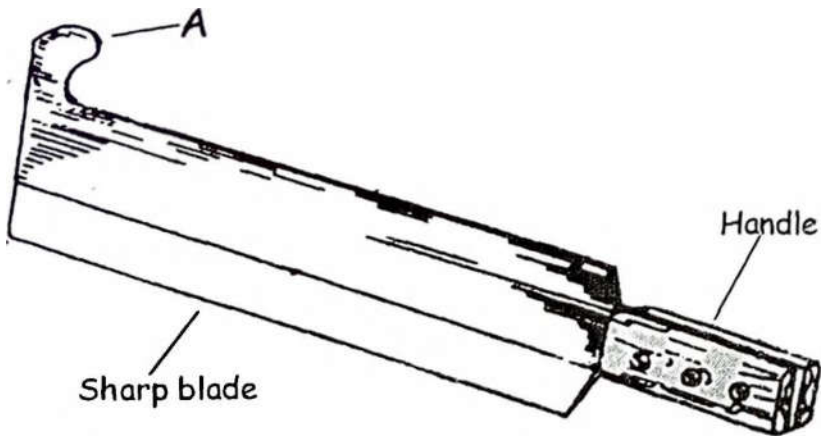
(b) Which of the three varieties named in (a) above is fairly resistant to bird attack. lmk

13. Give three uses of sorghum. 3mks

14. List three characteristics of sorghum that make it suitable for growth. 3mks

15. How can birds be controlled in crop of sorghum.

16. The diagram below is a tool used to harvest crops in the farm. Use it to answer the questions that follow.



(i) Identify the tool represented above. lmk

(ii) Name the crop harvested by the tool above. lmk

(iii) Name the part labeled A. lmk

(iv) Give two reasons why the crop named in (ii) above should be cut at ground level. 2mks

(v) List two reasons why the leaves of the crop should be removed after cutting.

CHAPTER 16
Answers on Crop ProductionVI
(Field Practices II)

1. Production of maize (Zea mays)

(i) **Ecological requirements.**

Altitude 0 - 2200m above sea level.
Temperature - medium temperatures.
Rainfall - medium rainfall.
Soils -fertile alluvial or loam soils.
Soil pH - neutral or alkaline.

(ii) **Land Preparation:**

- Land is prepared early.
- Ploughing and harrowing where the seedbed is rough.

(iii) **Planting:**

- Planting is done before the onset of rains and to reduce attack by stalk borers.
- Dig holes 2.5cm to 10cm deep.
~ Place one or two seeds per hole.
- Spacing - 20 to 30cm by 75cm to 90cm, depending on variety.
- Apply DSP during planting at a rate of 100 to 150 kg per hectare.
- Top dress with CAN when maize is 45cm high/knee high.
- Organic manures also give good responses.

(iv) **Weed control.**

- Done from the early stages of growth to reduce competition for moisture and nutrients.
- 2 - 3 weedings done.
- Hand weeding is mainly practiced.

- Herbicides can also be used after the crops have emerged.

(V) **Pests that attack maize.**

(i) Maize stalk borer (Buseola fusca)

Controlled by early planting, rogueing, burning infested maize crop.

Pesticides e.g. endosulfan, diazinon, malathion can also be used to control the pest.

(ii) Army Warm (Spodoptera exempta)

- Controlled by dusting malathion, diazinon and other appropriate chemicals.

(iii) Aphid (Rhopalosiphum maidis)

- Controlled by spraying suitable insecticides e.g. diazinon, malathion.

(iv) Birds.

- Controlled by scaring them away.

(v) Maize weevil (Sitophilus zeamais)

- Controlled by proper storage hygiene, fumigation with malathion and methyl bromide.

(vi) Red flour beetle (Tribolium castanenm)

- Controlled by proper storage hygiene.

(vii) Rats (Rattus rattus)

- Controlled by use of rat proof store; cats, traps and poisoned baits.
- Bush clearing around stores.

(vi) Diseases.

(i) White leaf blight.

- controlled by planting resistant varieties.

(ii) Maize streak

- Controlled by use of certified seeds, early planting, uprooting and burning affected plants.

(iii) Rust
- Controlled by planting resistant varieties.

(iv) Smut
- Controlled by crop rotation.

(v) **Harvesting.**
- Stalks are cut and stooked to allow cobs to dry properly.
- Remove cobs by hand and store.
- De-husking directly without stooking can also be done.
- Combine harvesters can also be used.
- Ensure seeds are completely dry (12% moisture content).

(vi) **Storage.**

Can be stored on cobs.
Can be shelled and bagged.
Proper storage to reduce losses due to weather elements and pests.

(vii) **Marketing**
- Maize should be sold through the National Cereals and Produce Board.
- Maize can also be sold locally as grains and as green maize.
- Private buyers can also purchase maize directly from farmers.

2. Production of finger millet (Eleusine coranaca)

(i) **Ecological Requirements:**

- Good supply of moisture.
- Rainfall - 900mm annually.
- Altitude 0-2400m above sea level.
- Soils - fertile and free draining.

(ii) **Land Preparation.**

Seedbed should have a fine tilth and free from weeds to reduce competition.

(iii) **Planting.**

Planted early.

Done by broadcasting.

When planted in rows, furrows should be 30-33cm apart.

Plants should be thinned to 5cm apart within rows.

(iv) **Weed control.**

Manual weeding due to close spacing i.e. uprooting.

(v) **Pests.**

Birds - controlled by scaring them off.

(vi) **Diseases.**

Head smut - controlled by planting resistant varieties.

(vii) **Harvesting.**

Hand knives used to cut the heads, which are dried, threshed and winnowed.

(viii) **Storage and marketing.**

Grains are dried and stored in bags and sold in local markets.

3. BULRUSH MILLET (Pennisetum typhoides)

(i) **Ecological requirements.**

- Altitude - 0 - 1200m above sea level.
- Rainfall - 500 - 600 mm per annum.
- Soils - well drained soils.

(ii) **Land Preparation.**

- Land is prepared early.
- Seedbed should be fine so as to give good contact with the soil.

(iii) **Planting.**

~ Done by broadcasting.

- Can also be done by row planting at a spacing of 60cm x 15cm.

(iv) **Weeding.**

- Hand weeding is done.
- Bulrush millet is resistant to weeds.

(v) **Pests and their control.**

- Quelea, weaver and Bishop's birds.
- controlled by scaring them away.

(vi) **Diseases and their control.**

(i) **Downy mildew.**

controlled by crop rotation and destroying remains after harvesting.

(ii) **Rust.**

- Controlled by planting resistant varieties.

(iii) **Ergot**

Controlled by use of certified seeds, crop rotation and destruction of infected crop residues.

(vii) **Harvesting.**

- Cutting the heads with a knife or sickle.
- Heads are then dried and threshed by beating.

(viii) **Storage and Marketing.**

- Grains are winnowed and stored in bags (should have a 14% moisture content.)
- Grown for subsistence and sold locally.

SORGHUM (sorghum vulgare)

(i) **Ecological Requirements:**

- Rainfall - 420mm - 630mm per annum.
- Altitude - 0 - 1500m above sea level.
- soils - fertile and well drained.

(ii) **Varieties.**

(i) Dobbs
(ii) Serena

(iii) **Planting.**

- Broadcasting.
- Row planting at a spacing of 60cm - 15cm.

(iv) **Pests.**

(i) Birds - controlled by explosives / poison sprays in the breeding grounds.

(ii) Sorghum shoot fly. (Antherigona varia)
Controlled by early planting, closed season and application of insecticides.

(iii) Stem borers (Busseola fusca)
- Controlled by use of insecticides and proper disposal of crop remains after harvesting.

(v) **Diseases:**

- Leaf blight, anthracnose, sooty stripe, loose smut, head smut.

Control:

- Leaf diseases are controlled by growing resistant varieties.
- Smut diseases are controlled by seed dressing.

(vi) **Harvesting:**

Done 3-4 months after planting.
Heads are cut using a sharp knife and sun dried.
Threshing and winnowing is done before storage.

(vii) **Marketing:**

Sorghum is marketed through the National Cereals and Produce Board.
Private buyers can buy directly from farmers.

5. **BEANS: (Phaseolus vulgaris]**

(i) **Ecological Requirements:**

Soils-Well drained loam soils; fertile.
Rainfall - Moderate rain.

(ii) **Land Preparation.**

Require a fairly fine seedbed.

(iii) **Planting.**

Done at the onset of rains.
Place 2-3 seeds per hole.
Spacing is 30-45cm x 15cm.
Apply DAP at a rate of 200kg/ha.

(iv) **Weeding**

- Shallow weeding to keep field clean and done before flowering.
  Hand weeding is practiced.

(iv) **Pests.**

Bean aphid, bean bruchid, spotted borer, American boll worm, bean fly and golden ring moth.

Can be controlled by spraying appropriate insecticides.

(v) **Diseases**

(i) Bacterial (Halo) bright.

- Controlled by planting healthy seeds, uprooting and destroying infected plants, crop rotation, rogueing.
- Can also be controlled by spraying with copper oxychloride from emergence.

(ii) Anthracnose.

- controlled by growing resistant vane ues, destroying infected crop residues.
- Spraying with copper fungicide.

(vi) Harvesting

- Harvesting is by uprooting dry plants.
- Done in the morning when weather is cool to minimize shattering.
- Drying before threshing.
- Use sticks to remove the seeds from pods by beating.
- Remove stems and pods before winnowing.
- Sorting after winnowing to remove damaged seeds.

- Treat with appropriate pesticide and pack in bags for storage.
- Marketing is through National Cereals and Produce Board.
- For green beans (French beans) harvesting of pods starts nine weeks after planting.
- Picking is done on dry weather.
- Sort the pods according to size.
- Pack the pods immediately after picking to avoid shriveling and loss of condition.
- For export the pods are transported to the airport within 12 hours.

6. Rice: (Oryza sativa)

i)Land preparation

- Level the field.
- Construct bunds around to control water.
- Use rotavators/jembes to work on the field.
- Flood the field.

ii) Water Control.

- Increase water level gradually from 5cm at planting to 15cm by the time the seedlings are fully grown.
- Allow water to flow slowly through the fields.
- Drain old water and add fresh water after every 2-3 weeks if continuous flow is not available.

(iii) **Weed Control.**

-Weeds are easily controlled by flooding.
- Weeds can also be controlled by uprooting.
- Herbicides e.g. Propanic / and Butachlor can also be applied.

7. (i) **Harvesting Cotton.**

Starts 4 months after planting.

Done at weekly intervals to prevent discolourisation of lint.

- Picking is done manually.
- Grading is done in the field during harvesting.
- Seed cotton is graded into two grades i.e. AR(safi) which should be free from insect damage, foreign matter, clean white and BR(fifi) that does not have all the qualities.
- Picked cotton should be free from leaves and twigs.
- Avoid picking when cotton is wet.
- Do not use sisal bags for handling cotton.

(ii) **Harvesting of Pyrethrum:**

- Flowers are ready for picking 3-4 months after planting.
- Pick only flowers with horizontal flowers (ray flowers).
- Picking interval is 14-21 days.
- Frequency of picking is dependent on weather, the clone used and soil condition
- Picking is by twisting the heads.
- Picked flowers should be kept in open baskets to allow proper ventilation.
- Wet flowers should not be picked to avoid heating up and fermenting.
- Do not compact the flowers after picking to avoid heating up and fermentation which may lower the pyrethrum content.

(iii) **Harvesting sugar Cane.**

- Harvest at the right stage when sugar content is high.
- Take samples for quality testing in the factory.
- Cut the cane at ground level using cane harvesting matchet.
- Remove the green tops to avoid growth substance from flowing backward lowering quality of sugar.
- Strip the leaves.
- Before harvesting burn the field to remove leaves and chase away snakes.
- Deliver the cane to the factory within 24 hours to ensure quality is maintained.

8. (i) **Harvesting Coffee.**

- Picking of cherries is done by hand.
- Only the red ripe berries are picked.
- Spread the berries on bugs to sort out the unripe, diseased, overripe, dry berries and small berries.
- Green berries, dry ones and undersized are dried at home and referred to as buni.
- During the peak season coffee is harvested once a week.
- Deliver the sorted berries to the factory the same day they are picked.

(ii) **Harvesting Tea.**

- Harvesting is done by plucking the leaves i.e. the top two leaves and the bud (have the highest quality).
- A plucking stick can be used to maintain the plucking table.
- Plucked tea is put in woven baskets that allow free movement of air to prevent fermentation.

- The leaves should not be compressed to prevent heating up, browning that lower the quality.
- Keep plucked tea in a cool shaded place.
- Plucked tea should be transported to the factory the same day it is harvested.

(a) Maize stalk borer (Buseola fusca)

(b) - Make holes on leaves.
- Destroy leaves at the centre making them to die.

(c) - Early planting.
- Rogue ing.
- Burning infected maize remains after harvesting.
- Use of appropriate pesticides.

10. (i) Army worm (spodoptera exempta)
(ii) Eat the leaves / cause defoliation.
(iii) Maize.
(iv) Dusting the crop with appropriate pesticide e.g. malathion, diazinon.

11. (a) Bulrush millet (Pennisetum tvphoides)
(b) - Downy mildew.
- Rust
- Ergot.

12. (a) - A - Sorghum open panicle
B - Sorghum compact panicle
C - Sorghum goose necked.
(b) C - sorghum goose necked.

13. Ground into flour for ugali, porridge and brewing.
- Used as fodder after wilting.
- Making silage.

14. - Drought resistant.
Resistant to water logging.
Yields reasonably well on infertile soils.
Can be rattooned.

15. Use of stone throwers.
- Explosives.
- poison sprays in their breeding grounds.

16. (i) Cane harvesting matchet.
(ii) Sugar cane.
(iii) Cane felling hook.
(iv) To avoid loss of yield.
To ensure proper establishment of ratoon crop.

(iv) - To avoid some growth substances from flowing back.
To avoid lowering the quality of sugar.

CHAPTER 17

Questions on Forage Crops

1. Define the following terms.
   (i) Forage crops. 2mks
   (ii) Pasture crops. 2mks

2. (a) Fodder crops. 2mks
   (b) Pasture. 2mks

3. State three ways in which pastures are classified and in each case give the various types and a brief description. 6mks

4. List three ways in which pastures can be established. $1^1/_2$ mks

5. Give four characteristics of materials selected for pasture establishment. 4mks

6. Mention three methods that can be used when sowing pasture crops. 3mks

7. Outline five effects of weeds on pasture. $1^1/_2$ mks

8. Give four effective measures of controlling weeds in a pasture crop. 2mks

9. List five reasons for top dressing pasture. $2^1/_2$ mks

10. Give five factors to consider when choosing top-dressing materials. $2^1/_2$ mks

11. Define the following terms.
   (i) Defoliation.
   (ii) Frequency of defoliation.

12. Outline six effects of early defoliation. 3mks

13. Outline the effects of late defoliation. 3mks

14. Give four reasons why pad docking is necessary. 4mks

15. Define *Carrying capacity.* 2mks

16. What is stocking rate. 2mks

17. List down three effects of overstocking. $1^1/_2$ mks

18. What is meant by intensity of defoliation? 2mks

19. Give two main grazing systems. 2mks

20. Define the following terms:
    (i) Rotational grazing. 2mks
    (ii) Paddocking. 2mks

21. Give the meaning of the following:
    (a) Strip grazing. 2mks
    (b) Tethering. 2mks

22. Outline the advantages of rotational grazing. 6mks

23. What is continuous grazing? lmk

24. What is zero grazing? lmk

25. Give the advantages of zero grazing. 6mks

26. List the disadvantages of zero grazing. 4mks

27. What are fodder crops? 2mks

28. List ten important fodder crops. lO mks

29. Give four reasons for conserving forage crops. 4mks

30. Mention three methods of forage conservation. 3mks

31. Illustrate the procedure for hay making. 4mks

32. Give five factors that determine the quality of hay. 5mks

33. What is silage? 2mks

34. What is a silo? lmk

35. Give the name given to the process of silage making. lmk

36. List three types of silos. 3mks

37. Outline the advantages of silage making. 6mks

38. What are the disadvantages of silage making? 6mks

39. Illustrate the process of silage making. 8mks

40. Give six qualities of good silage. 6mks

41. List three ways in which silage losses occur. 3mks

42. What is meant by the term standing forage? 2mks

CHAPTER 18
Answers on Forage Crops

1. (i) Forage crops - These are plants which grow naturally or are planted by man to feed livestock.
   (ii) Pasture crops - These are forage crops that are harvested directly by livestock through grazing.

2. (a) Fodder crops - These are forage crops that are harvested at a certain stage and fed to livestock.
   (b) Pasture - This is land on which forage crops are grazed on directly.

3. Pasture classification.

(i) According to the pasture stand.
- Pure stands - A pasture that have either grass or legumes on them.
- Mixed stand pastures - Grass and legumes are grown together.

(ii) According to the pasture establishment.
- Natural pastures - Pasture grasses and legumes that grow naturally and extensively for both domestic and wild animals.
- Artificial Pastures (LEYS) - Pasture grasses and legumes planted by man purposely for livestock feed.

(iii) Classification on the Basis of Altitudes (zones).
- High altitude pastures - Pastures which are found at high altitude of 2500m above sea level.
  Medium altitude pastures - Pastures found between 1500m - 2500m above sea level.
- Low altitude pastures - Pastures found in marginal areas of Kenya below 1500m above sea level, and which receive little rains.

