How to Pass

KCSE

AGRICULTURE

Questions & Answers

ealand W[illegible]

G[illegible]thu M

Form 1 & 2

How to Pass
Agriculture

Secondary: Revision

Questions & answers

Form 1 and 2

Mwangi Gituthu

Published by
Motivating Educational Enterprises
P.0 Box 333-00600 Nairobi
motivating2000@yahoo.com

sms: 0722 441 379
*

First published: 2012 November. 2013 May.
2014 July
ISBN 978-9966-1541-9-4

PRINTED IN KENYA

TABLE OF CONTENTS

Form I Page

Form 2 **Page**

Mission statement-

To motivate people so that they achieve the success they desire.

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
Introduction to Agriculture

1. Define the term agriculture. (1 mark)

2. Give the meaning of the two Latin words from which the term agriculture is derived (2 marks)

3. List the Five branches of agriculture. (5 marks)

4. Give six activities that make agriculture be defined as an art (6 marks)

5. 3tate four types of livestock farming. (4 marks)

6. Why is agriculture regarded as a science? (3 marks)

7. Explain the meaning of the following terms. (3 marks)
   a) Arable farming
   b) Field crops
   c) Horticultural crops

8. What do the following branches of horticulture deal with?
   a) Floriculture
   b) Olericulture
   c) Pomology

9. Define the following terms
   a) Pastoralism
   b) Nomadism
   c) Pastoral - nomadism
   d) Agro-forestry

e) Crop pathology
f) Agricultural engineering

10. a) What is a farming system? (1 mark)
    b) Name two types of farming systems. (2 marks)
    c) Give three differences between the two farming systems named in b) above. (3 marks)

11. Name five major methods of farming. (5 marks)

12. State four advantages of shifting cultivation. (4 marks)

13. Give four disadvantages of shifting cultivation. (4 marks)

14. a) Define organic farming. (1 mark)
    b) State five advantages of organic farming. (5 marks)

15. Give four practices carried out in organic farming. (4 marks)

16. State six major roles of agriculture in the Kenya's economy. (6 marks)

17. a) Define mixed farming? (1 mark)
    b) Give two main advantages of mixed farming. (2 marks)

18. Why is ranching referred to as an improved pastroral-nomadism system? (1 mark)

19. Name four scientific studies involved in agriculture. (4 marks)

20. Highlight two ways in which agriculture acts as a source of employment. (2 marks)

21. State six advantages of plantation farming. (6 marks)

22. Distinguish between pastoralism and nomadism. (2 marks)

23. Name one raw material provided by agriculture to the following industries. (5 marks)
    a) Canning factories
    b) Breweries
    c) Leather tanning industries
    d) Kenya Meat Commission (K.M.C).
    e) Creameries

24. State four factors that determine the choice of a farming system. (8 marks)

25. Give five problems facing agriculture in Kenya. (5 marks)

26. Name five industrial goods whose market is provided by agriculture. (5 marks)

27. Name any five crops that can be grown in a plantation. (5 marks)

28. State four differences between ranching and pastoral nomadism. (4 marks)

29. What is involved in horticulture as a branch of crop production? (3 marks)

30. State four areas where shifting cultivation is applicable. (4 marks)

CHAPTER 02
Answers on
Introduction to Agriculture

1. **Agriculture** is the science and art of crop and livestock production.

2. **Ager** meaning field and **cultura** meaning cultivation.

3. Crop production, livestock production, agricultural economics, agricultural engineering, soil science.

4. **Activities that make agriculture be defined as an art**

- Tillage of land
- Construction of farm structures
- Measuring distances
- Machine operations
- Harvesting of crops
- Feeding and handling animals.
- Marketing of agricultural products.

5. Four types of livestock farming. (3 marks)
- Pastoralism (mammalian livestock farming)
- Fish farming / aquaculture
- Poultry keeping
- Bee keeping / apiculture

6. Why agriculture is regarded as a science.
- It entails pathology
- It entails entomology
- It entails agricultural engineering
- It entails soil science
- It entails genetics as applied in plant and animal breeding.

7. (a) Arable farming

This is the production of crops on cultivated land

(b) Field crops

These are crops which are grown in a fair ly large area of land

(c) Horticultural crops

These are the perishable crops.

8. What the following branches of horticulture deal with.

(a) Floriculture

Growing of flowers

(b) Olericulture

Growing of vegetables

(c) Pomology

Growing of fruits

9. Definition of the following terms

a) Pastoralism

Practice of rearing livestock on natural pasture

b) Nomadism

Practice of moving from one place to another

c) Pastoral - nomadism

Moving animals from one place to another in search of fresh pastures and water.

d) Agro-forestry

Growing of trees and crops and keeping of animals on the same piece of land.

e) Crop pathology

The study of crop diseases

f) Agricultural engineering

Branch of agriculture that deals with the use and maintenance of farm tools, machinery and structures.

10. (a) Farming system is the organisation of the farm and all the enterprises in relationship to each other.

(b) Two types of farming systems.

- Extensive farming systems
- Intensive farming systems

(c) **Differences between two farming systems named in b)above.**

Intensive farming	Extensive farming
High capital investment per unit area	Low capital investment per unit area
High labour investment	Low labour investment
Does not require large tracts of land	Requires large tracts of land
High yields per unit area	Low yields per unit area

11. Major methods of farming

- Mixed farming
  Nomadic Pastoralism
- Shifting cultivation
- Organic farming
- Agro-forestry

12 Advantages of shifting cultivation

- It has low capital investment
- There is no pest and diseases build up.
- Soil structure is maintained
- No land disputes as land ownership is not individualized.

13. Disadvantages of shifting cultivation

- Total yield per unit area is low
- A lot of time is wasted when the farmer is shifting and building structures
  Farmers have no incentives to develop land and conserve water and soil.
- Not applicable in areas of high population density or where there is a high population increase.

14. (a) **Organic forming** is growing of crops and rearing of animals without using agricultural chemicals.

(b) Advantages of organic farming

- It is environmental friendly i.e. does not pollute environment
- Products do not have any inorganic chemical residues
- It improves soil structure
- It enhances soil water infiltration and retention.
- It provides food for soil microbes which help them in releasing minerals for crop nutrition.

15. Practices carried out in organic farming

- Use of medicinal plants instead of chemicals.
- Use of organic manure in place of chemical fertilizers.
- Mulching using organic materials.
- Crop rotation.
- Biological pest control method e.g. use of predators.

16. Major roles of agriculture in the Kenya's economy

- Food supply
- Source of employment
- Provision of foreign exchange
- Source of raw materials for industries
- Provision of market for industrial goods.
- Source of money or capital

17. (a) **Mixed farming** is growing of crops and rearing animals on the same farm

(b) **Main advantages of mixed farming**

- It is a method of diversification i.e. if one enterprise fail, the farmer can benefit from the other.
- There are mutual benefits between the crops and livestock and they later provide farmyard **manure** for the crops.