4. - Seeds
- Rhizomes
- Splits.

5. -The materials should be adapted to the prevailing environmental conditions.
- Materials should be fast growing to give good ground cover which help control soil erosion.
- The variety should give high herbage yield per unit area.
- Should be of high nutritive value.

6. (i) Direct sowing.
- This is the establishment of the pasture crops in a clean seedbed where no other crops are growing.

(ii) Under sowing.
- This is the establishment of a pasture under a cover crop, usually maize.

(iii) Over sowing:
- This is the establishment of a pasture legume in an existing grass pasture.

7. - They reduce life span of the pastures.
They compete for nutrients, moisture
They reduce quality and herbage yield.
Some weeds are poisonous e.g. Datura stramonium.
Weeds interfere with forage fertilization.

8. - Timely land preparation.
Slashing.
- Application of selective herbicides.
Uprooting of weeds.

9. To add soil nutrients and ensure proper nutrient balance.
To increase the herbage yield.
To'improve the nutritive value of the crop.
To correct physical and chemical properties e.g. soil structure and moisture holding capacity.
To enable the soil - microorganisms to break down organic residues into available nutrients.

10. - Rate of application.
- Topping.
- Re-seeding.
- Controlled grazing.
- Pest control.

11. (i) **Defoliation** - Refers to grazing in pastures and cutting for feed in fodder crops.
(ii) **Frequency of defoliation** - Refers to how often forage stand is grazed or cut for feed.

12. Effects of very early defoliation.
The forage has very high moisture content (90%).
Very high protein content on weight basis.
It has low dry matter content hence low dry matter yield.
It has very low crude protein yield.
It has high dry matter digestibility but low digestible nutrients.
Leads to gradual weakening of the stand.

13. **Effects of late defoliation.**
    - The forage has high dry matter content hence high dry matter yield.
    - Has high cellulose content hence it is woody and fibrous.
    - Has high lignin, cutin, tannin, and silica content which are all indigestible.
    - Has low crude protein content.
    - Has low leaf to stem ratio.
    - Has low dry matter digestibility.

14. **Reasons for paddocking:**
    - To control grazing and ensure sufficient re-growth before grazing is resumed.
    - To ensure better forage utilization and less wastage through trampling, fouling and selective grazing.
    - To facilitate conservation of excess pasture in form of hay or standing forage.
    - To maintain a favourable grass-legume balance where applicable.

15. Carrying capacity - This is the ability of forage stand to maintain a particular number of livestock units per unit area.

16. Stocking rate - Refers to the number of the animals maintained per unit area of land.

17. - Insufficient re-growth period for the forage.
    - Overgrazing and loss of soil cover leading to soil erosion.
    - Invasion of undesirable plant species (weeds and shrubs).

18. Intensity of defoliation - This refers to the proportion of herbage removed through grazing and that of the residual forage. (The ratio of the forage grazed or cut to what is left.)

19. - Rotational grazing.
Continuous grazing.

20. (i) **Rotational grazing** - This is the practice of allowing livestock to feed on a part of a pasture for a period before they are moved to the next.
(ii) **Paddocking** - A paddock is a fenced portion of a pasture land in which animals are restricted for grazing. Paddocking means grazing livestock in one paddock for a short period and then moving them to another.

21. a) **Strip grazing** - This is done by allowing livestock to graze on restricted portions of the pasture at a time.
(b) Tethering - it involves tying an animal to a post with a rope such that it feeds within a restricted area.

22. **Advantages of rotational gracing.**
- Livestock makes maximum use of pasture.
- It reduces the build up of pest and diseases.
- Animal waste is distributed evenly in all fields or paddocks.
- Pasture is given time to re-grow before grazing again.
- Excess pasture can be harvested for conservation.
- Possible to apply fertilizers
- Reseeding can also be done.
- Weeding is done.

23. **Continous grazing-** This is a type of grazing where the pasture is not allowed any resting period.

24. **Zero grazing** - This is the practice of rearing animals in a permanent feeding enclosure known as a stall.

25. **Advantages of zero grazing.**
- There is quick accumulation of manure.
- There is no wastage of feeds.
- High yields due to less wastage of energy.
- It is easy to control diseases and parasites.
- Requires little land.
- Allows higher stocking rate.

26. **Disadvantages of zero grazing.**
- High initial capital required.
- High management skills needed.
- Requires a lot of labour.
  Diseases can be easily spread.

27. **Fodder crops** - These are forage crops which are grown, allowed to mature, then cut and given to livestock as feed.

28. Nappier grass - (Pennisetum pmrpureum)
Guatemala grass (Trvpsacum laxum)
Sorghum (Sorghum alum)
Columbus grass (Sorghum alum)
Sudan grass (Sorghum Sudanese)
Kales (Brassica spp.)
Edible canna (Canna edulis)
Marigold/sugar beets (Beta vulgaris)
Kenya white clover (Trifolium semipilosum)
Lucerne (Medicago sativa)
Desmodium
Agroforestry trees /Bushes used as fodder crops.

29. Reasons for conserving forage.

To distribute available forage for stock throughout the year.
To provide feed for the dry season.
To ensure better and full utilization of available land.
Conserved forage can be sold.

30. - Hay
- Silage
- Standing forage.

31. Process of Hag making.

Cut the crop when 50% of the plants have flowered,
spread the crop evenly on the ground to dry (2 - 3 days)
Windrow the hay, gather or bale.
Store the hay bales in a shed out of reach by rain water and sunshine.

32. **Factors determining the quality of Hay.**

- Forage species used.
- Stage of harvesting (leaf to stem ratio)
- Length of drying period.
- Weather condition during the drying process.
- Condition of the storage structure.

33. Silage - This is a fodder crop harvested while green and kept succulent by partial fermentation.

34. Silo - It is a structure used for fermenting silage.

35. Ensiling.

36. - Trench silo
- Clamp silo
- Bunker tower silo.

37. Advantages of silage making.

More nutrients are preserved.
Has few field losses.
It is less dependent on weather conditions.
Can be preserved for long periods with minimum loss of nutrients.
There are no storage problems.
Can be directly fed without liquid additives.

38. **Disadvantages of silage making.**

Requires skills and great attention.
It is labour extensive hence expensive.
Most farmers cannot spare sufficient forage for ensiling at any one time.
It is bulky to store and handle, must be fed soon after removal.

39. **The process of silage making.**

- Prepare the silo before harvesting the crop (size depends on the amount of forage to be ensiled).
- Cut the crop at the appropriate stage.
- Chop up the crop and put into the silo, compacting it every 10-12cm layer.
- fill the silo rapidly (preferably less than two days).
- Check the temperature regularly (maintain at 32.2°C). (if higher add water, if lower compact, or add dry materials or molasses.)
- Cover with polythene to protect from water and air.
- Cover the silo with a thick layer of soil to maintain the ridge appearance.
- Dig a trench around the silo to drain off rain water.

40. - Be from high quality forage.
- pH of 4.2 or below.
- Have 5 - 9 % lactic acid.
- Free from moulds and bad odours.
- Greenish to yellow colour (not brown / black)
- Have fine texture with no sliminess)

41. - Surface spoilage
- Seepage losses.
- Gaseous losses.

42. Standing forage- This is growing forage set aside for dry season feed.

CHAPTER 19
Questions on
Livestock Health III

1. Define the term disease. 2mks

2. What is meant by the term symptoms? lmk

3. List nine specific conditions that help in observing the disease symptoms. 4 1/2 mks

4. Write down the causes of diseases in livestock. 4mks

5. What does the term disease predisposing factors mean? 2mks

6. List nine disease predisposing factors. $4^{1}/_{2}$mks

7. Define the following terms as used in livestock diseases.
   (i) Incubation period. 2mks
   (ii) Mortality. 2mks
   (iii) Treatment. 2mks
   (iv) Immunity. 2mks

8- (i) Name two types of treatment and for each give a brief description. 2mks
   (ii) In each of the type named in b(i) above, state how each is done. 4mks

9. Name two types of immunity. 2mks

10. Name four major groups of livestock diseases. 4mks

11. Mention four protozoan diseases. 4mks

Discuss the diseases in questions 12-15 under the following sub headings:-

(i) Animals attacked.
(ii) Causal organism.
(iii) Symptoms of attack.
(iv) Control and treatment.

12. East Coast Fever (E.C.F.)
13. Anaplasmosis (gall sickness)
14. Coccidiosis.
15. Trypanosomiasis (Nagana)

16. List seven bacterial diseases. 3 1/2mks

Discuss the diseases in question 17-24 under the following sub headings:

(a) Animals attacked.
(b) Causal organisms.
(c) Predisposing factors (where necessary).
(d) Symptoms of attack.
(e) Control and treatment.

17. Mastitis.
18. Fowl typhoid.
19. Foot rot
20. Contagious abortion (brucellosis/bangs disease)
21. Scours (white scours/infectious diarrhea)
22. Black quarter (blackleg)
23. Anthrax.
24. Pneumonia.

25. Name six viral diseases. 6mks

Discuss the following diseases under the following subheadings.

(i) Animals attacked.
(H) Causal organisms.
(iii) Symptoms of attack.
(iv) Control and treatment.

26. Rinderpest
27. Newcastle.
28. Fowl Pox
29. Gumboro
30. African Swine Fever.

31. Name two nutritional diseases.

32. Discuss milk fever under the following sub headings:-
    (i) Animals attacked.
    (ii) Symptoms of attack.
    (iii) Control and treatment.

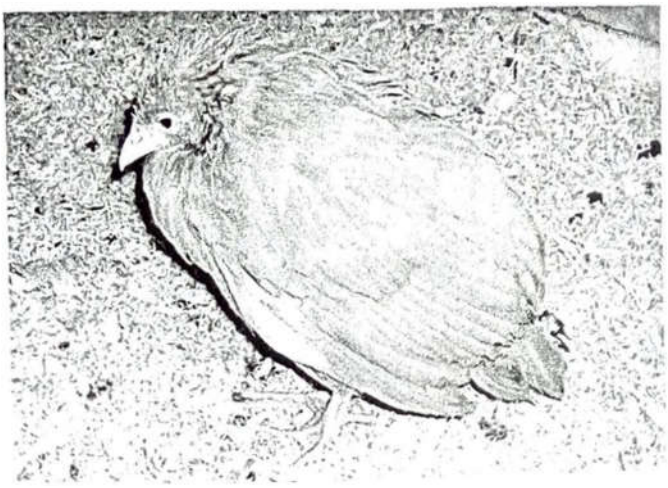
33. Discuss bloat disease under the following sub headings:-
    (i) Animals attacked.
    (ii) Symptoms of attack.
    (iii) Control and treatment.

34. Define the following terms as used in livestock diseases.
    (I) Vector. 2mks
    (ii) Notifiable disease. 2mks

35. Define the following terms as used in livestock diseases.
    (iii) Rigor mortis 2mks
    iv) Dry cow therapy. 2mks

36. Discuss the predisposing factors of mastitis. 4mks

37. Study the photograph below and answer the questions that follow.



(i) Identify the disease the animal is suffering from. lmk
(ii) List three observable symptoms that can be identified from the diagram.
(iii) Give the name of drugs that are used to treat and prevent the disease mentioned in (i) above.

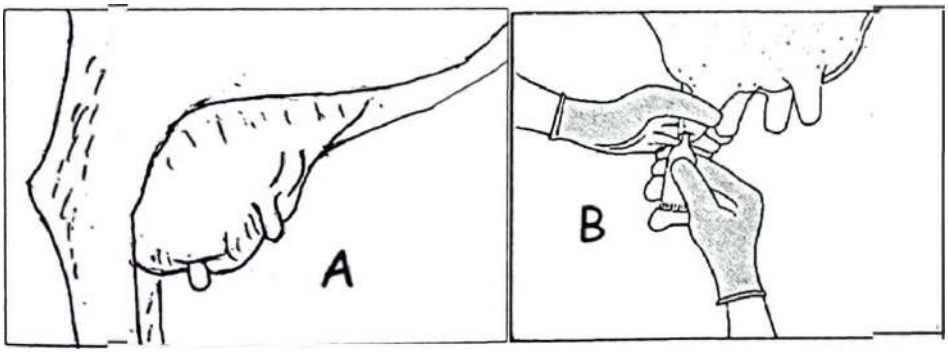
38. (a) The photograph below shows a sick bird.

(i) Name the disease the bird is suffering from. lmk
(ii) List the main method of controlling the disease.

39. (i) Identify the disease the bird below is suffering from.

(ii) Give the main symptom observed. lmks

40. The diagrams below show certain conditions in cattle.



(a) Identify the conditions A and B.
(b) How is the condition identified as A corrected.

CHAPTER 20
Answers on Livestock Health

1. **Disease** - It is any alteration in the state of the body of the animal or of its organs which interferes with the proper performance of its functions.

2. **Symptoms** - These are the visible signs of a disease.

3. Pulse rate and respiration rate.
Temperature.
Body condition.
Visible mucous membranes.
Skin of the animal
Defaecation.
Urination.
Feeding habit / Appetite.
Level of production.

4. Protozoa
- Bacteria
- Virus
- Fungi
- Poor nutrition.
- Physical injuries.
- Chemical poisoning.

Parasitic infestation.

5. **Predisposing factors** - These are conditions inside or outside the body of an animal which may lead to the animal contracting a disease or injury.

6. Age of the animal
Sex of the animal
Colour of the animal
Change of climate / Environment.
Heredity.
Environment.
Overcrowding.
- Physiological conditions eg. Fatigue, weakness, pregnancy.
Contact with sick animals.

7. (i) **Incubation period** - It is the duration between the time of infection and the time the first symptoms show up.
(ii) **Mortality** - This is the likelihood of death occurring in a disease outbreak.
(iii) **Treatment** - It is the application of physical and chemical means to an animal to help it recover from a disease or prevent it from getting a disease.
Immunity — This is the ability of an animal to resist the infection of a disease.

8. (i) **Preventive treatment** - involves administration of drugs to prevent the occurrence of a disease.
Curative treatment - This tries to restore a sick animal to health.
(ii) Preventive treatment is done by:
Vaccination.
Use of prophylactic drugs.
Curative treatment is done by:
- Good feeding.
- Provision of a clean environment.

- Neutralizing the ill effects produced by the disease- Repair of damaged tissues.
- Relieving discomfort or injury to the animal.
- Preventing further spread of the disease.

9. - Natural immunity.
- Artificial immunity.

10. - Protozoan diseases.
- Bacterial diseases.
- Viral diseases.
- Nutritional diseases.

11. -East Coast Fever (E.C.F.)
- Anaplasmosis (gall sickness)
- Coccidiosis.
- Trypanosomiasis (Nagana)

12. East Coast Fever (E.C.F.)

(i) Animals attacked.
- Cattle.

(ii) Causal organism.
- Protozoa called Theirelia jaarva and transmitted by brown **ear tick (Rhinicephalus** appendiculatus}

(iii) Symptoms of attack.
- Swollen lymph nodes (around ears, shoulders, stifle joints)
- High temperature (fever)
- Profuse salivation.
- Lachrimation (production of a lot of tears)
- Difficulties in breathing.
- Haemorrhages in vulva and mouth.
- **Coughing**
- Sight impairment

(iv) Control and treatment.

- Control ticks by regular spraying,e.g. dipping and hand dressing usingacaricides.
- Fence the farm to keep away wild animals and confine animals within.
- Treat using appropriate drugs.

Anaplasmosis (gall sickness)

(i) **Animals attacked.**

Cattle, sheep and goats.

(ii) **Causal organism.**

Protozoa known as Anaplasma marginale transmitted b}' the Blue tick (Boophilus decolaratus)

(iii) **Symptoms of attack.**

Fever.
Constipation/hard dung
Paleness in gums, eyes and lips /anaemia
Milk production decreases.

(iv) **Control and treatment.**

- Control ticks and biting insects using appropriate chemicals.
- Treat using intramuscular injections of antibiotics and iron-giving injections.

Coccidiosis.

(i) **Animals attacked**

- Poultry, calves, young rabbits, kids and lambs.

(ii) **frugal organisms.**

- Protozoa called coccidia of the Eimeria species.

(lii) **Symptoms of attack.**

- Diarrhoea
- Dysentery /blood in the dung.
- Emaciation.
- Ruffled feathers in birds.
- Birds become dull with dropping wings.
- Sudden death in birds, rabbits and kid.

(iv) **Control and treatment.**

- Give drugs called coccidiostats to prevent and treat.
- Isolate infected animals / use portable calf pens.
- Proper hygiene in animals surroundings.
- Avoid common watering points.
- Avoid overcrowding in poultry house.

15. **Trypanasomiasis** (Nagana)

(i) **Animals affected.**

Cattle , sheep, goats, pigs and horses.

(ii) **Causal Organisms.**

Protozoa of Trypanosoma spp and transmitted by tsetse fly.

(iii) **Symptoms of attack.**

- Fever/intermittent body temperature.
- Dullness.
- Loss of appetite.
- General body weakness.
- Swollen lymph nodes.
- Lachrimation leading to blindness.
- Diarrhoea.
- Rough/cracked coat.
- Swollen belly.
- Decline in milk production.
- Loss of hair at tail end.
- Anaemia.
- Abortion in pregnant females due to high fever.

(iv) **Control and treatment.**

Treatment with trypanocidal drugs.
Control tsetse flies through bush clearing.
spraying using appropriate chemicals. use of sterilized males.
Confine game animals in game parks.