18. Why ranching is referred to as an improved pastoral nomadism system

Because animals are enclosed in an area where management practices such as disease control improved pastures, supplementary feeding and water are provided.

19. Scientific studies involved in agriculture

- Entomology
- Pedology / soil science
- Genetics
- Botany
- Zoology

20. Ways in which agriculture acts as a source of employment

- Directly e.g. Milkman, manager, tractor driver.
- Indirectly e.g. extension officers, researchers' etc.

21. Advantages of plantation farming

- Generates foreign exchange when products are exported.
- Creates employment opportunities
- Products of high quality and quantity are attained
- Huge economic benefits are obtained due to utilization of economies of scale
- May lead to provision or improvement of infrastructure and amenities such as roads and electricity.
- Expands domestic / local market
- Government earns revenue from taxation.

22. Distinguish between pastoralism and nomadism

Pastoralism - The practice of rearing livestock **on natural pastures**

Nomadism - The practice of moving from one **place to another.**

23. Raw material provided by agriculture to the following industries:

(a) **Canning factories:** fruits / pigeon peas / livestock / honey/ vegetables.

(b) **Breweries:** Barley / Grapes / hops.

(c) **Leather tanning industries:** hides / skins

(d) **K.M.C (Kenya Meat Commission):** Beef cattle / sheep / goat.

(e) **Creameries:** milk

24. Four factors that determine the choice of a farming system

- Resources / Capital available / inputs
- Climate
- Knowledge and skills
- Topography
- Socio-cultural factors
- Government policies e.g. quota system
- Land tenure systems
- Enterprise itself
- Aims and objectives
- Security
- Common pests and diseases
- Farmers tastes and preferences
- Viability / sustainability of the enterprises

25. Problems facing agriculture in Kenya

- Marketing problems
- Poor crop and animal husbandry
- Lack of capital
- Unfavourable climate
- Pests and diseases
- Inadequate agricultural extension services
- Socio-cultural factors / negative attitude towards agriculture.
- Poor land tenure system such as land fragmentation and communal land tenure

26. Industrial goods whose market is provided by agriculture.

- Tools e.g. *jembes,* forks, spades, hammers, nails
- Agrochemicals e.g. fertilizers, insecticides, pesticides
- Machines e.g. tractors, generators, pumps
- Power e.g. electricity, geothermal, solar panels
- Equipment e.g. knapsack sprayer, stir-up pump
- Animal feeds e.g. dairy meal

27. Crops that can be grown in a plantation

□ Tea □ Sugar □ Coffee □ Sisal D Cotton	□ Wheat □ Maize / corn □ Banana □ Rice □ Pineapple

28. Differences between ranching and pastoral nomadism.

Ranching	Pastoral nomadism
□ Animals are enclosed	□ Animals graze freely
□ Improved pastures provided	□ Animals feed on natural vegetation only
□ Supplementary feeding provided	□ Supplementary feeds not provided
□ Water provided artificially from boreholes	□ Animals take water from natural sources such as streams.

29. What is involved in horticulture as a branch of crop production

- Floriculture
- Olericulture
- Pomology

30. Areas where shifting cultivation is applicable

- Where land is abundant
- Where population is sparse
- Where number of livestock per unit area is low
- Where land is communally owned.

CHAPTER 03
Questions on
Factors Influencing Agriculture

1. Explain superficial layer in soil profile. (1 mark)

2. Give six effects of HIV/AIDS on agriculture. (6 marks)

3. State four effects of pests on crop production. (4 marks)

4. Name the forms of soil water described below. (3 marks)
   (a) Water occupying the macro-pores
   (b) Water occupying the micro-pores
   (c) Water that forms a thin film around the soil particles

5. List four characteristics of top soil. (4 marks)

6. Name the two market forces that influence agriculture. (2 marks)

7. State four major forces that influence soil formation. (4 marks)

8. (a) Define soil structure. (1 mark)

   (b) Name two types of soil structures found in acidic soils. (2 marks)

9. Give five government policies that influence agriculture. (5 marks)

10. In what three ways do bacteria influence agriculture? (3 marks)

11. Name three aspects of light that affect crop growth. (3 marks)

12. Define the term soil. (1 mark)

13. Give three agents of chemical weathering. (3 marks)

14. What two substances bind soil particles to form a soil structure? (2 marks)

15. Distinguish between superficial layer and transitional zone in relation to soil profile. (2 marks)

16. Give three reasons why a waterlogged soil is unsuitable for most crops. (3 marks)
17. State three physical properties of soil. (3 marks)
18. Where are the following soil structures found?
    a) Single grained
    b) Granular
    c) Prismatic
    d) Platy (4 marks)

19. Name the six common types of structures. (6 marks)

20. Which type of soil water is available to plants? (1 mark)

21. List five characteristics of clay soils. (5 marks)

22. Name the type of soil structures found in the:
    a) Subsoil horizons of soil under bush
    b) Topsoil of alkaline soils

23. Describe two ways by which a soil of pH 3 can be raised to pH 6. (2 marks)
24. Give four characteristics of subsoil layer of a soil profile. (4 marks)

25. List seven biotic factors that influence agricultural production (7 marks)

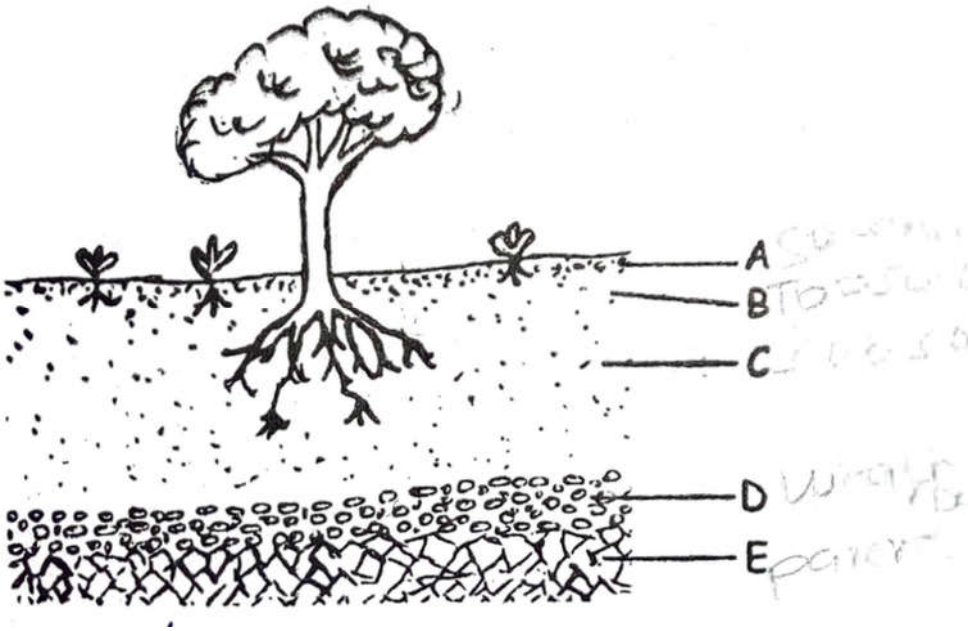
26. State four major constituents of soil. (4 marks)

27. What is meant by soil texture? (1 mark)

28. Give the two main ways of determining soil texture. (2 mark)

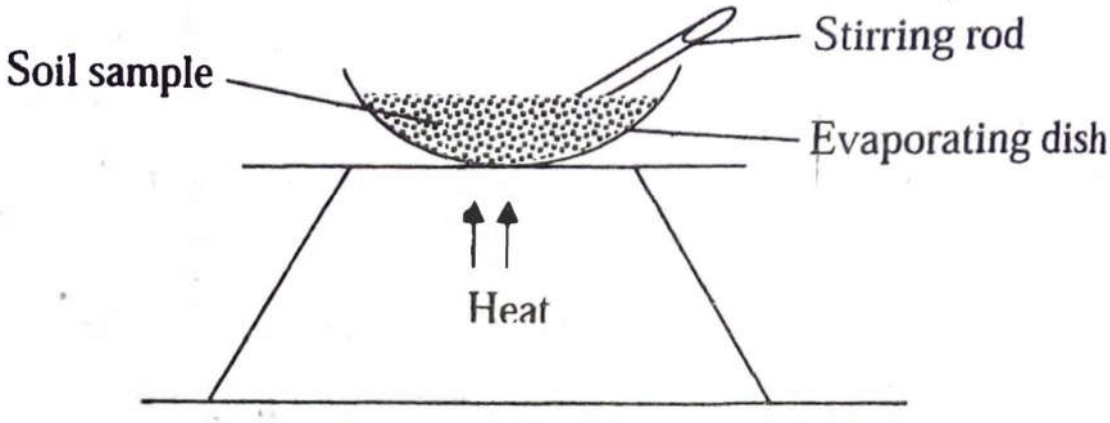
29. Name five types of soil based on soil texture. (5 marks)

30. The Diagram represents a phenomenon observed on the side of a newly constructed road.



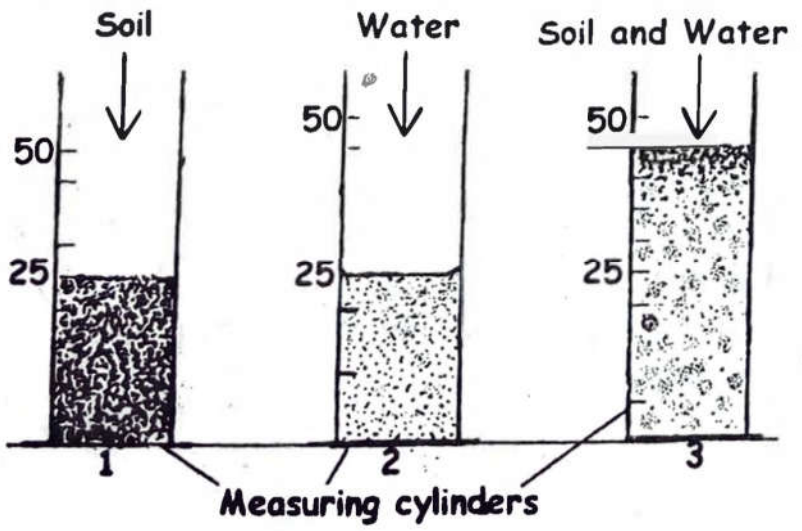
(a) Identify the phenomenon above. (1 mark)
(b) Name the parts labeled A - E. (5 marks)

31. Form one students of Elimu Bora Secondary School set up an experiment as shown below.



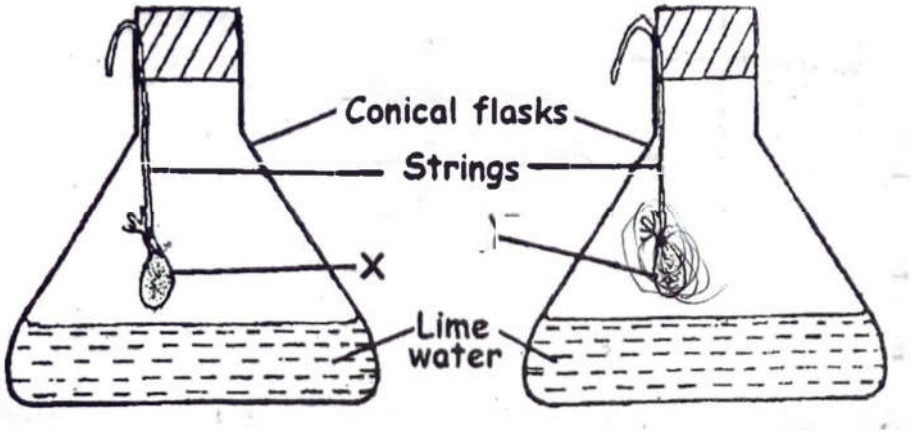
(a) State the aim of this experiment? (1 mark)
(b) What conclusion can be made from the results obtained? (1 mark)

32. Use the experimental set up below to answer the questions that follow.



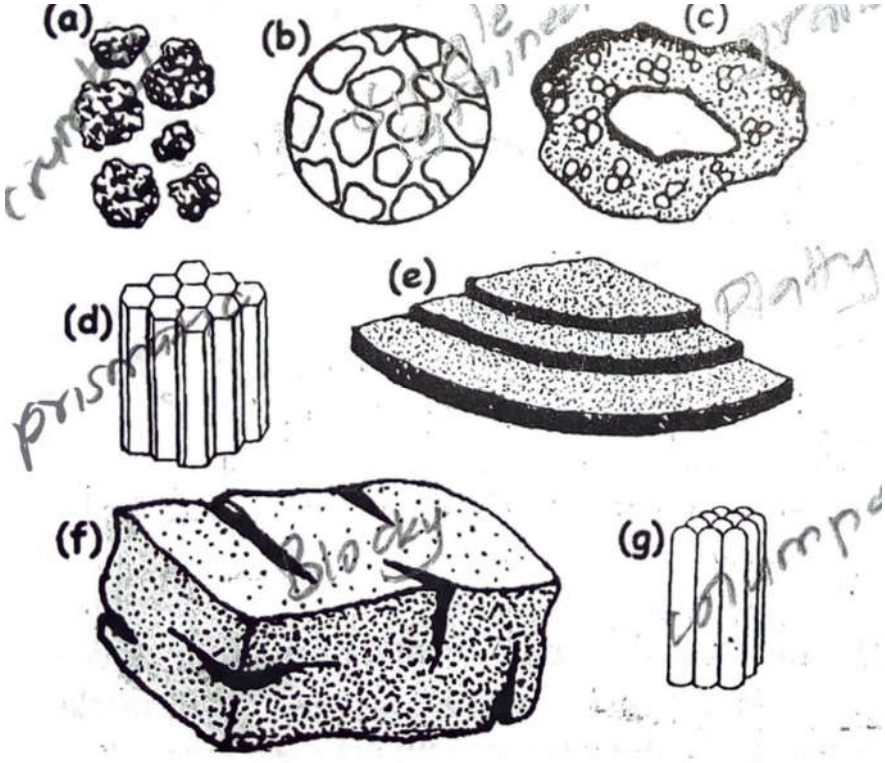
(a) What was the aim of the above experiment? (1 mark)
(b) Suggest the conclusion that can be deduced from the above experiment. (1 mark)