16. (i) Mastitis.
Foot rot
Contagious abortion (Brucellosis)
Scours.
Black quarter.
Anthrax.
Pneumonia

17. Mastitis.

This is an infectious disease of the mammary gland characterized by the inflammation of the udder.

(i) **Animals affected.**

- Cattle, sheep, goats, pigs, camels, horses.

(ii) **Causal organisms.**

(a) Streptococcus agalactiae a bacterium which causes streptococcal mastitis.

(b) Staphylococcus urens a bacterium which causes staphylococcus mastitis.

(iii) **Predisposing factors.**

- Age
Stage of lactation.
Udder attachment.
Incomplete milking.
Mechanical injury.
Poor sanitation.
Poor milking technique.

(iv) **Symptoms of attack.**

- Milk contains pus, blood, thick clots or turns watery.
- Swollen teats and udder / painful.
- Death of infected quarter.
- Milk has salty taste.

(v) **Control and treatment.**

Empty the affected quarter of milk and instill an antibiotic and leave for 12 hours.

Use teat dip on every quarter after milking.

Cleanliness and use of disinfectants during milking.

Dry cow therapy.

Detect infection by use of strip cup and milk infected animals last.

Use separate udder cloths /disinfect under cloths after milking each animals.

Remove sharp objects from grazing and milking areas.

Treat open wounds on teats immediately.

18. <u>Fowl Typhoid.</u>

(i) **<u>Animals affected:</u>**

Chicken, turkey and ducks.

(ii) **<u>Causal Organisms.</u>**

Bacterium called <u>Salmonella gallinarum</u>.

(iii) **<u>Symptoms of attack.</u>**

Signs of depression.
Respiratory distress
Dullness
Drooping wings.
Sleepy eyes.
Combs become pale.
Shrunken wattles.
Greenish yellow diarrhea

Birds die within a few days.

(iv) **Control and treatment.**

- Kill affected birds and dispose properly.
- Proper hygiene (dry, clean well ventilated house)
- Obtain eggs / chicks from reliable sources.
- Provide sulphur drugs in water or mash for treatment.

19. Foot Rot (Foul in the foot)

(i) Animals affected:

Cattle, sheep, goats.

(ii) **Causal Organism.**

Bacteria - Fusiformis necrophorus and Fusformis nodosus.

(iii) **Predisposing factors.**

Filthy conditions (wet, muddy areas)
Cracking of hooves.
Overgrown hooves.

(iv) **Symptoms.**

Swollen foot.
Lameness/limping/pain.
Pus and rotten smell from the hoof.
Kneeling when grazing (when hind feet are affected)
Lying down most of the time (when hind feet are affected)
Emaciation due to lack of feeding.

(v) **Control.**

Proper hygiene.

Hoof trimming (regular)

Provide foot bath (copper sulphate solution.)

apply antiseptics on wounds or the feet.

Give antibiotics injections on sick animals.

Isolate sick animals.

Move healthy sheep to dry clean areas.

20. **Contagious abortion** (Brucellosis/Bangs disease)

(i) **Animals affected:**

Cattle, sheep, goats, pigs.

(ii) **Causal organisms.**

-Bacteria - (i) Brucella abortus - cattle

(ii) Brucella sui - pigs

(iii) Brucella malitensis - sheep and goats.

(iii) **Symptoms of attack.**

Spontaneous abortion/premature birth.

Retained after birth / placenta after abortion.

Cows become barren while bulls have low libido and inflamed testis (orchitis)

Yellowish, brown, slimy, odourless discharge from the vulva after abortion.

(iv) **Control.**

- Use of artificial insemination.
- Cull and slaughter and dispose affected animals.
- Vaccinate young animals against the disease.

- Avoid contact with aborted foetus.
- Blood test on breeding animals to detect infected ones.
- Proper hygiene in animal houses.

There is no effective treatment.

SCOURS (White scours/infectious diarrhoea)

(i) **Animals affected.**

Calves, piglets, lambs and kids.

(ii) **Causal organism.**

Bacterium

(iii) **Predisposing factors.**

Unhygienic conditions in houses of young ones.

Poor feeding (over-feeding on milk, feeding on cold milk, lack of colostrums, feeding at irregular intervals).

(iv) **Symptoms of attack.**

White or yellowish diarrhea.
Pungent smell in faeces.
High temperatures.
Listlessness.
Loss of appetite.
Sunken eyes.
Undigested milk and mucus with blood spots on faeces.
Sudden death in case of no treatment.
Recovered animals remain generally weak.

(v) **Control.**

Cleanliness/proper hygiene in housing units.
Avoid dampness on floors.
Disinfect fingers used to trash young calves in bucket feeding.
Clean and disinfect calving areas.
Have separate attendants for the infected calves to prevent spread of disease.
Mix warm water with glucose to replace milk once first symptoms are observed.
Raise calf houses.
Treat animals with antibiotics.

22. **BLACK QUARTER** (**Black leg)**

(i) **Animals affected.**

Cattle, sheep and goats.

(ii) **Causal Organisms.**

Bacteria - Clostridium chauvei
- Chauvei septicum

(iii) **Symptoms of attack.**

Lameness
Swellings on affected body parts.
Body temperature rises.
Heavy and fast breathing.
When touched swollen parts crackle.
Dullness and animal goes off feed.
Grunting and grinding of teeth.
Animals stops chewing and sudden death.
Blood oozes from anus and nose of dead animals.
Bloody froth.

(iv) **Control.**

Treat with antibiotics.
Vaccinate using Blanthrax.
Burry the carcass deep/burn completely.

ANTHRAX.

(i) Animals affected.

Cattle, sheep, goats, man, wild animals.

(ii) **Causal Organisms.**

Bacterium called Bacillus anthracis.

(iii) **Symptoms.**

Swollen belly/extensive bloating of stomach.
Fever.
Blood stains in faeces and milk.
In pigs the throat swells.
Tar-like watery blood in orifices (nose, anus, mouth)
Carcass lack rigor mortis.

(iv) **Control**

Give anti-anthrax serum for treatment.
Give antibiotics e.g. Procaine and Penicillin
Treat wounds.
Burn/burry dead body very deep.
Sprinkle quick lime (calcium oxide) on carcass to kill bacteria.
Do not open the carcass.
Vaccination using Blanthrax.
Impose quarantine in case of outbreak.

. ..i

24. **PNEUMONIA.**

(i) **Animals affected.**

Calves, kids, lambs, piglets and poultry.

(ii) **Causal Organism.**

Bacterium - Mycoplasma mycoides.

(iii) **Predisposing factors.**

Poor ventilation (lack of enough oxygen)
Overcrowding.
Age.
Diarrhea and other illness.

(iv) **Symptoms of Attack.**

Dullness and reluctant to move.
Loss of appetite.
Rough hair coat.
Emaciation.
Rapid breathing.
Abnormal lung sounds e.g. hissing, giggling, bubbling when breathing.
Coughing when chest is pressed.
Fluctuating body temperature.
Nasal discharge.

(v) Control and Treatment.

keep young animals in warm areas.
Proper sanitation.
Isolate affected animals.
Treat early cases using antibiotics.

Rinderpest
Foot and mouth disease.
Newcastle.
Fowl Pox
Gumboro
African Swine Fever.

26. Rinderpest.

(i) **Animals affected.**

Cattle, sheep, goats, pigs and wild animals.

(ii) **Causal Organism**

Virus.

(iii) **Symptoms of attack.**

High temperature
Staring coat
Watery eyes.
Diarrhea and dysentery.
Reddening of mucous membranes (mouth and nose)
Emaciation.
Grinding of teeth.
Death in two to ten days after incubation.

(iv) **Control.**

- Vaccination.
- Quarantine
- Kill affected animals.
- Disinfect wounds.
- Give antibiotics to prevent other diseases.

27. NEW CASTLE DISEASE.

(i) Animals affected.

- Poultry.

(ii) **Causal Organism.**

Virus

iii) Symptoms of attack.

Difficult in breathing.
Beaks remain wide open.
Strained neck.
Dullness.
Birds stand with eyes closed.
Loss of appetite.
Nasal discharges.
Birds walk with staggering motion.
Paralysis of wings and legs.
Beaks and wings are often down.
Watery greenish diarrhea.
Soft shelled eggs.

(iv) **Control and Treatment.**

No known treatment.
Kill all infected birds and bum them.
Vaccination (first 6 weeks, 2-3 months later)
Quarantine.

28. FOWL POX.

(i) **Animals infected.**

Chicken, Turkeys, Pigeons and other birds.

(ii) **Causal Organism..**

Virus known as Avian fox.

(iii) **Predisposing factors.**

- Presence of wounds.
- Presence of mosquitoes, ticks, lice and biting insects.

(iv) Symptoms of Attack.

Injuries on comb and wattles.
Lesions on legs, vent, feet, under wings.
Loss of appetite.
Emaciation.
Watery discharge on eyes and nose.
Dullness.

(v) **Control and Treatment.**

Remove and kill infected birds.
Vaccinate healthy birds.

GUMBORO DISEASE (Infectious Bursal Disease).

(i) Animals affected.

Chicken, turkeys, pigeons and ducks.

(ii) **Causal Organisms.**

Virus called Birna virus.

(iii) **Incubation.**

2-3 days

(iv) **Symptoms of attack.**

Swollen vent (Bursa)
Decrease in egg production.
Respiratory distress.
Loss of appetite.
Low water intake.
Severe immuno-suppression (birds are more susceptible to other diseases.)
Mortality (death rate) increases in hot and humid weather.

(v) **Control.**

Vaccination.

Provide vitamin B_{12} for faster blood manufacture.

30. AFRICAN SWINE FEVER.

(i) **Animals affected:**

Pigs (female pigs)

(ii) **Causal Organisms.**

Virus called Irido virus.

(iii) **Symptoms of attack:**

Rise in temperature.
Animal becomes depressed.
Loss of appetite.
General body weakness
Coughing
Nasal discharge
Diarrhoea.

(iv) **Control**

Vaccination in case of outbreak.
Impose quarantine.
Kill and d'spose affected animals
Prevent consumption of pig products from pandemic areas.
Double fencing to keep off wild animals.

31. - Milk fever (Parturient parensis)

Bloat

32. **MILK FEVER (Parturient parensis)**

(i)Animals affected.

- cows, goats, pigs.

(ii) **Cause.**

- Low calcium levels in blood.

(iii) **Symptoms of attack:**

Dullness
Muscular twitching (animal trembles)
Staggering motion.
Animal falls and become unconscious.
Lying down on its side and body stiffens.
Body functions stops (urination, defaecation, milk secretion)
Sudden death in case of no treatment.
Complete loss of appetite.

(iv) **Control and treatment.**

Intravenous injection of soluble calcium salt.
Nursing care (keep animal in comfortable position)
Mechanical removal of urine.
Provide fresh water.
Do not give medicine orally.
Partial milking in first ten days.
Give rations containing phosphorous and calcium.

33. BLOAT

- It is the accumulation of gases as a result of food fermentation in the rumen.

(i) **Animals affected.**

All ruminants e.g. cattle, sheep and goats.

(ii) **Causes.**

Obstruction of esophagus due to bulky food.
Abnormal pressure on the esophagus by a swelling in the wall of the chest.
Indigestion.

\

(ii) **Symptoms:**

Swollen left side of abdomen.
Death due to excess pressure on blood vessels, lungs.

(iv) **Control.**

Feed ruminants with dry roughage in wet seasons.
Treat by manual and surgical means.
Drenching using suitable oils e.g. turpentine.
Administer Epsom salt.
Administer methyl silicone as injection into the rumen.

34. (i) Vector-These are organisms that spread diseases and organisms that act as carriers.

(ii) Notifiable disease - A disease whose outbreak must be notified to the authorities for action.

35. (i) Rigor Mortis - this is the stiffness of the body which is seen in other carcasses.

(ii) Dry Cow. therapy - This is the infusion of long acting antibiotics into the teat canal when drying off the cow.

36. - Age - Older animals are more likely to be infected compared to young ones.

Stage of lactation - Animals are likely to suffer from mastitis at the beginning of lactation and at the end of lactation.

Udder attachment - Animals with large pendulus or loosely hanging udders and long eats are more likely to get infected; since such udders are liable to mechanical injuries.

Incomplete milking - left milk in teat canals act as culture media for bacteria.
Mechanical injuries - wounds on teats / udders allow micro-organisms entry into the udder.
Poor milking technique - Results in mechanical injury of teats or weakening of the sphincter muscles of the teat.

37. (i) Coccidiosis.
(ii) - Rough plumage.
- Dropped wings
- Heads tucked in.
(hi) Coccidiostats.

38. (i) New castle disease.
(ii) Vaccination.

39. (i) Fowl pox.
(ii) Lesions/injuries/wounds on the comb and wattles.

40. (a) A - Udder affected quarter by mastitis.
B - Treating mastitis.
(b) Empty the affected quarter of the udder of milk and administer an antibiotic and leave for 12hours.

CHAPTER 21
Questions on Poultry Production

1. Give two reasons why poultry are kept. 2mks

2. List five types of poultry kept in Kenya. $2^1/_2$ mks

3. Define the term broodiness. lmk

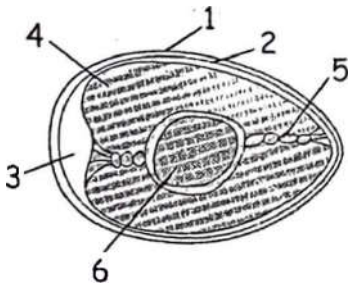
4. Give two reasons why hybrids are not recommended for breeding. 2mks

5. Outline five characteristics of birds that should be selected for breeding. 5mks

6. Give four factors that a commercial poultry farmer should consider. 4mks

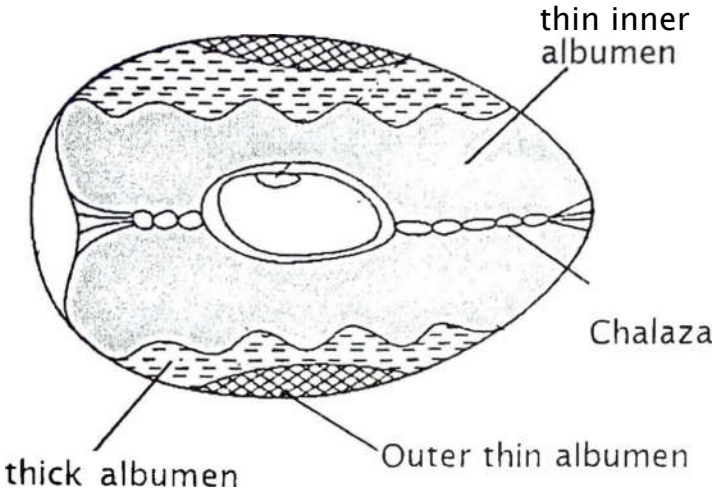
7. Name six main components (parts) of an egg. 6mks

8. The diagram below shows parts of an egg. Study it and answer the questions that follow.



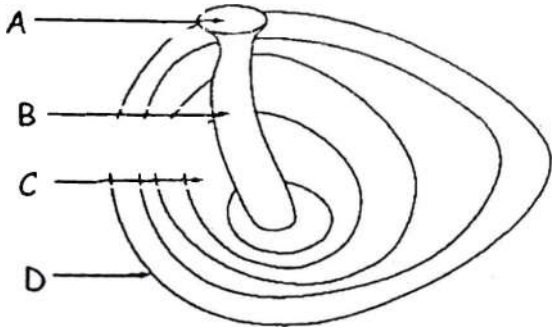
(a) Name the parts labeled 1 - 6 . 6mks
(b) Give the functions of the parts labeled in (a) above. 6mks

9. The diagram below is a part of an egg.



(i) Identify the part, lmk

10. Use the following diagram to answer the questions that follow.



(a) Name the part of an egg illustrated by the diagram. lmk

(b) Name the parts labeled A - D. 4mks

(c) Give the functions of parts A, B and D. 3mks

11. Define the term egg incubation. 2mks

12. Give the incubation periods of chicken and turkey. 2mks

13. List nine characteristics of eggs for incubation. 9mks

23. Give three requirements of the free range system. 3mks

24. Outline the advantages of the free range rearing system. 6mks

25. Mention the disadvantages of the free range system. 8mks

26. Outline the advantages of the fold system. 3mks

27. List the disadvantages of the fold system. 4mks

28. Mention the requirements of a deep litter system. 2mks

29. Give six advantages of the deep litter system. 6mks

30. List the disadvantages of the deep litter system.

31. Describe battery cage system. 2mks

32. List ten advantages of battery cage system. l0mks

33. Give six disadvantages of battery cage system. 6mks

34. State two factors that affect egg production. 2mks

35. List two types of vices in poultry rearing. 2mks

36. Mention five factors that lead to egg eating. 5mks

37. Give five control measures of egg eating. 5mks

38. Define cannibalism. 2mks

39. Give six causes of cannibalism. 6mks

40. Outline seven control measures of cannibalism. 7mks

41. What is stress in relation to poultry rearing? lmk

42. Give five factors that can cause stress in birds. 5mks

43. List five measures that a poultry farmer may carry out to control stress in birds. 5mks

44. List five routine management practices carried out in poultry. 5mks

45. Give five factors that necessitate culling of birds. 5mks

46. Give two ways that a farmer can use to distinguish a good and poor layer. 2mks

47. Outline ten differences between a good and poor layer. lO mks

48. Mention four factors that should be considered when sorting and grading eggs for marketing. 4mks

49. Give two methods of killing chicken for meat. 2mks

50. Distinguish between plucking and dressing in poultry rearing. 2mks

CHAPTER 22
Answers on Poultry Production

1. - for high quality eggs.
   - for meat.
2. chicken
   - Turkeys
   - Ducks
   - Geese
   - Pigeons.