33. The experiment below was set up by form one students. X is fresh garden soil while Y is strongly heated soil.

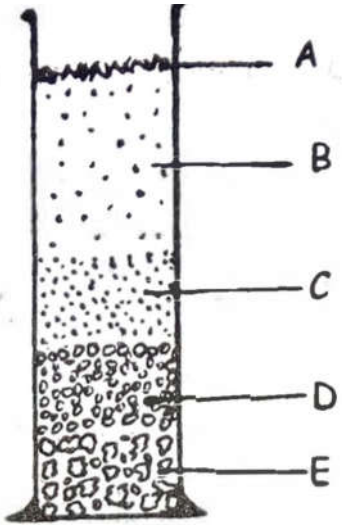


(a) State the aim of the above experiment. (1 mark)
(b) Explain the observations made. (3 marks)

34. Identify the soil structures shown below:

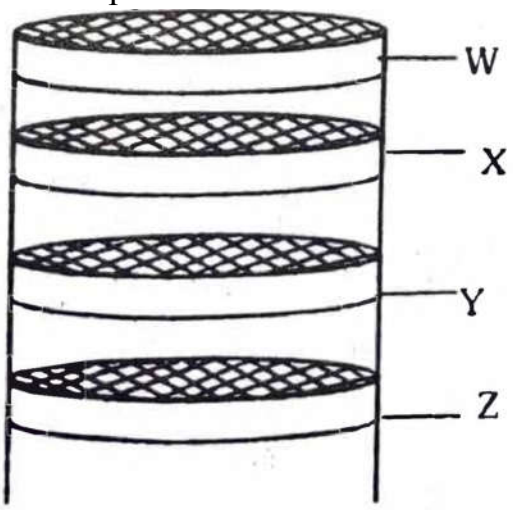


35. The experiment below was set up to investigate a certain aspect of soil.



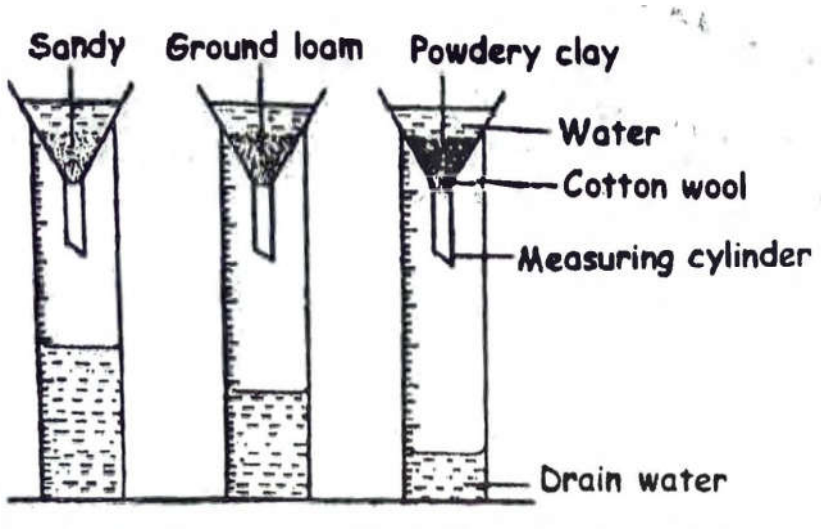
(a) State the aim of the experiment above, (1 mark)
(b) Identify the parts labeled A - E. (5 marks)

36. The diagrams below represent sieves used for analysis of soil composition.



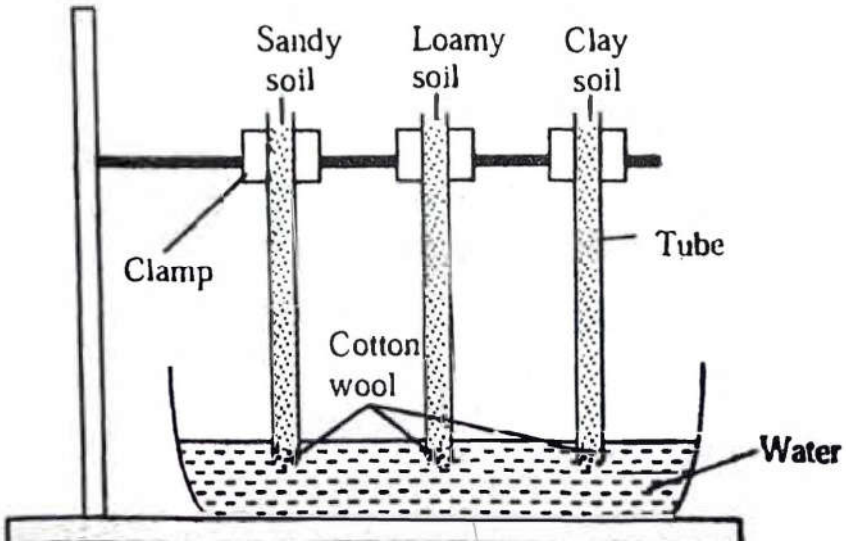
(a) Indicate the mesh diameter of each of the four sieves. (4 marks)
(b) What aspect of soil was being investigated above? (1 mark)
(c) Suggest a conclusion for the above experiment. (1 mar k)

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



(a) What was the aim of the above experiment? (1 mark)
(b) State the conclusion that derived from the above experiment. (2 marks)

38. The experiments below were set up to investigate a property of soil.



(a) State the aim of the above experiment. (1 mark)
(b) From the experiment, what conclusion can be deduced? (4 marks)

CHAPTER 04
Answers on
Factors Influencing Agriculture

1. Superficial layer in soil profile

A thin layer consisting of dry decaying and decayed matter covering the soil surface.

2. Effects of HIV/AIDS on agriculture. (6 marks)

- Loss of farm labour
- Low food production
- Leads to low investment in agriculture as more resources are channeled towards treatment and control
- Low standards of living/poverty of HIV /AIDS patients and relatives
- Waste of time while seeking medical attention and taking care of the sick
- Low motivation of infected people towards work and investment

3. Effects of pest on crop production

- Lowers crop yields
- Lowers quality of the yield both in the field and storage
- Transmits diseases such as mosaic virus by aphids
- Increases the cost of producing the crops

4. (a) **Water occupying the macro-pores**

Superfluous / gravitational water

(b) Water occupying the micro-pores

Capillary water/ available water

(c) Water that forms a thin film around the soil particles

Hygroscopic water.

5. Characteristics of top soil

- It is darker due to its high humus content
- It is well aerated and contains active living organisms which break down and decompose organic matter into humus
- It is well drained
- It contains most of the plant nutrients

6. **Market forces that influence agriculture**

Demand
Supply

7. Major forces that influence soil formation

- Parent rock material
- Climate
- Topography
- Time
- Biotic / living organisms

8. (a) **Soil structure** is the physical appearance of the soil according to the way the individual soil particles are arranged, packed or aggregated.

(b) Types of soil structures found in acid soils.

- Single grained (structureless) structure
- Prismatic structure

9. **Government** policies that **influence agriculture**

- Heavy taxation on imports
- Quality control
- Conservation of natural resources
- Stepping up the control of diseases and parasites that affect crops and livestock

10. Ways in which bacteria influence agriculture

- Some cause decomposition/decaying
- Some cause diseases
- Some help in nitrogen fixation

11. Aspects of light that affect crop growth

- Light intensity
- Light duration
- Light wave length

12. Sol is the natural material on the uppermost layer of the earth's crust

13. Give three agents of chemical weathering

- Water
- Oxygen
- Carbon (IV) oxide

14. Substances that bind soil particles to form a soil structure

- Humus
- Wet / sticky clay

15. Superficial layer is a thin layer consisting of dry decaying and decayed organic matter covering the soil surface.

Transitional zone is a layer between any two bordering soil layers.

16. Reasons why a waterlogged soil is unsuitable for moat crop

- It is not aerated (as water expels air)
- It lacks micro-organisms
- It is always acidic
- Low temperature

17. Physical properties of soil

- Soil colour
- Soil texture
- Soil structure

18. Where the following soil structures are found:

a) Single grained

Top soil of sandy soils, arid climates and alkaline soils.

b) Granular

Top soil horizon of cultivated soils and sub soil horizons of soils under grass or bush.

c) Prismatic

Subsoil horizons of arid and semi-arid soils.

d) Platy

Top horizon of soils in the forest and in clayey soils.

19. Six common types of soil structures

- Single-grained structure
- Crumby structure
- Granular structure
- Prismatic structure and columnar
- Platy structure
- Blocky structure

20. Type of soil water available to plants

Capillary water

21. Characteristics of clay soils

- Have very high water holding capacity
- Have more than 40% clay content
- Have a crystalline and platy structure
- Have high capillarity
- Are poorly drained (hence waterlogged)
- Are poorly aerated
- Are smooth, plastic and stick together.

22. Type of soil structures found in the:

a) **subsoil horizons of soil under a bush**

Granular structure

b) Topsoil of alkaline soils

Single-grained structure

23. Ways by which a soil of pH 3 can be raised to pH 6

- Application of lime
- Application of a basic fertilizer

24. Characteristics of subsoil layer of a soil profile

- It is more compact
  It is less aerated than top soil
- May have hardpan
- Contains clay deposits because of downward movement of clay colloids
- Minerals leached from the topsoil accumulate here

25. **Seven biotic factors that influence agricultural production**

C Pests
- Parasites
- Decomposers
- Pathogens
- Predators
- Pollinators
  Nitrogen fixing bacteria

26. **Major constituents of soil**

- Mineral matter
  Organic matter
- Air
- Water
- Living organisms

27. **Soil texture** is the relative proportions of the various sizes of mineral particles in a sample of soil.

28. **Main ways of determining soil texture**

- Mechanical analysis / use of sieves of different mesh diameters
- Chemical analysis.

29. Types of soil based on soil texture

- Sandy soils
- Silty loams
- Clayey loams
- Clayey soils
- Loamy soils

30. (a) Soil profile

(b) A. Superficial layer. B. Top soil C. Sub soil
D. Weathered rock E. Parent rock.

31. (a) To find the percentage of total water content of soil,
(b) Soil has water

32. (a) To find the percentage of air by volume in a sample of soil.

(b) Soil contains a certain percentage of air by volume.

33. (a) To investigate the presence of living organisms in the soil.

(b) Lime water in flask X turns milky while that in flask Y remains clear. Carbon (IV) oxide which turns lime water milky in flask X could have been produced only during the respiration of living organisms present in fresh soil. The lime water in flask Y remains clear because the living organisms in the soil had been killed, therefore no respiration occurred and no carbon (IV) oxide was released.

34. (a) crumby structure (b) single grained (c) granular
(d) prismatic (e) platy (f) block (g) columnar

35. (a) To show that soil is made up of different sized particles.

(b) A: Floating organic matter (humus)
B: Water with fine clay particles and dissolved mineral salts.
C: Silt and clay
D: sand
E: Gravel

36. (a) W 2.0 mm
X 0.2mm
Y 0.02mm
Z 0.002mm

(b) Soil texture.

(c) **Soil is made of** different sized particles.

37. (a) To compare porosity and water holding capacity of **different soils.**

(b) Conclusion that derived from the experiment

- **The rates of** porosity vary from **one type of soil to another, with the** sandy soil being more **porous, than clay.**
- **Different soils** have different water holding **capacities With day soils** having the highest.

38. (a) To compare capillarity action in different soils.

(b) Clay and loamy soils have greater capillarity **action due to their fine pore** spaces. In addition, loamy **soil contains some** quantity of organic materials **which absorb water very** fast. Sand **has** poor capillary action **due to wide pore** spaces. Clay soil has the **highest capillarity.**

CHAPTER 05
Questions on
Farm Tools and Equipment

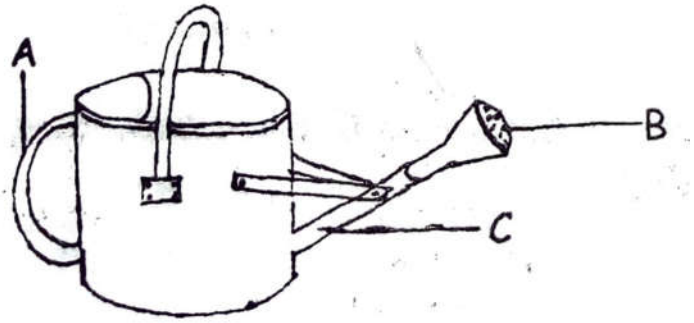
1. Explain the meaning of the following terms. marks)
   a) Tool
   b) Equipment

2. Give three reasons for using farm tools and equipment. (3 marks)

3. List the five categories into which farm tools and equipment are grouped. (5 marks)

4. (a) what is meant by Garden tools and equipment? (I mark)
   (b) Name three tools/equipment used for each of the following farming activities
   (i) Clearing (3 marks)
   (ii) Digging (3 marks)
   (iii) Irrigation (3 marks)
   (iv) Pruning (3 marks)
   (v) Planting (3 marks)
   (vi) Lifting manure (3 marks)