3. broodiness — This is the desire of a hen to sit on eggs for incubation.

4. - Hybrid vigour declines in their offsprings.
   - Many do not go broody.

5. Young hens and cocks.
   - Healthy birds
     Able to go broody
   - Prolific
   - Good mothering ability.

6. - The enterprise (meat or egg production)
   - Age (day old or at point of laying)
     Breeds of birds (egg colour and size of birds)
   - Production (Percentage laying or growth rate)

7. - The shell
     Shell membrane
   - Air space
     Egg white (albumen)
   - Chalaza
   - Yolk.

8. (a) 1. - Shell
   2 - Shell membrane

3 - Air space
4 - Egg white
5 - Chalaza
6 - Yolk

(b) 1 - Shell - Gives the egg its shape
- Provides protection to inner components.
- Allows gaseous exchange since it is porous.

2. Shell membrane - forms the inner lining of the shell.
3. Air space - Provides oxygen to the developing embryo.
4. Albumen (egg white) - Surrounds the yolk.
- Serves as a food reserve to the developing chick.
5. Chalaza- hold the yolk in place.
6. Yolk - Supply the embryo with its food requirements.

9. - The albumen (Egg white).

10. (a) - The yolk.
(b) A - Germinal disc
B - Streak (Latebra)
C - The yolk.
D - Vitelline membrane.
(c) A - Heat transfer to the developing embryo.
B - Joins the germinal disc to the yolk.
D - Surrounds the yolk and gives the yolk its shape.

11. Egg incubation - This is the embryonic development of a fertilized egg into a chick under correct conditions which will ensure that a chick is ultimately hatched from the egg.

12. Chicken - 21 days
- Turkey - 28 days.

13. - Should be fertilized
- Should be of medium size (55-60gm)
  Have smooth shells.
- Oval in shape
- Free from any cracks on the shells.
- Clean to ensure pores are open.
- No abnormalities e.g. meat spots, blood spots or double yolk.
- Should be fresh (collected within one week)
- Should not be stored for more than 8 - 1 0 days

14. Egg candling - This is the method of examining the internal condition of an egg for any abnormalities.

15. (a) Egg candling.

(b) - To observe the size of the air space (cell)
- Check if the egg is fertilized i.e. germinal disc will appear as a black spot.
- Check if the yolk has blood spots.
- Check whether the shell has hair cracks.
  Check whether the egg shell is broken.
- Check whether the shell is porous.

16. (a) - Natural incubation.
- Artificial incubation.

(b) (i) Advantages of natural incubation.
- suitable to a small scale farmer who cannot afford an incubator.
- less laborious
- little skills required.
- reduces the margin of risk.

(ii) Disadvantages of natural incubation.
only few chicks can be hatched at a time,
farmer cannot plan when to incubate,
easy to transmit disease and parasites to the chicken.
hens can only be used when broody.

(iii) Advantages of artificial incubation.
- Many chicks are hatched at a time.
- Possible to plan when to hatch chicks.
- Incubator is always ready when required.
- Chicks have no danger of suffering from parasites and diseases under good management.

(iv) Disadvantages of artificial incubation.
- Expensive to buy an incubator.
- More labour demanding.
- Requires more skills than natural method.
- High risks of damaging eggs or embryos if all requirements are not strictly adhered to.

17. - Reputation of the supplier.
- Time (between the hatchery and farm)
- Type of chick available i.e. breed, size, sex and incidence of disease.

18. - Natural brooding - Hen is allowed to stay with and provide warmth to the chicks.
- Artificial brooding - chicks are kept in a structure in which food and other requirements are provided.

19. - Litter.
- fresh air
- heat source
- feeders and waterers
- shape of brooder (round)

20. - Prepare the brooder 2-3 days before the chicks arrive.
- all equipments should be functioning well, spread newspapers on the floor of the brooder, to prevent chicks from eating litter.
- spread some feeds on the newspapers and place some in the feeders.
- clean and disinfect the brooder ho^se anu brooder equipment.

- mix the drinking water with agricultural treacle or glucose and give to chicks that appear weak on arrival.
- feed chicks on chick mash for eight weeks.
  Provide chicks with clean water and feed.
- vaccinate chicks against gumboro after 2 weeks, Newcastle at 3-4 weeks and fowl typhoid at 7 weeks.
  dust chicks with appropriate insecticides to control external parasites.
  control coccidiosis by giving coccidiostats through water and feed.
  introduce roosts for chicks to perch at 6 weeks
  introduce grit/sand to help digestion.
  in the 7th week provide growers mash mixed with chick mash.
  in the ninth week provide growers mash only,
  take the growers into the main poultry house,
  control parasites and diseases,
  provide plenty of clean water,
  provide green vegetation to keep birds busy,
  provide soluble grit/oyster shell in the 12 th week,
  introduce layers mash on the 16th week,
  vaccinate the birds against Newcastle and fowl typhoid every six months.
  provide enough laying nests, feeders, waterers and roosts.
- collect eggs twice a day.

- availability of land.
- Topography to facilitate drainage.
  Labour availability.
- Availability of appropriate equipment.
- Capital
- Security
- Market
- Knowledge of the farmer.

22. - free range
- fold system
- deep litter system
- battery cage system.

23. - Land
Runs/partitional areas
House.

24. - Reduces cannibalism and egg eating.
Provides birds with plenty of exercise.
- No need to provide grit.
- Less feed is used.
Manure is evenly spread which helps vegetation to regenerate.
- Requires low capital.

25. Requires a lot of land.
- Birds can be stolen or eaten by predators.
- Eggs get lost in the runs.
- Eggs get dirty.
Difficult to have close supervision on individual birds.
- Range area may be contaminated with diseases and parasites.
- Breeding programme is not easy to follow.
- Birds cause damage to crops if fence is not properly constructed.

26. - Manure is spread uniformly in the field.
- Less feed is used because birds eat grass.
The system reduces buildup of parasites and diseases.

27. - Few birds are kept per fold.
- It is laborious since folds need to be moved.
Difficult to keep individual egg production.
The fold is not long lasting.

28. Site - well drained.
- Leak proof house
- Feeders and waterers
- Roosts and perches.
- Laying nests.

29. - Many birds can be kept in a small area.
- Low labour requirements.
- System can be used to rear breeding stock.
- Birds are safe from predators and thieves.
- There is fast accumulation of manure.
- Less loss of eggs.

30. High incidence of cannibalism and egg eating.
Likelihood of pests and disease accumulation in litter.
Difficult to keep individual laying record.
Litter may be difficult to find in some areas.
Eggs may become dirty.
Feeders and waterers may be contaminated.

31. Battery cage system - It is a system where birds are totally confined in cages throughout their laying period.

32. - High egg production due to less energy loss.
- Accurate egg records can be kept.
- Minimizes cannibalism and egg eating.
- Eggs are clean.
-'"System can be mechanized.
- Birds do not contaminate food and water.
- Handling of hens is easy. *
- Discourages broodiness since birds do not reach eggs.
- A large number of birds can be kept in a small area.
Sick birds can be detected easily and isolated for treatment.
- Wire floors prevent re-infestation of parasites.
No bullying during feeding.
- Low labour requirements.

33. - Requires high initial capital.
Requires high level of management/skilled manpower.
Fast spread of diseases in case of outbreak.
Birds develop bruises on combs, breast as they stick their necks out to eat and walk in cages.
Birds do not have enough room for exercise.
System is not good for brooding purposes.
Not good for rearing chicks.

34. - Vices
- Stress.

35. - Egg eating
- Cannibalism.

36. - Presence of broken or soft - shelled eggs.
Bright light in the nests.
Idleness.
Inadequate laying nests.
Lack of minerals e.g. Calcium in the diet.

37. - Collect eggs regularly.
- Make nests dark
- Feed birds on balanced ration
- Debeak perpetual egg eaters.
Supply green leaves to keep birds busy.
- Scatter grains in the litter to enable birds to scratch for them.

38. Cannibalism - This is a condition where birds peck each other.

39. - External parasites.
- Overcrowding.
- Bright light
- Prolapse
- Mineral deficiency.
- Introduction of a new bird in a flock.

40. - Avoid bright light in the house.
Avoid overcrowding/provide enough space.
Provide birds with a balanced diet.
Keep birds according to age groups.
Control external parasites.
Keep birds busy by hanging green leaves in the house.
Debeak hens which peck others.
Cull perpetual cannibals.

41. Stress - This is any discomfort in birds.

42. - Sudden change in feed.
Presence of strangers and predators.
Handling of birds e.g. During vaccination etc.
Sudden noise.
Sudden change of weather.
Diseases and parasites infestation.
Lack of food or water.

43. - Keep the house quiet.
Insulate the house to maintain uniform temperature.
Control diseases and parasites.
Change of routine programme must be gradual.
Provide enough feed and water.

44. - Feeding.
Control oi diseases and parasites.
- Egg collection.
- Debeaking.
- Culling.

45. - Poor/stunted growth.
Chronic diseases/injuries.
Old age
- Vice.
- Poor layers.

46. - Observe physical characteristics of birds.
- Trap nesting.

47

	Good layer	Poor layer
1.	Combs and wattles are large, warm, waxy and red	Combs and wattles are small/shrunken, dry, scaly, pale and cold.
2.	Eyes are bright orange and alert	Eyes are dull and pale yellow.
3.	Beak is pale	Beak is yellowish in colour.
4.	Vent is oval, moist, reddish and active	Vent is round, dry and less active.
5.	Space between keel and pelvic bone is wide (3-4 fingers can fit)	Space between keel and pelvic bone is narrow (1-2 fingers fit)
6.	Alert and active	Lazy and dull
7.	Dry and rugged plumage	Preened and glossy plumage
8.	Moulting starts late	Moulting starts early.
9.	Shanks are pale	Shanks are yellowish.
10.	Abdomen is soft, pliable and wide	Abdomen is hard and sometimes full.
11.	Broodiness is rare.	Broodiness is common.

48. - Cleanliness
- Size of the egg
  Candling quality
- Egg colours.

49. - Dislocating the neck.
- Killing with a sharp knife.

50. - Plucking - removal of feathers from a bird.
- Dressing - removal of intestinal parts (ofals) from the bird.

CHAPTER 23
Questions on Livestock Production VI (Cattle)

1. Give five reasons why colostrum is important to calves. 5mks

2. What is colostrum? lmk

3. List four ingredients used to prepare artificial colostrum. 4mks

4. Name two methods of calf rearing. 2mks

5. Give the advantages of natural method of calf rearing. 3mks

6. List the disadvantages of natural method of calf rearing. 3mks

7. Outline the procedure of training a calf to drink milk from a bucket. 5mks

8. What are the advantages of bucket feeding? 5mks

9- Give the two calf weaning programmes. 2mks

10. Define replacement stock. 2mks

11. State five routine management practices carried out on calves. 5mks

12. Give five advantages of castration. 5mks

13. List three reasons for dehorning. 3mks

14. Name three types of calf pens. 3mks

15. Give eight requirements of a calf pen. 8mks

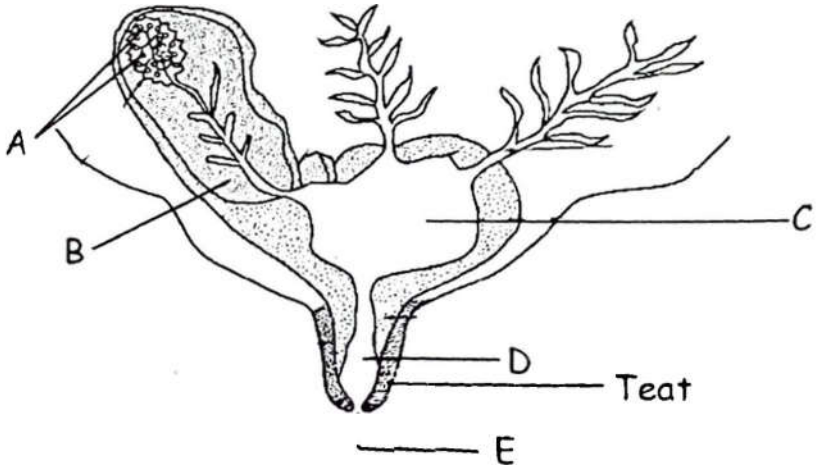
16. What is milk? 2mks

17. Give five components of milk. 5mks

18. State eight factors affecting milk composition. 8mks

19. What does SNF mean? lmk

20. The diagram below is an illustration of a certain structure.



(a) Name the structure illustrated above, lmk
(b) Identify the parts labeled A-E. 5mks

21. What is lactogenesis? 1 mk

22. What is lactation? lmk

23. What is milk let down? 2mks

24. List five factors that may initiate milk let down in a lactating cow. 5mks

25. Give seven factors that may cause a cow to hold back her milk. 7mks

26. Give the role of the following hormones.
    (i) Prolactin. lmk
    (ii) Oxytocin. lmk
    (iii) Adrenaline. lmk

27. State five characteristics of clean milk. 5mks

28. Outline seven essentials of clean milk production. 7mks

29. List eight milking materials and equipments. 8mks

30. Give two methods of milking. 2mks

31. State four rules that should be observed during milking. 4mks

32. Mention seven post-milking practices. 7mks

33. Define the term dry cow therapy. 2mks

34. List ten products obtained from milk after processing. lOmks

35. Distinguish between homogenization and pasteurization. 2mks

36. List three channels through which Kenyan beef farmers can market their products. 3mks

CHAPTER 24
Answers on Livestock Production VI (Cattle)

1. - It is highly digestible.
   - Highly nutritious.
     Has antibodies.
     Good in cleaning bowels (has laxative effect)
   - Highly palatable.

2. Colostrum is the thick yellow milk produced by a cow in the first 1-6 days after calving.

3. - A fresh egg
   - Half a litre of warm water.
   - One teaspoonful of cod liver oil.
   - One tablespoonful of castor oil.

4. - Natural method.
   - Artificial /Bucket feeding.

5. Advantages of natural method.
   - Calf takes milk at body temperature.
   - Milk is free from contamination.
   - Minimizes problems of scouring.

6. Disadvantages of natural method.
   - Farmer may remove all the milk from the udder hence the calf may be underfed.
   - Cows used to be stimulated by calves will not let down the milk in the absence of the calf.
   - It is difficult to keep clear records of milk yield.

7. - Put clean milk in a clean bucket.
   - Place the index finger into calfs mouth.
   - Lower the finger slowly until it is submerged in the milk as the calf sucks.
   - Slowly withdraw the finger while the calf is sucking.
   - Repeat the above steps until the calf learns to drink from the bucket without assistance.

8. Advantages of bucket feeding.
   - Easy to keep accurate milk records.
   - Easy to regulate the amount of milk taken by the calf.
   - Cows continue to produce milk even in the absence of their calves.
   - Easy to maintain high standards of sanitation.
   - Farmer may sell more milk hence high profit.

9. - Early weaning.
   - Late weaning.

10. Replacement stock is a group of heifers and young bulls meant to replace old stock.

11. - Parasite control
    - Disease control
    - Castration.
    - Identification.
    - Removal of extra teats.
    - Dehorning / Disbudding.

12. Advantages of castration.
    - Castrated males are docile.
    - Steers fatten faster.
    - Controls inbreeding.
    - Controls breeding
    - Controls breeding diseases e.g. vaginitis

13. Reasons for dehorning.
- Make animals docile.
  Makes animals easy to handle.
  Facilitates economic use of space when feeding or drinking.
- Reduces chances of causing injury to others and the farmer.
  Avoids damaging the skin.

14. - Raised permanent pens.
  Permanent calf pens with concrete floor.
- Mobile calf pens.

15. - Cleanliness
- Dryness and warmth.
- Adequate 'space.
- Proper lighting.
- Proper drainage.
  Drought free.
- Proper ventilation.
- Single housing.

16. - Milk is the white substance secreted in the mammary glands of the females of all mammals.

17. - Proteins.
- Fats.
- Carbohydrates (lactose)
- Minerals.
- Water.

18. - Age of the animal
- Condition of the animal
- State of lactation.
- Stage of pregnancy.
- Completeness of milking.
- Breed
- Season of the year.
- Type of feed eaten by the animal .

- Diseases e.g. mastitis.
- Use of drugs while treating animals.

19. SNF - Solids — Non — Fat.

20. (a) The udder.

(b) A - Alveolus.
B - Lobe
C - Gland cistern
D - Teat Cistern
E - Teat canal (Nipple/Sinus)

21. Lactogenesis - This is milk secretion or milk synthesis.

22. Lactation - This is the copious flow of milk from the udder.

23. Milk let down. - This is the flow of milk from the upper region of the udder /alveolar region) to the gland and teat cisterns and then out of the teat either by milking or sucking.

24. - Suckling calf.
Washing the udder with warm water.
Feeding.
- Familiar noises.
- Whistling.

25. - Strange surroundings.
- Strange people
- Change of milkman
- Change of routine
- Fear
- Anxiety
- Pain.

26. - Prolactin - Initiates lactogenesis.
- Oxytocin - causes contraction of the muscle of the upper region of the udder.
- Adrenaline - causes relaxation of the muscle fibres and limits blood supply to the udder.

27. - Free from disease causing organisms.
- Has no hair, dirt or dust.
- High keeping quality.
- Good flavour.
- Good chemical composition .

28. - Healthy milking herd
- Clean milking cows.
- Healthy and clean milkman
- Clean milking shed.
- Clean milking utensils.
- Milk filtration, cooling and storage
Avoid flavours in milk.

29. - udder cloths/towels.
- Filtering pads.
- Milking jelly
- Warm water.
- Milking pails/buckets.
- Strip cup
- Milk cans/chums
- Cooling apparatus
Milking stool.
Weighing scale.

30. - Hand milking.
- Machine milking.

31. - Milk quickly and evenly.
Milk at regular times/intervals
- Avoid use of wet hands.
Complete milking.

32 - Weighing
- Recording
- Milk straining
- Cooling
- Storage
- Cleaning utensils
- Cleaning the parlour.

33. Dry cow therapy - This is the application of antibiotics into the teat canal after drying off the cow.

34. - Homogenized and Pasteurized milk.
- Ultra Heat Treated (UHT) milk.
- Cream.
- Skim milk
- Butter.
- Ghee.
- Curd
- Cheese.
- Powdered milk.
- Ice cream.
- Condensed milk.
- Yoghurt.

35. Homogenization is the process by which the fat globules in the milk are broken mechanically to smaller fat particles which are then distributed evenly in milk.
Pasteurization - Heating the milk and then cooling it immediately.

36. - Kenya Meat Commission.
- Livestock Marketing Division (LMD).
- Local Slaughter Houses.

CHAPTER 25
Questions on
Farm Power and Machinery

1. Define the term power. lmk

2. List nine sources of power in the farm. 9mks

3. Give five advantages of animal power. 5mks

4. Give four disadvantages of using animal power. 4mks

5. Give three reasons why the use of water power is **limited** in the farm. 3mks

6. Give three uses of biogas. 3mks

7. State three advantages of biogas. 3mks

8. What are the disadvantages of biogas? 3mks

9. Outline the general uses of solar energy. 5mks

10. What is an engine? lmk

11. List the four strokes of an engine. 4mks

12. Briefly describe the four strokes of an engine. 8mks

13. Mention six advantages of a four stroke engine. 6mks

14. Give three disadvantages of a four stroke engine. 3mks

15. List two machines that has a two stroke engine. 2mks

16. Name the three ports found in a two stroke engine. 3mks

17. Name the two strokes in a two stroke engine. 2mks

18. Give the advantages of a two stroke cycle engine. 4mks

19. State the disadvantages of a two stroke cycle engine. 3mks

20. Name two types of tractor engines. 2mks

21. Outline the structural and functional differences between petrol and diesel engines. 5mks

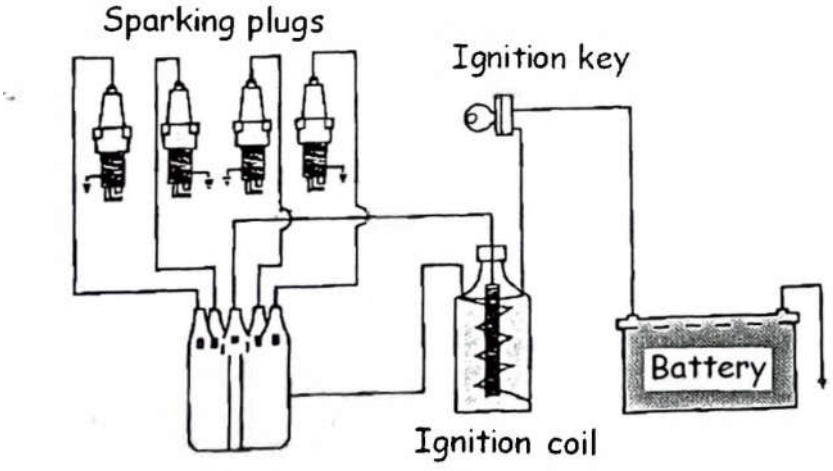
22. What is the main difference between the petrol fuel system and the diesel fuel system in a tractor? lmk

23. State 3 maintenance practices on petrol fuel system. 3mks

24. Give three maintenance practices on a diesel fuel system. 3mks

25. Describe the care and maintenance of a tractor battery. 7mks

26. The diagram below shows a certain system in a tractor.



(i) Identify the system. lmk

(ii) State two common faults of the system named in (i) above. 2mks

(iii) For each of the faults named in (ii) above, state their causes and the correction measures that can be taken. 8mks

(iv) Give the maintenance practices carried out on the system above. 7mks

27. Give three characteristics of air cooled engines. 3mks

28 List two problems of air cooled engines. 2mks

29. Give Five maintenance practices of a water cooling system. 5mks

30. What is the main aim of the lubrication system? 2mks

31. Mention four importances of lubrication system in tractors. 4mks

32. List three types of lubrication systems. 3mks

33. State four maintenance practices of the lubrication system. 4mks

34. Give the function of the power transmission system. 2mks

35. (i) Name the components of the power transmission system. 4mks

(ii) Give the functions of the components named in b(i) above.

36. What is tractor servicing? 2mks

37. Outline ten short term services to a tractor. lOmks

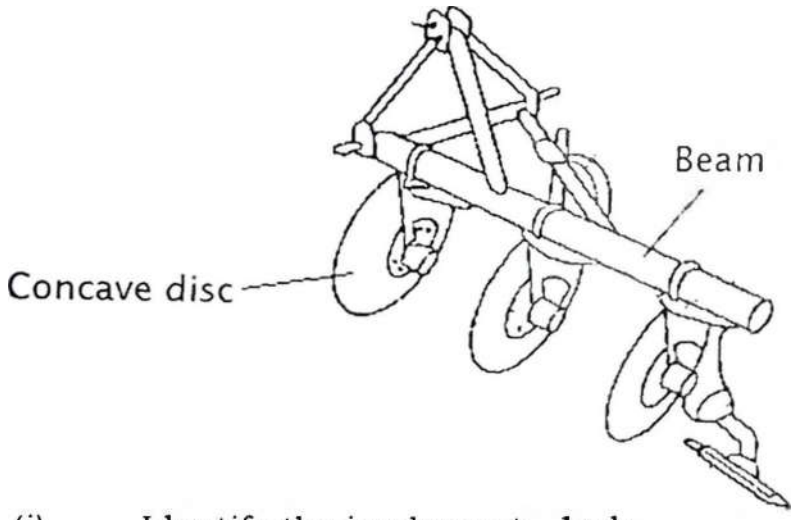
38. Give five long term services to a tractor. 5mks

39. List two categories of tractor drawn implements. 2mks

40. Give five maintenance practices of a trailer. 5mks

41. List two types of ploughs. 2mks

42. The following diagram is an implement used in the farm.



(i) Identify the implement. 1mk

(ii) Give the functions of the following parts of the implement.

(a) The beam. lmk
(b) Disc. lmk
(c) Scrapers. lmk
(d) Standards. lmk
(e) Furrow wheel. lmk

43. List six maintenance practices of disc plough. 6mks

44. Give the functions of the following parts of a mouldboard plough.

(a) Share lmk
(b) Mouldboard, lmk
(c) Disc coulter lmk
(d) Landslide, lmk
(e) Depth whee41 lmk

45. Outline the maintenance practices of mouldboard ploughs. 7mks

46. Give six operational differences between a disc plough and a moulboard plough. 6mks

47. Name three types of harrows. 3mks

48. Describe the maintenance practices carried out on each of the harrows named in (a) above. 14mks

49. What is the use of subsoiler? lmk

50. State the maintenance practices of sub-soilers. 4mks

51. What are ridgers? lmk

52. How can ridgers be maintained? 5mks

53. Give the maintenance practices of rotavators. 5mks

54. Name two types of mowers. 2mks

55. Give two functions of mowers. 2mks

56. State ways of maintaining mowers. 5mks

57. What are planters and seeders? 2mks

58. List the maintenance practices of planters and seeders. 5mks

59. Give the maintenance practices of cultivators. 4mks

60. Give the maintenance practices of Sprayers. 4mks.

61. Name three common implements used for harvesting. 3mks

62. List the maintenance practices of forage harvester. 6mks

63. Describe the parts and functions of an ox-plough. 5mks

64. Outline the maintenance and repair practices of an ox-plough. 6mks

65. Give the maintenance practices of the ox-tine harrow. 4mks

66. Name five animal drawn implements. 5mks

67. List three uses of ox-carts in the farm. 3mks

68. State the maintenance practices of an ox-cart. 4mks

69. List the advantages of using animal drawn implements compared to tractor drawn implements. 4mks

70. Give the disadvantages of using animal drawn implements compared to tractor drawn implements. 6mks

CHAPTER 26
Answers on Farm Power and Machinery

1. Power - This is the amount of work done per unit time.

2. - Human power
   - Animal power
   - Wind power
   - Water power
   - Biomas
   - Solar radiation
   - Electrical power
   - Fossil fuel
   - The tractor.

3. Advantages of animal power.

Does not require skilled labour as compared to engine power.
- Animals are cheaper to buy and maintain compared to tractor engine power.
- Work output from animals is higher than that of human beings.
- Animals can work in hilly areas.
- Animals work better on small holdings than tractors (economical for small scale farmers)

4. Disadvantages of using animal power.

- Animals need a big portion of land for grazing.
  Animals are slower than tractors.
- Animals cannot cope with large amount of land.
- Animals can damage crops during weeding.
  Animals get sick hence reduce their work output.

5. - Most rivers are small and seasonal.
   - It is expensive to harness the power
     Most farms do not have access to large quantities of moving water.

6. Cooking.
   Lighting
   - Used in internal combustion engines.

7. Economical for farmers with enough zero grazing cows.
   - The effluent is a better quality fertilizer i.e. more available nitrogen than manure.
   - Harmful wastes of cows and pigs are removed from zero grazing enclosures.

8. - Initial capital is high.
   Requires high management skills to produce the gas.
   Requires large number of farm animals to sustain the production of the gas.

9. - Drying some farm produce and other materials.
   - Heating water.
   - Distillation of clean drinking water.
   - Cooking.
   - Generating electricity.

10. Engine - This is a mechanical device which converts fuel into mechanical energy.

11. Induction stroke
   - Compression stroke
   - Power stroke
   - Exhaust stroke.

12. Induction stroke — Piston moves down the cylinder causing the inlet valve to open and let in fresh supply of petrol vapour and air into the cylinder.

Compression stroke - Inlet valve closes and the piston moves up the cylinder. The fuel mixture is compressed into the combustion chamber.

Power stroke - A spark is produced at the spark plug. This causes the fuel mixture to ignite and expand resulting in pressure that force the piston down the cylinder.

Exhaust stroke — Piston moves up the cylinder to eliminate the burned fuel mixture through an open exhaust valve.

13. - Engine produces high power and can do heavy work.
- Efficient utilization of fuel and oil.
- Can perform a wide range of farm operations.
- The engine is efficiently cooled with water.
- Exhaust gases are effectively expelled from the cylinders.

14. - They are expensive to buy
- Limited use in some areas.
- Require skilled personnel and support services.

15. - Mowers.
- Chain saws.
- Motor bikes
- Water pumps.

16. - Inlet port.
- Transfer port.
- Exhaust port.

17. (i) Induction and compression stroke.
(ii) Power and exhaustion stroke.

18. - Not expensive to buy and maintain.
Economical in fuel consumption
Can be used in a wider range of farm land.

- Can do small tasks which are uneconomical to do using four stroke cycle engine.

19. - Produce less power hence cannot do heavy duties.
Inefficient in burning fuel.
Are air cooled hence limiting the size of the engine.

20. - Petrol engine.
- Diesel engine.

21.

Petrol engine	**Diesel engine.**
Has a carburetor	Has an injector pump.
Fuel and air are mixed in the carburetor before it gets into the engine.	The fuel and air are mixed within the cylinder.
Fuel is ignited by an electric spark	Fuel is ignited by compression of air and fuel mixture in the cylinder.
Produces little smoke because petrol is completely burnt.	Produces a lot of smoke since diesel is not completely burnt.
Light in weight and suited for light duties.	Relatively heavy in weight and suited to heavy duties.

22. Petrol fuel system has a carburetor.

23. - Clean the carburetor jets regularly.
- Clean the fuel filter by washing in petrol.
- Keep the hole in the fuel tank cap clean.

24. - Replace filters.
- Bleeding to remove trapped air.
- Regular cleaning of sediment bowl.

25. - Maintain level of electrolyte by topping using distilled water.
- Scrap and smear with grease corroded terminals.
- Fix the battery tightly to avoid spillage and damage.
- Fit the battery correctly on the tractor.
- Change the batter correctly on the tractor.
- Empty the battery and keep it upside down for long storage.
- The generator fan belt should be functional to ensure battery is fully charged.

26. (i) Ignition system.

(ii) - Sudden stopping.
- Continuous engine running.

(iii) **Causes of sudden stopping.**

Poor terminal connections.
Faulty ignition system.

Correction measures.

- Proper tightening of the terminals.
- Proper cleaning and readjustment of terminals.

Causes of continuous engine running.

- Broken leads.
- Poor terminal connections.
- Faulty contact breaker

Correction Measures.

- Replace broken leads.
- Regular cleaning of leads.
- Regular tightening of leads

(iv) - Remove carbon deposits on spark plug electrodes.
Replace worn out electrodes.
Clean the contact breaker
Adjust breaker points to lie between 0-30mm-0-50mm.
Replace the condenser regularly.
Keep ignition system dry.

Replace ignition wires with poor insulation.

27. - They are simple to construct.
- They have fins and a fan blade to assist in circulation.
- Are light in weight (have no radiators and water jackets)

28. - They get hot quickly.
- Use heavy lubricating oils.
- Cooling is not adequate under all conditions.

29. - Lubricate the water pump regularly.
- Use clean water in the radiator and remove trash.
- Fit the pipes tightly to avoid leakage.
- Fill the radiator with water before starting day's work.
Check the fan belt tension regularly and adjust accordingly.

30. To supply oil to all parts of the engine where friction is likely to occur.

31. - It increases the efficiency of the machine and reduces the rate of wear and tear in moving parts.
- Reduces the heat created by the rubbing surfaces and acts as a seal between them.
- Acts as a cleaning agent as it washes off dust, dirt, soot and metal chippings from oil paths to the sump.
- Oil prevents rusting of stationery machines.

32. Splash feed type.
Force feed type
Oil mist type.

33. - Do not use old or contaminated oil.
Drain the oil while still hot to avoid sticking on the walls of the sump.
Replace oil filters when necessary.
Use the correct type of oil as per the manufacturers instructions.

34. To transfer power from the tractor engine to the drive shaft, wheel axle, power take off shaft and hydraulic system.

35. (i) - Clutch
- Gear box
- Differential
- Final drive

(ii) - Clutch - connects or disconnect the drive shaft to or from the engine.

Gear box - provides different forward speeds and allow the driver to select forward or reverse gear.

Differential - allows change in direction of the drive to right angles so that power is transmitted to the rear wheels.

Final drive. Propels the tractor either forward or backward enabling the tractor to move and do useful work.

36. Tractor servicing - These are practices carried out on a tractor to keep it in good and efficient working condition and increase its lifespan.

37. Short term tractor services.

Check the engine oil daily by use of a dip stick and if low, should be added.

Check the fuel level at the start of every days work and add if necessary.

Inspect the water level in the radiator and if possible top up.

Check the level of electrolyte daily and if the level is low, top up with distilled water.

Tighten loose nuts and bolts daily and replace the lost nuts and bolts.

Grease using grease gun.

Remove large sediments from the sediment bowl.

Check the tyre pressure every morning using a pressure gauge and inflate or deflate as required.

Check the fan belt tension and ensure that it deflects between 19cm to 25cm when pushed.
Grease the brake shaft bearing.
Ensure the brake fluid level is maintained at the recommended level.

38. Long term service.
The engine oil should be drained completely from the sump and replaced with new oil.
Inspect and refill the steering gear box oil if the level goes down.
Replace the oil in the differential.
Grease the linkage and the pulley attachment.
Check the pulley oil and add if the level is low.
Remove and replace dirty oil.

39. - One point hitch implements.
- The three point hitch implements.

40. - Lubricate moving parts.
Check the tyre pressure regularly and adjust to the correct pressure.

41. Disc ploughs
- Mouldboard ploughs.

42. (i) Disc plough.
(ii) a) The beam — Provides attachment for all parts of the plough.
(b) Disc - cut, turn and invert the furrow slices.
(c) Scrapers - Remove wet soil from the disc.
(d) Standards - They connect the disc to the plough beam.
(e) Furrow wheel - balancing the whole implement.
- Adjust depth of ploughing.

43. Maintenance practices of disc plough.
- Lubricate the hubs and furrow wheels.
- Clean the plough after a day's work.
- Repair broken discs.
- Sharpen the discs when blunt.
- Smear old engine oil to the unpainted parts during long storage.
- Tighten loose nuts and bolts.

44. (a) Share - Makes a horizontal cutting on the furrow slice.
(b) Mouldboard - Completes the turning of the furrow slice.
(c) Disc coulter - Cuts the furrow slice separating it from the unploughed land, and also cuts trash.
(d) Landslide - Counteracts pressure exerted by furrow slices on the mouldboard and share
- Makes the plough steady.
(e) Depth wheel - controls the depth of ploughing.