5. Study the illustration below and answer the questions that follow.



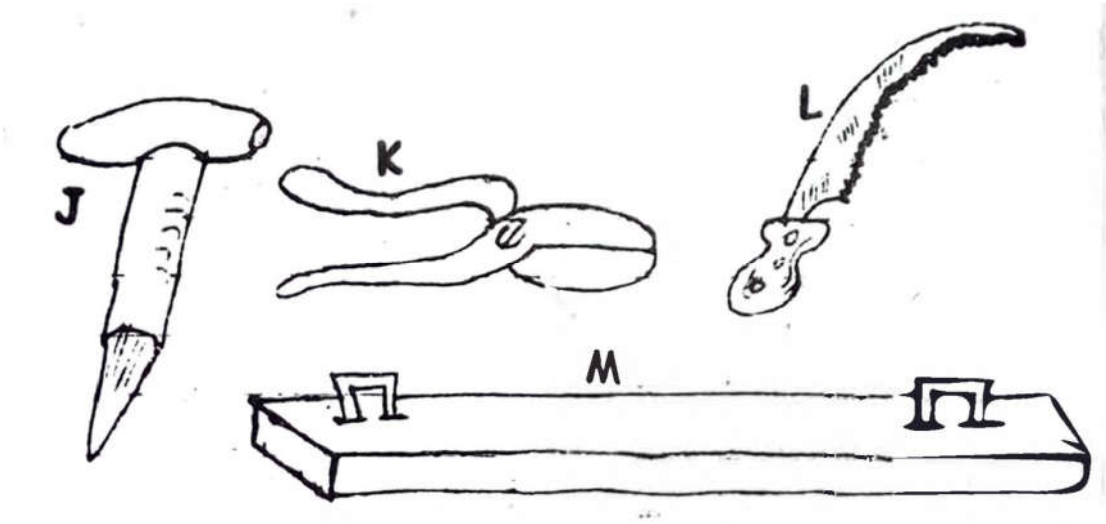
(a) Identify the equipment (1 mark)
(b) Name the parts labeled A, B and C. (3 marks)
(c) Give one use of the above equipment. (1 mark)

6. State five reasons for maintaining farm tools and equipment (5 marks)

/7. State one use of each of the tools/equipment named below

a) Machete
b) Pick axe
c) Pruning knife
d) Rake
e) Garden trowel (5 marks)

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

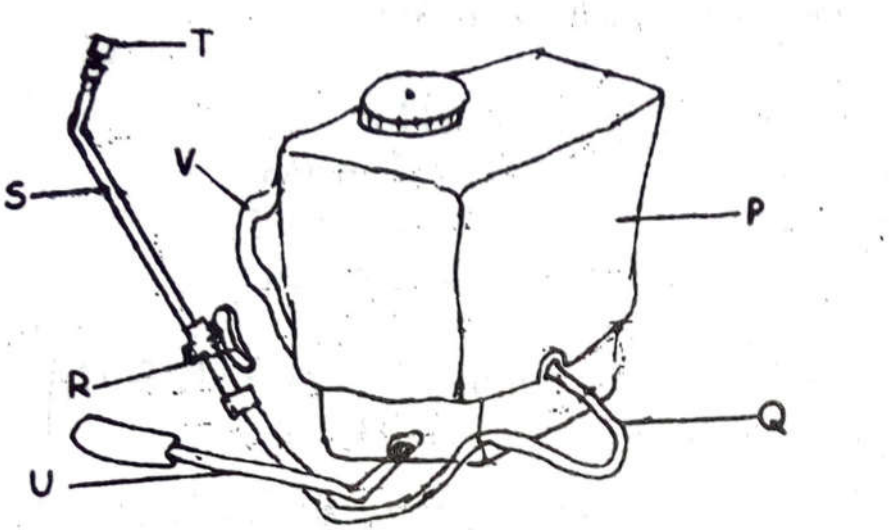


Identify the above tools /equipments J, K, L and M, and state one use of each. (8 marks)

9. Give six safety practices that should be taken when using farm tools (6 marks)

10. State three maintenance practices carried out on a wheel barrow (3 marks)

11. Below is a diagram of farm equipment. Study it carefully and answer the questions that follow.



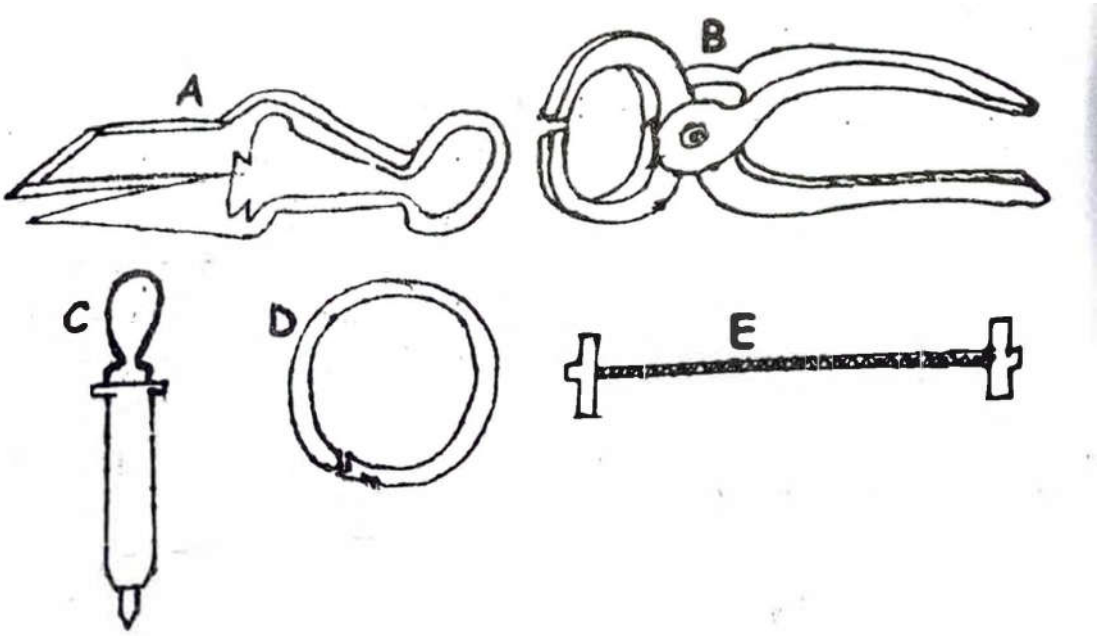
a) Identify the equipment above (1 mark)
b) Name the parts labeled P, Q, R, S, T, and U. (6 marks)
c) State one function of parts labeled T, U and V. (3 marks)
d) Name another equipment that can be used for the same purpose as the one named in a) above. (1 mark)