45. - Lubricate moving parts.
- Keep the shares tight and sharp.
- Tighten loose nuts and bolts.
- Scrap all trash and wet soil.
- Coat unpainted parts with old engine oil for long storage.
- Replace worn out parts.
- Check the nuts and belts daily.

46. Operational differences between disc and moulboard ploughs

Disc plough	Mouldboard plough
1. Can be used on a field with obstacles.	Cannot be used on a field with obstacles.
2. Does not invert the furrow slices completely.	Inverts the furrow slices completely.
3. More secondary operations necessary after using disc plough	Fewer secondary operations needed.

4. Cuts at varying depth.	Operates on a uniform depth.
5. Easily broken by obstacles as it is rigid.	Not easily broken by obstacles as it rides over them.
6. Requires less power to pull when operating.	Requires more tractor power when operating.

47. - Disc harrow.
    - Spring tine harrow.
    - Spike tooth harrow.

48. (i) Maintenance of a disc harrow.
    - Lubricate the disc bearing after days work
    - Repair/replace damaged disc.
    - Remove trash / soil from the harrow after use.
    - Apply old engine oil on unpainted parts for long storage.
    - Check the bolts and nuts.
    - Tighten loose bolts and nuts.

    (ii) Maintenance of spring tine harrow.
    - Replace worn-out parts.
    - Tighten loose bolts and nuts.
    - Replace lost bolts and nuts.
    - Clean the harrow after days work.
    - Oil the unpainted parts during long storage.

    (iii) Maintenance of spike toothed harrow.
    Replace worn-out parts.
    Clean after days work
    Tighten loose bolts and nuts.
    Oil unpainted parts for long storage.

49. Sub-soiler is used for breaking the hard pans and facilitate aeration and water infiltration in the soil.

50. - Replace / repair worn-out parts.
- Oil unpainted parts for long storage.
- Clean the subsoiler after days work.
- Store under shed when not in use.

51. Ridgers. - These are implements for making ridges.

52. - Scrap the soil sticking on the mouldboards.
- replace worn-out shares.
- repair broken shares.
- Store in the shed when not in use.
- Tighten loose bolts and nuts.
- Oil unpainted parts to prevent rust.

53. - Clean after days work.
- Replace worn-out parts.
- Lubricate moving parts.
- Oil unpainted parts during long storage.
- Tighten loose bolts and nuts.

54. Name two types of mowers. 2mks
- Reciprocating mowers.
- Rotary (Gyro mower) mowers.

55. Give two functions of mowers. 2mks
- Cutting grass for hay making/cutting silage crops
- Clearing vegetation before ploughing.
- Cutting grass into lawns.

56. - Sharpen the blades of cutting knife.
Replace worn-out blades.
Tighten loose nuts and bolts.
Lubricate moving parts.
Clean the mower after days work.
Replace worn out guard.
Oil unpainted parts during long storage.

57. Planters and seeders are machines used for placing seeds at the correct spacing, depth and density in order to obtain required plant population per hectare.

58. - Lubricate moving parts.
- Clean seed hoopers and fertilizer containers after use.
- Tighten loose nuts and bolts.
- Repair broken parts.
- replace worn-out parts.
- Unblock coulter tubes for efficient seed passage.

59. Maintenance practices of cultivators.
- Tighten loose bolts and nuts.
- Remove trash after use.
- Repair broken parts.
- Replace worn-out tines.
- Keep the implement in the shed during long storage.

60. Maintenance of sprayers.
Drain the tank after use.
Check for cracks on the hand lance.
Clean blocked nozzles.
Wash the tank and other parts thoroughly.
Clean and paint all parts prone to rusting.

61. - Combine harvesters for grain crops.
- Root crop harvesters (Ridgers).
- Forage ha westers.

62. - Lubricate moving parts.
- Sharpen cutting edges.
- Tighten loose bolts and nuts.
- Remove trash and dirt after use.
- Keep the implement in the shed.
- Oil to prevent rusting during long storage.

63. (i) Beam - attaches all parts of a plough and adds weight to the plough for better penetration.
(ii) The handles - enable the operator to set the implement in the proper direction when ploughing.
(iii) The mould board - inverts the furrow slices.
(iv) Share - cuts the furrow slice horizontally.
(v) Landside - presses against the wall of the unploughed land and helps to stabilize the plough.
(vi) Land wheel - regulates the ploughing depth.
(vii) Draft rod - forms the draught mechanism of the plough.

64. Lubricate the land wheel bearing.
- Repair/replace worn-out shares.
- Sharpen the blunt shares by hammering.
- Tighten loose bolts and nuts before days work.
- Apply old engine oil during long storage to prevent rust/or use anti-rust substance.
- Keep the implement under shade.

65. - Repair/replace broken and worn-out tines.
- Clean the implement after use.
- Store the implement in a shed.
- Apply oil for long storage.

66. - Ox-plough.
- Seeders.
- Cultivators.
- Mowers.
- Carts.
- Ox-tine harrows.

67. - To transport produce from the farm to the store or market.
- Transport purchased goods from stockists to the farm.
- Transport water from the source to the farms

68. - Oil / grease moving parts to reduce friction and wearing.
Repair/replace worn-out pads on the yoke.
Check and adjust the tyre pressure accordingly.
- Repair other damages on the cart.

69. - Initial cost of purchasing is lower.
- Requires less skills to operate.
- The repairs and maintenance are less expensive.
- Can be used in areas where tractors cannot eg. Steep land.

70. - They are more tedious.
- Requires more than one person.
- They are slower.
- Animals get tired.
- Some diseases make it difficult to use animals in some areas.
- Requires more land to grow fodder crops or pasture for the animals.

CHAPTER 27
Questions on Agricultural Economics III (Production Economics)

1. Define the following terms.
   (i) Economics. 2mks
   (ii) Production economics. 2mks

2. Define the following terms.
   (i) Micro-economics 2mks
   (ii) Macro-economics. 2mks

3. List five parameters that can be used to measure the national economic development. 5mks

4. Define National Income. 2mks

5. Distinguish between household and firm. 2mks

6. Define the following terms.
   (i) Gross domestic product (GDP). 2mks
   (ii) Gross National Product (GNP) 2mks

7. Define the following terms.

   (i) Gross National Income (GNI) 2mks
   (ii) Per Capita Income 2mks

8. State six ways in which agriculture contributes to national development. 6mks

9. List four factors of production. 4mks

10. What is meant by factor of production? 2mks

11. Give two contexts in which land is viewed as in agricultural economics. 2mks

12. List two types of labour. 2mks

13. Mention four ways on how to improve labour productivity. 4mks

14. Define the term capital. 2mks

15. Name three types of capital 3mks

16. List three sources of capital. 3mks

17. Outline seven functions for a manager in the farm. 7mks

18. Mention five qualities of a good farm manager. 5mks

19. Define the term Production Function (PF). 2mks

20. Name three properties of inputs. 3mks

21. List two types of inputs.

22. Describe the characteristics of variable inputs. 4mks

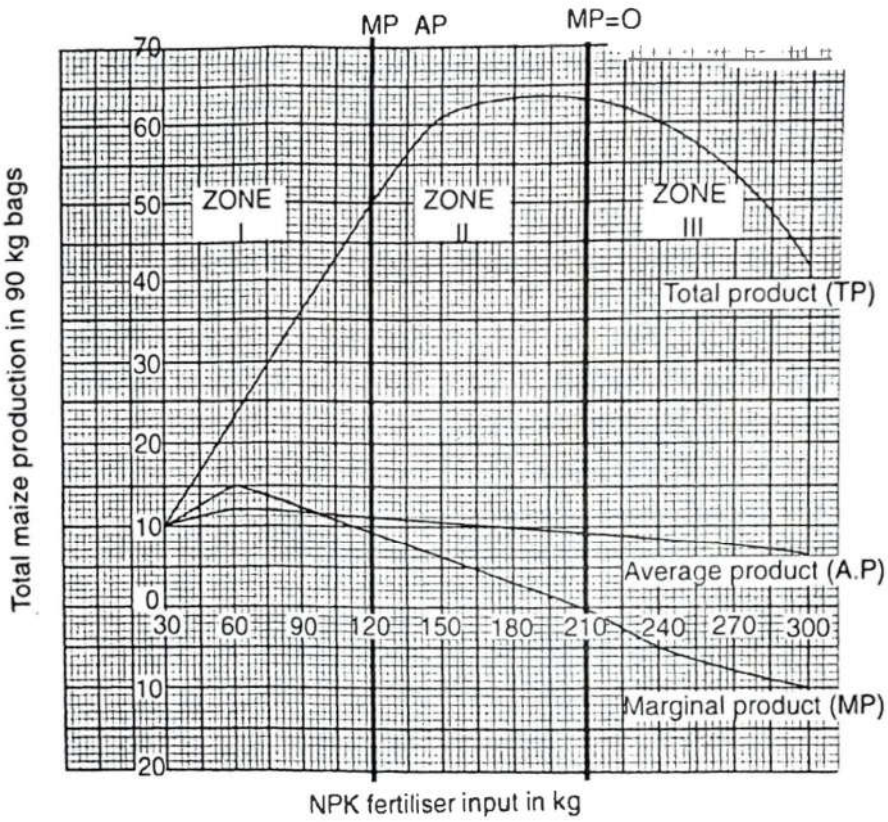
23. Describe the characteristics of fixed inputs. 4mks

24. Distinguish between marginal products and marginal inputs. 2mks

25. Name three types of production function. 3mks

26. State the law of Diminishing Returns.

27. The following is a graph showing zones of a production function curve.



(i) Name the three zones labeled zone (I), zone (II) and zone (III). 3mks

(ii) Which is the most economical zone to operate? lmk

28. State the principle of substitution. 2mks

29. What is input-input relationship? 2mks

30. State three ways in which inputs can be combined. 3mks

31. Define product - Product relationship. 2mks

32. State four examples of product - product relationship.

33. State the principle of equi-marginal returns. 2mks

34. Define the term cost. 2mks

35. Mention three roles of cost. 3mks

36. Name eight types of cost and for each state what it means. 8mks

37. Define the term revenue. 2mks

38. State three types of revenue. 3mks

39. What is farm planning? 2mks

40. Outline the factors to consider when drawing a farm plan. lOmks

41. Distinguish between budget and budgeting. 2mks

42. Name two types of farm budgets. 2mks

43. State the importance of farm budgeting. 7mks

44. List the guidelines followed when preparing a complete budget. 9mks

45. List eight agricultural support services available to the farmer. 8mks

46. Give five advantages of banking to a farmer. 5mks

47. Name three categories of credit. 3mks

48. List six sources of credit to a farmer. 6mks

49. State six problems associated with credit to a farmer. 6mks

50. State the main objectives of agricultural research. 6mks

51. Distinguish between risks and uncertainties. 2mks

52. List eight types of risks and uncertainties. 8mks

53. Give seven ways in which a farmer may adjust to uncertainties and risks. 7mks

54. What is meant by tractor hire service? 2mks

55. Name four areas from where a farmer may hire tractor services. 4mks

56. Give the advantages of tractor hire services. 3mks

57. State two disadvantages of tractor hire services. 2mks

58. What are joint products in a farm business? 2mks

59. Give examples. 6mks

60. Describe the following:
    (i) Competitive products. 2mks
    (ii) Supplementary products. 2mks
    (iii) Complimentary products. 2mks

61. The table below shows data on the effect of labour inputs on onion yields in kg/ha.

Unit of labour input	Onion yield (kg
0	0
10	840
20	1900
30	4000
40	4600
50	5700
60	4600

(a) Calculate the marginal product of labour;
   (i) Between 40 and 50 units of labour input (lmk)
   (ii) Between 50 and 60 units of labour input (lmk)

(b) Assuming that the cost of labour is kshs 3000 per 10 units and the price of onion is kshs 60
Per kg. Calculate the value of onion produced against the corresponding units of labour inputs (7 mks)

Unit of labour input	Value of onions(kshs)
0	
10	
20	
30	
40	
50	
60	

62. Name any two examples of working capital in maize enterprises (2mks)

63. Give two reasons why both the household and the firm are important in the economic development of a country (2mks)

64. Give two ways in which labour peak constraint can be overcome in the farm (2mks)

65. Explain five methods in which extension services and information can reach farmers (5mks)

66. State two ways of production functions (2mks)

67. Under what conditions is a partial budget an appropriate tool for planning (4mks)

68. A farmer has 160 ha of land; 60ha is under wheat, 32 ha under maize, 12 ha under fodder
Crops and the rest on pasture. He wishes to know whether replacing 12 ha of maize with Irish
Potatoes in the following year are worthwhile. The fertilizer rate would have to be increased
From 5 bags per ha for maize to 7 bags per ha of Irish potatoes. An extra 100 man days of casual labour per ha will be required for the change. The average yield of maize and potatoes is 45 and 115 bags /ha respectively. The prices are 1400/= per bag of maize, 1200/= per bag of Irish potatoes. Seed costs are 2500/= for maize per ha and 30000/=per ha for Irish potatoes. Fertilizers costs are 1300/= per bag. labour is paid at 150/= per man day.
Draw a partial budget and indicate the effect s of the change (10 mks)

69. List two determinants of national income (2mks)

CHAPTER 28
Answers on Agricultural Economics III (Production Economics)

1. (i) Economics - This is the study of how man chooses to allocate scarce productive resources to produce goods and services.
   (ii) Production Economic - This is the study of how the resources (factors of production) are combined in a production process to produce goods and services.

2. (i) Micro economics - This is the study of economic activities at the individual level.
   (ii) Macro-economics - The study of economic activities at the national level.

3. - National income.
   - Per capita income
   - Level of technology.
   - Literacy levels.
   - Gender parity at all level of human activities.

4. National income - This refers to the total value of all goods and services produced by the citizens of a country in a given year.

5. Household is a unit comprising the farmer and members of his family.
   Firm - This is a business unit involved in production.

   (i) Gross Domestic Product - This is the total of goods and services produced by a country within a period of one year.

(ii) Gross National Product (GNP) - This is the total output from resources owned by the nationals of a country wherever the resources are located.

7. (i) Gross National Income (GNI) - Refers to the total output from resources expressed in monetary terms.
(ii) Per capita income. - This is the average income of the citizens of a country.

8. - Creates employment.
- Provides capital
- Food supply.
- Provides foreign exchange earnings.
- Supply raw materials to industries.
Provides market for industrial goods.

9. - Land
- Labour
- Capital
- Management.

10. A factor of production is anything that contributes directly to the output.

11. - Ability to produce crops and livestock.
- space for construction of buildings, industries etc.

12. - Human labour.
- Hired labour.

13. - Training
- Farm mechanization.
- Giving incentives and improve terms and conditions of service.
- Labour supervision.

14. Capital - This refers to all man made assets that are used in the production of desired goods.

15. - Liquid capital.
    Working capital
    - Fixed /durable capital

16. - Savings.
    - Credit facilities.
    - Grants.

17. - Short term planning.
    - Long term planning
    - Information gathering.
    - Comparing the standards of one's enterprises with the set standards.
      Detecting weakness and constraints and finding ways and means of overcoming them.
    - Keeping farm records and using them in the day to day running of the farm.
    - Implementing farm decisions and taking responsibility.

18. - Should have knowledge about specific agricultural principles, marketing and accounting.
    - Hardworking and time conscious.
    - Should have practical farming skills.
    - Should be responsible, dynamic, prudent, competent and ambitious.
    - should be flexible in decision making in order to adjust to the changing social and economic trends.

19. Production function (PF) - this is the physical relationship between inputs and outputs.

20. - Physical properties.
    - Chemical properties.
    - Biological properties.

21. _ Variable inputs.
    - Fixed inputs.

22. Characteristics of variable inputs.
    Changes in quantity required with the level of production in a given time.
    Are added to fixed inputs for production.
    Their cost value depends on the kind and quantity used (Have variable cost)
    Are allocated to specific enterprises.
    Their cost value is used to calculate the gross margins of various farm enterprises.

23. Characteristics of fixed inputs.
    - Constancy (fixed costs)
    - Does not vary with level of production in a given time.
    - Cost not normally allocated to specific enterprises.

24. Marginal Product - This is the additional return realized above the previous total product.
    Marginal inputs - These are additional inputs above the previous inputs.

25. Three types of Production Functions.
    - Increasing returns production function.
    - Constant returns production function.
    - Decreasing returns production function.

26. The law of diminishing returns states that if successive units of one input are added to fixed quantities of other inputs, a point is reached when additional and average product per additional unit of input will decline.

27. (i) Zone (I) - Irrational zone of production.
    Zone (II) - Rational zone of production.
    Zone (III) - Irrational zone of production.

    (ii) Zone (III) - Rational zone of production.

28. Principle of substitution - It states that if the output is constant, it is profitable to substitute one input factor for another as long as it is cheaper than the one being substituted.

29. This is the way the factor inputs are combined in production to maximize profits or revenue.

30. - Fixed proportions.
- Constant rate of substitution.
- Varying rate of substitution.

31. Product - Product relationship is the combination of enterprises with the aim of maximizing revenue.

32. - Joint products.
- Competitive products.
- Supplementary products.
- Complimentary products.

33. Principle of equi-marginal returns states that the limited amount of resources should be allocated in such a way that the marginal return to those resources is the same in all alternative uses to which they are put.

34. Cost - This is the price paid for goods used and services rendered in a production process.

35. - It relates to the production of a given quantity of a product in a given period of time.
- They help to indicate the most profitable level of production.
- They are used to calculate gross margins.

36. (i) Fixed costs (FC - These are inputs costs which do not vary with the level of production e.g. rent.

(li) Variable costs (VC) - These are inputs costs that vary with the level of production e.g. costs of feeds.

(iii) Total Costs (TC) - This is the sum of all fixed and variable costs used in the production of a given quantity of a product i.e. TC = FC + VC.

(iv) Average Cost (AC) - This is the total cost divided by the number of units of input i.e. AC = $\frac{TC}{Y}$

Where Y is the number of units of inputs.

(v) Average variable cost (AVC) - This is the total variable costs divided by the total output i.e. AVC = $\frac{VC}{Y}$

Where Y is the output.

(vi) Average fixed cost (AFC) - This is the total Fixed costs divided by the total output. AFC = $\frac{FC}{Y}$

(vii) Average total cost (ATC) - This is the sum of the average variable cost and the average fixed costs i.e. ATC = AFC + AVC.

(viii) Marginal cost (MC) - This is the extra cost incurred in the production of an additional unit of output, i.e.

$$MC = \frac{AVC}{Y}$$

Where A (Delta) = change
VC = variable cost
Y = output.

37. Revenue - This is the amount of money got from the sale of produce.

38. (i) Total Revenue (TR) - This is the total physical product multiplied by the unit price of the product i.e.

R = Qy x Py where R = Revenue
Q = Quantity of commodity.
P = Price per unit of commodity.

(ii) Net Revenue (NR) - This is the difference between the total revenue and the total costs of production, i.e. profit
NR = TR - TC where NR - Net revenue
TR = Total revenue
TC = Total cost

(iii) Marginal Revenue (MR) - This is the extra income obtained from the sale of one additional unit of output.

39. Planning - This involves establishing organizational objectives and defining clearly the means of achieving them.

40. - Size of the farm.
- Environmental factors
- Current trends in labour market.
- Farmers objectives and preferences.
- Possible production enterprises.
- Existing market conditions and price trends.
- Availability and cost of farm inputs.
- Government regulations / policy.
- Security.
- Communication and transport facilities.

41. Budget - This is an estimate of the future income and expenses.
Budgeting - This is the process of estimating the future results of a farm plan.

42. - Partial Budget.
- Complete Budget.

43. - Helps the farmer in decision making.
- Enables the farmer to predict future returns.
Helps the farmer to avoid incurring losses.
- Enable farmers to secure loans.
- Ensures a periodic analysis of the farm business.
- Acts as a record for future reference.
- Pinpoints efficiency or weakness in farm operations.

44. Guidelines in preparing complete budget.
- Formulate farming goals.
- Take farm inventory.
- Planning for resources.
- Estimating production.
- Estimating income and expenditure.
- Analyzing input - output relationships.
- Analyzing production weaknesses in the farm.
- Make a number of alternative farm plans and choose one for adoption.
- Put the best chosen plan into operation and supervise its implementation.

45. - Extension and training.
- Banking
- Credit
- Artificial insemination (AI) services
- Agricultural Research.
- Marketing.
- Veterinary Services.
- Farm inputs supplies.

46. - The money is safer in the bank than in the farm.
A cheque can be used as evidence of payments if a dispute arises.
- Easier to,write a cheque where large sums are involved.
A farmer can get credit in form of overdrafts
- Bank offers advice to farmers on how to use credit given for maximum returns.

- Bank statement can be used as evidence of financial worthiness in respect to credit or lease.

47. Short term credit.
Medium term credit.
- Long term credit.

48. - Cooperative Societies.
- Crop boards.
- Commercial Banks
- Agricultural finance corporation (AFC).
Settlement fund trustees.
- Hire Purchase Companies.
Individuals.
- Insurance Companies.
- Traders.

49. - Lack of collaterals/security.
Loans may be diverted to other uses.
High interest rates.
Non payment may lead to land/other assets used as security being auctioned.
Misappropriation/misuse of funds due to lack of knowledge / skills in managing credit.
Lack of proper farm records make it difficult to acquire loans / credit.

50. Objectives of agricultural research:
- Improve crop and livestock production techniques.
Develop improved varieties of crops and livestock.
Improve pasture and fodder quality.
Develop techniques for controlling diseases and pests.
Determine suitable ecological zones for various crops.
Coordinate research work to avoid duplication of work.

51. Risks - This is the divergence between the expected and actual income.
Uncertainty - This is the imperfect knowledge about future events or outcome due to uncontrollable variables.

52. - Fluctuation of commodity prices.
Physical yield uncertainty.
Ownership uncertainty.
Outbreak of pests and diseases.
Sickness and injury uncertainty.
New production technique uncertainty.
Obsolescence (obsolete machinery).
Natural catastrophies e.g. floods, droughts etc.

53. Diversification.
Selecting more certain enterprises.
Contracting.
Insurance.
Input rationing.
Flexibility in production methods.
Adopting modern methods of production.

54. Tractor hire services - This involves hiring of tractors and implements by farmers who do not have them.

55. Government Tractor Hire Service.
Private Contractors.
Individual farmers.
Cooperative societies.

56. Farmers can get access to tractor services.
Farmers do not incur the cost of servicing and maintaining the tractor and its implements.
The services are more efficient than hand tools.

57. - They are not available to most farmers when needed.
Some farmers may be overcharged by private and individual farmers.

58. Joint Product - This is a situation whereby a farmer aims at producing one product but automatically ends in getting another product.

59. Examples of joint products.
Wool and mutton.
- Mutton and skin.
- Cotton lint and cotton seed.
- Milk and butter
- Beef and hides.
- Honey and wax.

60. (i) Competitive Products - This is a situation where the production of one product increases while reducing the production of another product.
(ii) Supplementary products - A situation whereby one product may be increased without decreasing the other.
(iii) Complimentary products - A situation where an increase in the production of one product leads to a simultaneous increase in the production of the other.

61. (a) (i) 5700 - 4600 = 1100kg
ii 4600 - 5700= - 1100kg

Unit of labour in ut	Value of onion in kshs
0	0
10	50400
20	114000
30	240000
40	276000
50	342000
60	276000

62. - fertilizers
- Tractor fuel
- Pesticides
- Herbicides

63. - generate income to farmers / capital to farmers
- creates employment
- They finance expansion of firm /industries
- Earns government revenue for national development

64. - overtime working for casual labourers
- Creative use of casual laborers
- Mechanization e.g. wheat harvesting
- Use of contractor
- Device new techniques of doing work
- Device cropping systems where ripening of crops will be at different times

65. - radio broadcasts
- Television documentaries
-Cinemas/ video shows
-Newspapers, magazines, letters, posters
-Agricultural shows
-Field demonstrations
-Workshops, seminars, meetings,
-Public lectures, conferences
-In service training
-Project and farm visits
-Consultancy services

66. -Increasing returns
-Decreasing returns
-Constant returns

67. -when expanding an enterprise / changing the size of an enterprise
-When changing the production techniques
-When changing the size of land under a crop
-When changing an enterprise / introducing a new enterprise / substituting one enterprise to another

68. PARTIAL BUDGET

DEBIT (-) KSHS	CREDIT (+) KSHS
(1) Extra costs of	(i)Extra revenue of potatoes
Potatoes	Potato yields
(i)fertilizers 7*12*1300	1.1.5*1.9*1.200
=109200	=1656000
(ii) labour 100*12*150	(ii) cost saved
=180000	Fertilizer 5* 1.2* 1.300= 1.08000
(iii)seeds 30000*12	(iii)seeds 2500*12=30000
360000	
SUBTOTAL 649200	SUBTOTAL = 138000
Revenue foregone	Extra revenue + costs saved
Maize yields	138000 + 1656000
45*12*1400	=1794400
= 756000	
Extra cost + Revenue foregone	
649+756000	
1405200	

Therefore (extra revenue + cost saved) - extra costs + Revenue foregone
= 1794400 - 1405200
388800/=
This indicates a profit hence the proposed change is worthwhile

69. - per capita income
- Gross domestic product (GDP)
- Gross national product (GND)

CHAPTER 29
Questions on Agricultural Economics IV (Farm accounts)

1. List four financial documents that a farmer may use. 5mks

2. Briefly explain the documents named in question 1 above. 4mks

3. Name four financial books/books of accounts. 4mks

4. Give the two groups of inventory records. 2mks

5. Name two subsidiary books of the journal. 2mks

6. List three types of financial statements. 3mks

7. Explain each of the statements named in question 6 above. 3mks

8. Define the term liability. 2mks

9. Give two types of liabilities. 2mks

10. State four examples of liabilities. 4mks

11. What are assets? 2mks

12. Name two types of assets. 2mks

13. Distinguish between solvent and insolvent. 2mks

14. What is meant by:
    (i) Closing valuation. 2mks
    (ii) Opening valuation. 2mks

15. Briefly describe the use of the following financial documents.
    (i) invoice
    (ii) receipt

16. Briefly describe the use of the following financial documents.

    (i) delivery note
    (ii) purchase order

17. (a) Use the following information to prepare a balance sheet for Mwangi farm for the year ending 31st December 2012.

The farm obtained on credit a tonne of manure at K.shs 1200
2 (50kg) bags of DAP at 2400/= each
Livestock feed 12,800/=
Wages to casual workers 3,800/=
Interest on loan 1,500/=
Bank loan 80,000/=
Milk deliveries to KCC 13,600/=
Sold incalf heifer 18,000/=
Sold 2 bull calves 9,600/ =
Maize to NCPB 16,000/=
Inputs in store 5,500/=
Dairy animals 126,000/=
Farm buildings 75,000/=
Tools and equipments 75,000/ =
Land 420,000/=
Cash in bank 61,500/=
Cash in hand 6,600/= 12mks

b). Is the business solvent or insolvent. lmk

18. The owner of Kirangi farm made the following purchases in 2012.

Feeds - 2,000/ =
Seeds - 1000/=
Fertilizer - 1,300/=
Fuel - 1,500/ =
Disc plough 100,000/ =
He also sold the following:
Wheat-4,000/ =
Cabbages - 35,000/ =
Milk - 10,000/ =
Delivered firewood - 6,000/ =

The farms opening valuation was 120,000/= while the closing valuation was 16,000/=.

(i) Prepare a profit and loss account for Kirangi farm for the year ending 2012.

(ii) Did the farm make a profit or loss?

19. The inventory of faulu farm as at 31st December 2007 was as follows

Cash at hand	10,000/ =
Land	400,000/ =
Buildings	100,000/ =
Machinery	500,000/ =
Mature cows	200,000/ =
Calves	20,000/ =
Layers	30,000/ =
Maize in store	6,000/ =
Potatoes	10,000/ =
Cooperative loan	200,000/ =
Delayed milk payment	9,000/=
Eggs supplied to Mara lodge	6,000/ =
Vegetables sales on credit	5,000/ =
Fertilizers brought on credit	8,000/ =
Pesticides	2,500/=
Interest receivable	1,000/ =
Wages payable	4,000/ =

Tax payable	500/=
Cash in the bank	25,000/=
Interest payable	2,500/ =

(a) Prepare a balance sheet for the farm (14mks)

(b) State whether the farm is solvent or insolvent (1 mk)

(c) State the importance of a journal as a financial book of accounting (5mks

20. The table below shows entries from the accounting books of Riasa farm at the end of the year 2001

Item	Amount in ksh
Sale of bull calve	16700
Purchase of animal feeds	21720
Veterinary bills	480
Sale of culled cows & heifers	30000
Opening valuation	22000
Sale of manure	9000
Milk sales	36450
rent	12000
Closing valuation	25000
Purchase of sprayers	5300
Debts payable	2400
Debts receivable	4750

Using the information above draw a profit and loss account for the year ending 2001

(i) Calculate the profit or loss incurred by the farmer fop the year

(ii) What is the use of profit and loss account in agro-business?

(c) List two books of accounts kept by a farmer (2mks)

(d) Give two ways of improving labour on the farm (2mks)

21. Describe the uses of financial documents commonly found on the farm (4mks)

22. Give any four details contained in a particular purchase order (4mks)

23. Give two uses of a balance sheet (2mks)

24. Name two examples of liabilities in a balance sheet (2mks)

25. Under what conditions is a business described as solvent (lmk)

CHAPTER 30
Answers on Agricultural Economics IV (Farm accounts)

1. Invoice
   Receipt
   Delivery note
   Purchase order.

2. (i) Invoice - This is a document used when goods are delivered on credit.
   (ii) Receipt - This is a document issued when cash payments for goods delivered and services rendered are made.
   (iii) Delivery note - This is a document that accompanies goods on delivery and serves as evidence that the goods have been physically delivered.
   (iv) Purchases order - This is a request to a trader to supply specific goods.

3. Ledger
   Inventory
   Cash book
   Journal

4. Consumable goods inventory records.
   Permanent goods inventory records.

5. Purchase Book
   Sales Book

6. Balance sheet.
   Profit and loss account
   Cash analysis.

7. (i) Balance sheet - This is a financial statement drawn to show the financial position of the farm business at a particular period of the year.
   (ii) Profit and loss account - It is a financial statement showing whether the business made a profit or loss,
   (iiij Cash analysis - It is a financial statement drawn to show the receipts and payment of cash in the business.

8. Liability - These are all the debts that the farmer or business owe other business firms.

9. Long term liability.
   Current liability

10. Loans and mortgages
    Bank overdrafts
    Debts payable
    Services paid to the business in advance.

11. Assets - These are property owned by the business and have a monetary value attached to them.

12. Fixed assets.
    Current assets.

13. Solvent - A business is said to be solvent when the value of assets exceeds that of the liabilities.

    Insolvent - a business is said to be insolvent when the liabilities exceeds the value of assets.

14. What is meant by:
    (i) Closing valuation - These are all the assets in the farm/business by the end of the financial year.
    (ii) Opening valuation - These are all the assets in the farm / business by the beginning of the financial year.

15. (i) Invoice - It is used to inform the buyer of the goods delivered and debits the buyer.
(ii) Receipt - It is used to show that payment has been made.

16. (i) Delivery Note - It is used as evidence that goods have been physically delivered from the supplier to buyer,
(ii) Purchase order - It is used to request a trader to supply specific goods.

17. (a) MWANGI FARM BALANCE SHEET AS AT 31ST DECEMBER 2012

LIABILITIES	SHS.	CT.	ASSETS	SHS.	CT
Current liabilities			Cash at hand	6,600	00
Debts payable			Cash at bank	61,500	00
Manure	1,200	00	Milk sales	13,600	00
2 DAP @ 2400	4,800	00	Sales of heifer	18,000	00
Livestock feed	12,800	00	Sale of bull calves	9,600	00
Wages	3,800	00	Maize	16,000	00
	22,600	00	Inputs in s tore	5,500	00
Bank loan	80,000	00	Dairy animals	126,000	00
Interest on loan	1,500	00	Farm buildings	75,000	00
	81,500	00	Tools and Equipment	75,000	00
Total liabilities	104,100	00			
Net worth	722,700	00			
TOTAL	826,800	00	TOTAL	826,800	00

(b) Solvent

18. PROFIT AND LOSS ACCOUNT FOR KIRANGI FARM FOR THE YEAR ENDED 31ST DECEMBER 2012

EXPENDITURE			INCOME		
	Shs	Cts		Shs	Cts
Opening valuation	120,000	00	Sales and Receipts		
Purchases			Wheat	40,000	00
Feeds	2,000	00	Cabbages	35,000	00
Seeds	1,000	00	Milk	10,000	00
Fertilizer	1,300	00	Firewood	6,000	00
Fuel	1,500	00			
Disc plough	100,000	00	Closing valuation	160,000	00
TOTAL	225,800	00	TOTAL	251,000	00
NET PROFIT	25,200	00			
	251,000	00		251,000	00

(b) It made a profit.