12. Give one function of each of the following tool/equipment.
a) Soil auger
b) Garden shears
c) Measuring tape
d) Pick axe
e) Knapsack sprayer (5 marks)

13. a) Which tools / equipment would you require when
    i) transplanting seedlings (3 marks)
    ii) preparing nursery bed (3 marks)
    b) Name and explain the uses of the various hand tools in the construction of the Kenya top Bar hive. (12 marks)
    c) Name eight tools/equlpment required during milking and state one use for each (8 marks)

14. Name three tools/equipment used for:
    a) Castration (3marks)
    b) Dehorning (3marks)
    c) Administration of drugs (3 marks)

15. The diagrams below show some livestock tools. Study them and answer the question that follows



Identify the tools A-E above and give one use of each. (5 marks)

16. Give one use for each of the following livestock production tools/equipment (6 marks)
    (a) Stir-up pump
    (b) Ear notcher
    (c) Clinical/veterinary thermometer
    (d) Chaff cutters
    (e) Lead stick
    (f) Halter

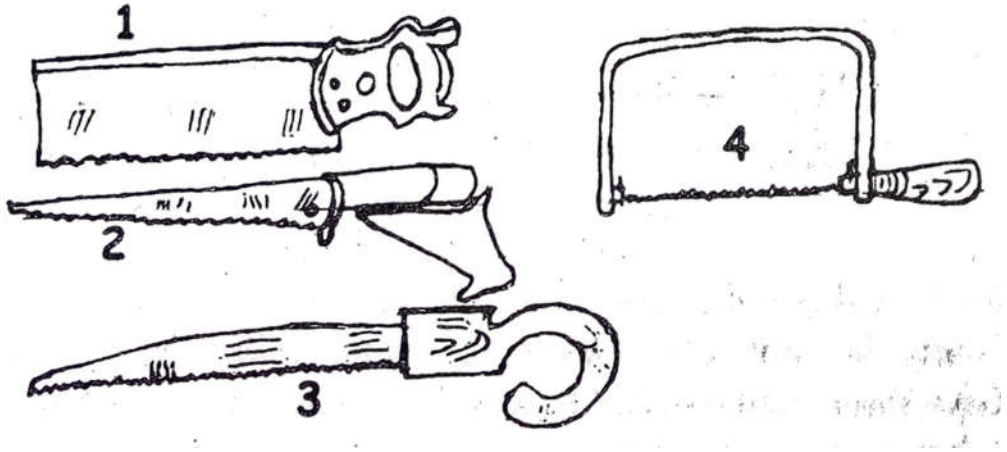
17. State three general purposes of workshop tools and equipment. (3 marks)

18. Give three factors that determine the type of workshop tools found in a farm. (3 marks)

19. Name two broad categories of workshop tools and equipment. (3 marks)

20. In what nine categories are woodwork tools and equipment classified? (9 marks)

21. The diagrams below shows farm tools

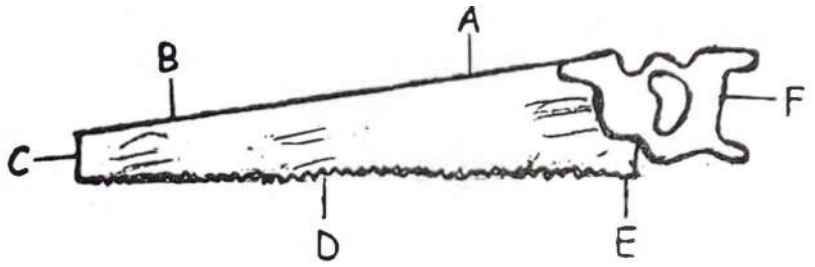


(a) What type of wood work tools and equipment are they? (1 mark)

(b) Identify the tools shown above and state one function of each. (8 marks)

(c) Give six maintenance practices carried out on the above tools. (6 marks)

22. The diagram below shows the general parts of a woodwork tool



i) Identify the tool (1 mark)

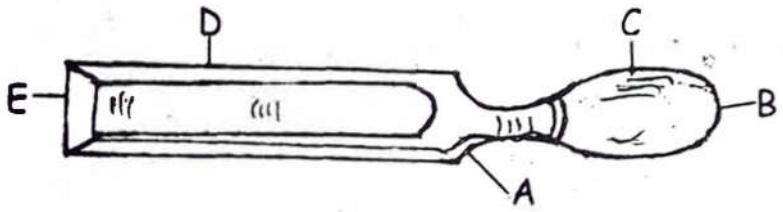
ii) Name the parts labeled A, B, C, D and E. (5 marks)

iii) State one maintenance practice carried out on the part labeled F. (1 mark)

23. (a) Name the two types of handsaws (2 marks)

(b) Give four differences between the two saws named in a) above (4 marks)

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



a) Identify the tool above (1 mark)

b) Name the parts labeled A, B, C, D and E. (5 marks)

c) Give three maintenance practices carried out on the tool shown above. (3 marks)

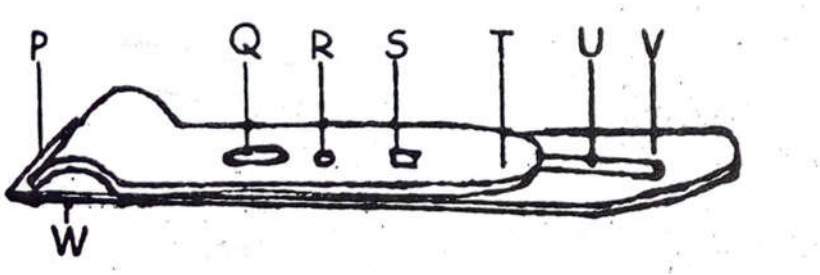
25. Name three workshop tools/equipment used for. (12 marks)
    a) Smoothing
    b) Measuring
    c) Layout and marking
    d) Boring
    e) Holding
    f) Sharpening
    g) Wrecking
    h) Assembling

26. Give three types of planes commonly used in agriculture workshops, (3 marks)

27. Name five types of planes used for special activities in the farm. (5 marks)

28. List five maintenance practices carried out on planes. (5 marks)

29. Study the illustrations below and answer the questions that follow



    a) Identify the equipment above. (1 mark)
    b) Name the parts labeled P-W. (5 marks)