19. (a)

BALANCE SHEET FOR FAULU FARM AS AT 31/12/2007

LIABILITIES			ASSETS		
Current liabilities			Current assets		
Fertilizers on credit	8000	00	Cash at hand	10000	00
Pesticides on credit	2500	00	Cash in bank	25000	00
Interest payable	2500	00	Interest receivable	9000	00
Wages payable	4000	00	Milk payment	9000	00
Taxes payable	500	00	Eggs sales	6000	00
total	17500	00	Vegetables sales	5000	00
			Maize in store	6000	00
Long term liabilities			layers	30000	00
Cooperative loan	200000	00	Mature cows	200000	00
Total liabilities	217500	00	calves	20000	00
			total	320000	00
Net worth	1102500	00	Fixed assets		
			land	400000	00
			machinery	500000	00
			Buildings	100000	00
			total	1000000	00
TOTAL	1320000	00		1320000	00

(b) The farm is solvent

(c) - records information on credit of capital investments
- records the sale on credit of investments

- Rectification or cancellation of errors or old entries
-transfers from two accounts to another in the ledger
-opening entries in new books
- used as a first entry for transaction in connection with issues of shares by a joint stock Company and by partnership

20. (a) profit and loss account for riasa farm for the year ending 31/12/2001

Purchases and expenses sales and receipts

	shs	cts		shs	Cts
Opening valuation	22000	00	Sell of bull calves	16700	00
Purchase of feeds |	21720	00	Sale of cows & heifers	30000	00
Purchase of sprayers	5300	00	Sale of manure	9000	00
Veterinary bills	480	00	Sale of milk	36450	00
Debts payable	2400	00	Debts receivable	4750	00
Rent	12000	00	Closing valuation	25000	00
Total	62900	00			
		00			
PROFIT	59000	00			
	121900	00		121900	00

(b)(i) Yes (it made a profit)
(ii) 59000

(c) A financial statement showing whether the business made a profit or loss

(d) -ledger
-inventory
-Cash book
-journal

(e) - Training workers
- Farm mechanization
- Giving incentives
- Labor supervision
- Improving terms and cor di ioi of service

21. Invoice - issued against goods delivered on credit
Receipts - issued when cash payment for goods delivered or services are made
Delivery note - accompanies goods on transit
Purchase order - a request to a trading business firm to supply goods

22. Give any four details of a purchase order
- Types of goods required
- Quantities of goods
- Date of order
- Date when order is to be delivered
- Name of the one who orders
- purchase order serial number

23. - Gives the financial position of a firm
- compares the liquidity of various firms

24. Unpaid expenses e.g. rent, water, electricity bills, telephone bills, bank loans, bank overdrafts

25. When assets exceed liabilities

CHAPTER 31
Questions on Agricultural Marketing and Organisation

1. Define the term market. 2mks

2. Distinguish between a perfect and imperfect market. 2mks

3. List three types of markets. 3mks

4. State five characteristics of monopolistic competition markets. 5mks

5. Give two main requirements of a purely competitive market. 2mks

6. Define the term marketing. 2mks

7. What are marketing functions? lmk

8. Define the term service, lmk

9. Mention ten processes involved in marketing.

10. Distinguish between grading and standardization. 2mks

11- Name eight marketing agencies and organizations. 8mks

12 List four special characteristics of agricultural products. 4mks

13. Outline eight problems faced by farmers when marketing agricultural produce. 8mks

14. Define the term Price. 2mks

15. List three factors that affect price. 3mks

16. Define the term demand. 2mks

17. State the law of demand. 2mks

18. List ten factors that influence the demand of a commodity. lOmks

19. Define elasticity of demand (Ed). 2mks

20. Outline the factors that determine elasticity of demand. 6mks

21. Define the term supply. 2mks

22. List ten factors that influence the supply of a commodity. lOmks

23. Define elasticity of supply (ES) 2mks

24. State two factors that determine market prices. 2mks

25. Define the term cooperative. 2mks

26. State nine principles of cooperatives. 9mks

27. List three types of farmers' cooperatives. 3mks

28. Give six functions of cooperative societies. 6mks

29. List ten agricultural parastatal bodies. lOmks

30. State three functions of National Cereals and Produce Board (NCPB). 3mks

31. List the functions of the Kenya Sisal Board. 6mks

32. Give the functions of the Coffee Board of Kenya. 4mks

33. Outline the functions of the Pyrethrum Board of Kenya. 6mks

34. What are the functions of the Cotton Board of Kenya? 7mks

List the functions of the Kenya Sugar Authority. 9mks

36. Give the functions of the Horticultural Crops Development Authority. 4mks

37. State the functions of the Agricultural Finance Corporation (AFC). 3mks

38. Give four functions of the Kenya Meat Commission (KMC). 4mks

39. List four functions of Agricultural Development Corporation. 4mks

40. Outline ten functions of the Kenya National Farmers Union (KNFU)

41. What are the functions of the Agricultural Society of Kenya (ASK)? 8mks

42. What does 4-K clubs stand for? lmk

43. Give five functions of the 4-K clubs. 4mks

44. State the functions of the Young Farmers Club. 7mks

45. Explain the importance of the following functions in the marketing process.
    (i) Packing lmk
    (ii) Processing, lmk
    (iii) Grading, lmk
    (iv) Collecting market information, lmk

46. What does equilibrium or market price mean?

47. What does the term agricultural organization refer to? 2mks

48. State four roles of agricultural development corporation (ADC) (4mks)

49. Give four responsibilities of the Kenya meat commission as an agricultural parastatal (4mks)

50. Give 5 reasons why processing of raw materials is important (5mks)

51. Names 3 types of farmers cooperative societies (3 mks)

52. Give 5 principles of cooperatives (5 mks)

CHAPTER 32
Answers on Agricultural Marketing and Organisation

1. Market - This is an institution for exchange of goods and services.
   - A place where buyers and sellers carry out business transactions.

2. Perfect (competitive) market - This is a market situation where any buyer can purchase from any seller and vice versa.
   Imperfect market - A market where some buyers, sellers or both are not aware of the prices offered by others.

3. - Monopoly.
   - Oligopoly
   - Monopsony

4. - Existence of many buyers and sellers.
   Product quality varies from one farm to another.
   - Products are close substitutes.
   - There is perfect product differentiation between firms.
   - A single seller may dominate the market due to technological superiority.

5. - Large number of buyers and sellers.
   - The product must be homogenous.

6. Marketing - This refers to all the activities and services which are associated with the flow of goods and services from production to consumption.

7. Marketing functions are all the activities involved in the marketing process.

8. Service - This is any function which alters a commodity in form, place, time or possession.

9. - Buying and assembling.
   - Transporting and distributing.
   Storage.
   Packing.
   Processing.
   Grading and standardization.
   Packaging.
   Marketing research.
   Selling.
   Financing.
   Bearing of risks.

10. Grading - means sorting out of produce into different lots each with the same characteristics, quality and flavour.

Standardization - means establishing some uniformity in the quality and quantity of products.

11. - Wholesalers.
   - Retailers.
   Itinerant traders.
   - Packers and processors.
   - Commission agents.
   - Broker agents.
   Cooperative societies and unions.
   Marketing.
   Auctioneers.

12. - Are bulky
   - Have weight
   - Have large volume.
   Are perishable.

13. - Perishability.
- Seasonality.
- Bulkiness.
- storage
- Poor transport system.
  Changes in market demand.
- Limited elasticity of demand.
- Lack of market information.
- Changes of supply.

14. Price - This is the amount of money paid in exchange for a good or service.

15. - Demand
- Supply
- Quality of a good or service.

16. Demand - This is the quantity of goods or services which consumers are willing and able to buy at each specific price at a given time.

17. Law of demand - It states that the quantity of a good or service demanded varies inversely with the price.

18. - Population
  Income
  Preference and tastes.
  Price of related goods.
  Advertisement
  Beliefs, customs and taboos.
  Price expectations.
  Level of taxation.
  Perishability.
  Future expectations or uncertainties.

19. Elasticity of demand (Ed) - This is the degree of responsiveness of demand to change in price.

20. - Availability of substitutes.
Degree of necessity.
- Number of uses of a product.
Time tag.
- Time span.
- Proportion.

21. Supply - This is the quantity of goods or services which producers / sellers are willing to sell at a specific price at a given time.

22. - Number of sellers in the market.
- Price of related goods.
- Price expectations.
- Technology.
Weather.
- Government policy.
- Change in prices.
Cost of production.
- Increase in the supply of associated goods.
Transport system.

23. Elasticity of Supply (Es) - This is the degree of responsiveness of supply to change in price.

24. Demand
- Supply.

25. Cooperative - This is an organization of people who have joined together voluntarily with a common purpose for a mutual economic benefit.

26. Open membership.
Equal rights.
Principle of share limit.
Interest on shares.
- Withdrawal from membership.
Loyalty.
Education.

- Cooperative principle.
- Non-profit motive.

27. - Farmer/producer cooperatives.
- Marketing cooperatives.
- Consumer cooperatives.

28. - Marketing farmers produce.
- Negotiating for fair prices.
- Keeping records of the cooperative activities.
- Paying dividends to members.
- Giving loans to members.
Educating members on cooperative matters.

29. - National irrigation Board.
- National Cereals and Produce Board (NCPB).
- Kenya Sisal Board.
- Coffee Board of Kenya.
- Pyrethrum Board of Kenya.
- Cotton Board of Kenya.
- Kenya Sugar Authority.
- Horticultural Crops Development Authority.
- Agricultural Finance Corporation (AFC)
- Agricultural Development Corporation (ADC)
- Kenya Meat Commission (KMC)

30. - Regulate and control production and storage of cereals.
- Buying and storing cereals.
- Advising the Minister on the production, importation or exportation of cereals.

31. - Promote the production of sisal.
- Regulate production, grading and marketing of sisal. - Registration of all sisal producers.
- Licensing sisal factories and sisal exports.
Examines sisal for export and maintain quality.
Labeling sisal which may be spoilt on transit from sisal estate to the port.

32. - Licensing coffee producers and processors.
- Carry out research on all aspects of coffee production and processing.
- Government agent on matters related to international coffee agreements e.g. prices and quotas.
- Marketing parchment coffee.

33. - Offering advisory services to the farmers.
- Managing pyrethrum nurseries.
Processing pyrethrum in the factory.
Marketing the processed products.
Buying pyrethrum from the farmers.
- Research to obtain the best cultivars through selection and breeding.

34. - Planning, monitoring and regulation of cotton growing and ginning.
- Licensing and control of cotton ginneries.
- Regulate and control of quality of raw, cotton.
-Regulate the export or import of cotton lint / cotton seed.
- Regulate and control of quality and supply of seed through ginneries.
- Carry out research and development in cotton production and processing technology.
Providing/coordinating training for any sector of the cotton industry.

35. - Advise on the development of sugar cane production for the manufacture of white sugar.
-Advise on rules and regulations necessary for the development of sugar industry.
- Formulate and advice on the price of cane to the out growers.
- Develop and implement a cane testing service and sugar cane quality control.
- Advise on all aspects of sugar processing.
- Register all cane producers within sugar factory zones.

- Ensure availability of adequate statistics relating to sugar cane industry.
- Advise on utilization of sugar by-products.

36. - Offering advisory services to farmers.
Collecting produce from farmers.
- Sorting and grading the produce.
- Marketing the produce.

37. - Provide agricultural credit to farmers.
Provide technical services to farmers.
- Ensure repayment of loans.

38. - Buying cattle from beef farms.
- Slaughtering the beef animals.
Grading carcasses.
Marketing beef.

39. - Running and operating state farms.
- Raising high quality livestock.
Bulking planting materials.
Promote agricultural production through field demon stration s.

40. - Bargaining for better prices of farm produce.
- Ensure adequate and timely supply of farm inputs.
Bargain for reasonable and affordable prices for farm inputs.
Provide better infrastructure for quick delivery of farm .produce.
Provide loan facilities.
Control of crop and livestock pests and diseases.
Look for markets of farmers produce.
Offer technical services to farmers.
Represent farmers in the international federation of agricultural producers.
Publish a monthly magazine (The farmers' voice.)

41. - Hold competitive agricultural shows and exhibitions of livestock, crops and farm produce.
- Encourage breeding and importation of pure breeds.
- Improve useful indigenous animals.
- Encourage and assist in official milk recording scheme.
- Organize the running of Young Farmers Clubs.
- Organize the National Ploughing contest.
- Publishing the Kenya stud book.
Publish monthly journal called The Kenya Farmers".
- Award bursaries for local and overseas studies / tours for its members.

42. 4K - Kuungana, Kufanya, Kusaidia Kenya.

43. - Teaching and carrying out practical projects to show that agriculture is profitable.
Expose youths on existing and improved agricultural technologies.
- Developing and enhancing leadership qualities among the youth.
Use the youth as agents of change by taking part in competitive shows.
Involvement in field trips to places of agricultural interest.

44. _ Participating in exhibitions and competitions at ASK shows.
Involvement in agricultural projects at club level.
- Participate in YFC annual rallies.
- Involvement in workshops and seminars related to agriculture.
- Participate in national tree planting activities.
Participate in national ploughing contests.
Involvement and participation in exchange programmes locally and abroad.

45. (i) Packing. - Protects the produce against damage, theft, and adulteration on its way to the market.
(ii) Processing - Enables the produce to be transformed from its original state to a state in which it can be used.
(iii) Grading - Helps buyers to select the most suitable produce.
-Allows buyers to purchase the deserved quality and avoid time wastage on inspection.
(iv) Collecting market information.
- To determine where and when to sell.
- To get information on quality, prices and alternative markets.
- To know the form of produce required.

46. Equilibrium / market price - This is where the quantity of goods supplied equals the quantity of goods demanded.

47. An agricultural organization is any body which promotes agricultural activities.

48. - Running and operation of state firms
- Raising high quality livestock which are sold to farmers as breeding stock
- Bulking planting materials eg maize, irish potatoes
- Promote agricultural production through field demonstrations

49. - buying cattle from farmers
- slaughtering of beef cattle
-Dressing and grading carcass
-marketing of beef locally and overseas

50. - to increase shelf life of a commodity
-transforms commodity into utilizable forms
-reduces bulkiness hence ease storage
- makes commodity easy to handle
- improves flavor of a commodity

51. - Producers cooperative societies
- Consumers cooperative societies
- Marketing cooperative socies

52. - Open membership
- Equal rights
- Share limited
- Interest on shares
- Loyalty
- Withdrawal from membership
- Education
- Non-profit motive

CHAPTER 33
Questions on Agroforestry

1. Define the term agro forestry. 2mks

2. Give four factors that determine the form of agro-forestry a farmer should adopt. 4mks

3. Give three forms of agro forestry. 3mks

4. Give four importance of Border planting form of agro forestry. 4mks

5. List the importance of agro forestry. lOmks

6. Mention four growing habits of trees and shrubs suitable for agro forestry. 4mks

7. What is a nursery bed? 2mks

8. Name three types of nurseries. 3mks

9. Mention two groups of nurseries. 2mks

10. List five factors to consider when selecting a nursery site. 5mks

11. Give three characteristics of seeds used for a agro-forestry. 3mks

12. Give two main reasons of treating seeds. 2mks

13. List four methods of treating seeds. 4mks

14. Outline the management practices carried out in the nursery while the seedlings are growing. 8mks

15. State three care and management of agro-forestry trees. 3mks

16. Name three agro-forestry practices. 3mks

17. List three sites for agro-forestry trees. 3mks

18. Outline the procedure of transplanting tree seedlings. 6mks

19. Give the meaning of Alley cropping. Imks

20. What is Multistory cropping? lmks

21. Give the meaning of Wood lots. lmks

22. Outline the advantages of growing trees in the homestead. (3 marks)

23. Name three common forms of agro forestry. (3 marks)

24. Define the following terms.
    (i) Agrosilvoculture (2mks)
    (ii) Silvopastoral (2mks)
    (iii) Agrosilvopastoral.

25. List three methods of harvesting agroforestry trees. (3mks)

26. Give two types of nurseries. (2mks)

CHAPTER 34
Answers on Agroforestry

1. Agro forestry - This is a term used to cover a variety of land uses that combine tree growing, pasture and crop production on the same piece of land.

2. - Farm size.
   - Type of crops grown.
   - Topography.'
   - Climatic factors.

3. Intensive hedgerow (intercropping)
   Wide row planting.
   Border planting.

4. - Protect the farm (act as a fence).
   - Mark the boundary.
   - Form windbreaks.
   - Provide wood and timber for fuel and building.

5. - Source of wood fuel (Remedy for deforestation)
   - Source of income
   - Environmental benefits.
   - Labour saving.
   - Aesthetic value.
   - Livestock feed /fodder.
   - Mark boundaries
   - Used as fences.
   - Nitrogen fixation.
   - Source of fruits.
   - Source of timber and poles.
   - Enrich the soil upon decomposition.
   - Some tree species are medicinal.

6. - Fast growth.
- Deep rooted.
- Nitrogen fixing.
- Good in by-product production.

7. Nursery bed - It is a special seedbed prepared for raising seedlings before transplanting.

8. - Vegetable crop nurseries.
- Tree nurseries.
- Vegetative propagation nursery.

9. - Raised nurseries.
- Sunken nurseries.

10. - Nearness to water source.
- Type of soil.
- Topography
- Security.
- Well sheltered.

11. - Good size.
- Free from pests and diseases.
- Fresh to ensure viability.

12. - To break seed dormancy.
- To improve vegetative growth.

13. - Seed inoculation.
- Hot water treatment.
- Mechanical breaking.
- Light burning.

14. - Mulching.
- watering
- Weed control
- Pricking out
- Root pruning / trimming.
- Shading.

Pest and disease control.
Hardening off
Transplanting

15. - Protection.
- Pruning and training.
Grafting old trees.

16. Alley cropping
Multistory cropping
Woodlots in farms. ,,

17. Boundaries.
River banks.
Homestead.
- Terraces
- Slopes.

18. Dig a hole.
Lift seedling with soil around the root, -
Cover to root collar.
Firm the soil around the seedling.

19. Alley cropping - Growing of trees and crops (hedgerow intercropping)

20. Multistory cropping- Growing crops which tolerate shading.

21. Woodlots - Plots of land set aside for trees only.

22. - Provide shade to man and livestock
- Source of wood fuel (firewood)
- Acts as wind breakers
- Provide timber and wood for building.
- Has aesthetic value.
- Source of fruits.
Environmental benefits.

23. - Agrosilviculture
    - Silvopastoral
    - Agrosilvopastoral.

24. (i) Agrosilviculture - This is a combination of trees or shrubs and crops in agricultural production.
    (ii) Silvopastoral - This is a combination of trees/shrubs and keeping livestock.
    (iii) Agrosilvopastoral - A combination of growing trees/ shrubs together with pastures for livestock and crops.

25. - pruning
    - Lopping
    - Pollarding
    - Coppicing
    - Thinning

26. - Direct nurseries
    - Containerised nurseries.

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