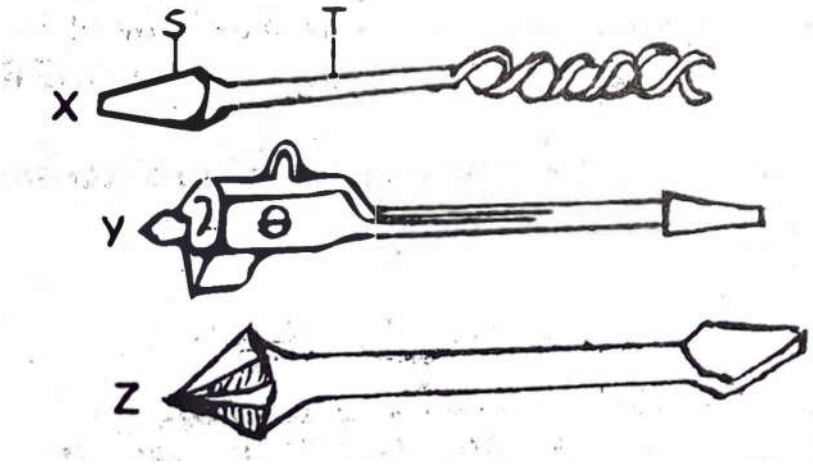
30. Give three types of scrapers. (3 marks)

31. Name the tool that is used for
    a) Measuring squareness and right angles.
    b) Accurate mark measurement.
    c) Initial smoothening of a rough wood
    d) Smoothing and clearing up surfaces of wood

32. Highlight four types of rulers used in measuring in farm work. (4 marks)

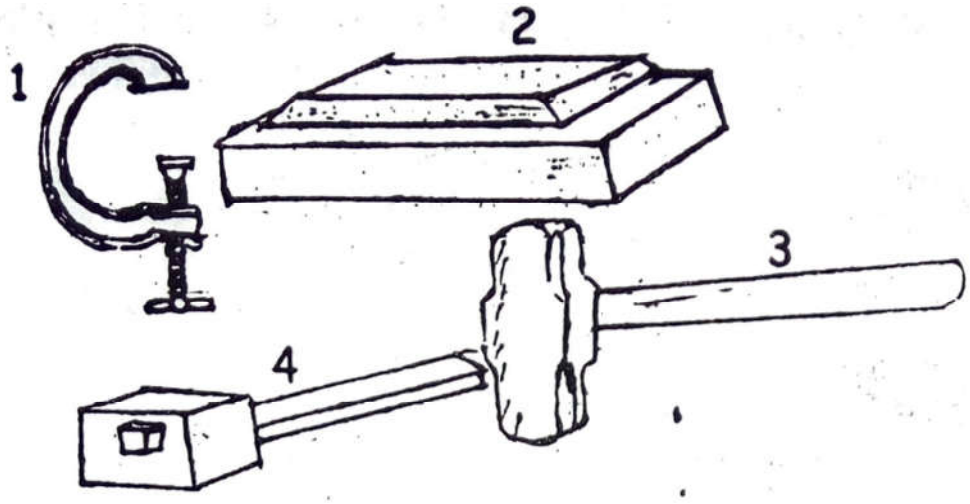
33. Give one functional difference between marking gauge and mortise gauge. (2 marks)

34. Using the diagrams below answer the questions that follow.



    a) Identify tool X, Y and Z. (3 marks)
    b) Name the parts labeled S and T. (2 marks)
    c) How does tool x differ from tool y and z. (2 marks)
    d) With what tools are tools x, y and z used? (3 marks)

35. Below are farm tools and equipment



(a) Identify the tools above (4 marks)
(b) Give one use of each of the tools named in (a) above

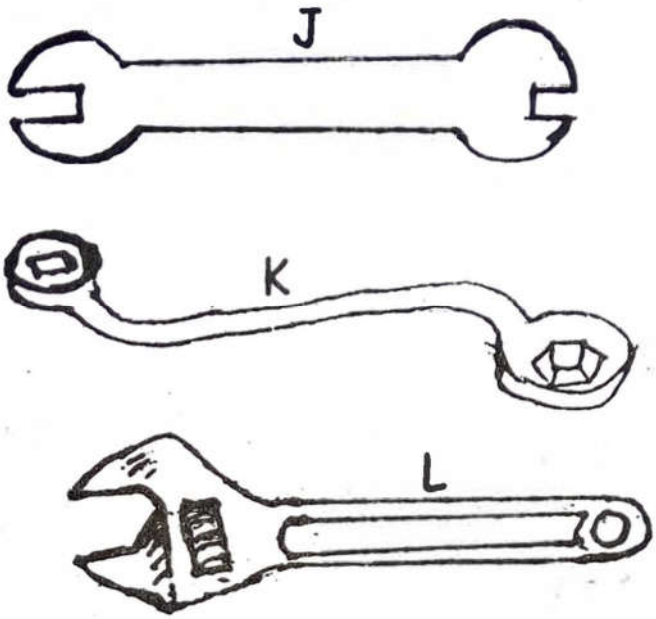
36. (a) Name the two types of screw drivers. (2 marks)
(b) Give one use of each of the screw driver named in (a) above. (2 marks)

37. State the main use of the following tools /equipment.
(i) Hacksaw
(ii) Cold Chisel .
(iii) Tinsnip
(iv) Pliers
(v) Wire strainers
(vi) Ball pein hammer
(vii) Centre punch
(viii) Riveting machine
(ix) Soldering gun
(x) Claw bar (10 marks)

(b) What term best describe the tools named in (a) above.

38. How should farmers care and maintain hammers? (5 marks)

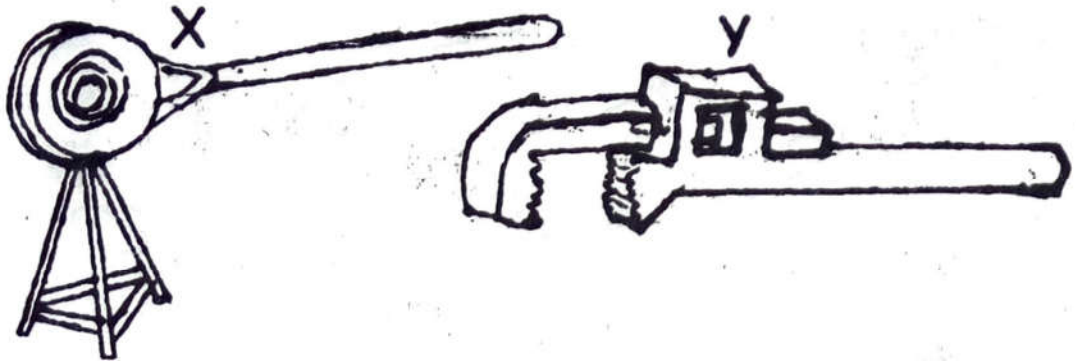
39. Identify the tools below and state one use of each. (6 marks)



40. Name the masonry tools and equipment that is used to do the following work. (9 marks)

a. Placing mortar between construction stones and bricks
b. Plastering to create a level surface of walls and floors
c. Spreading creed over floors or walls
d. Checking whether a surface is vertical or horizontal
e. Checking whether a tall wall is vertical
f. Checking right angles during construction
g. Scooping and mixing concrete or mortar
h. Carrying loads and measuring sand and ballast
i. Removing rough stone surfaces

41. Below are diagrams representing plumbing tools/ equipments?

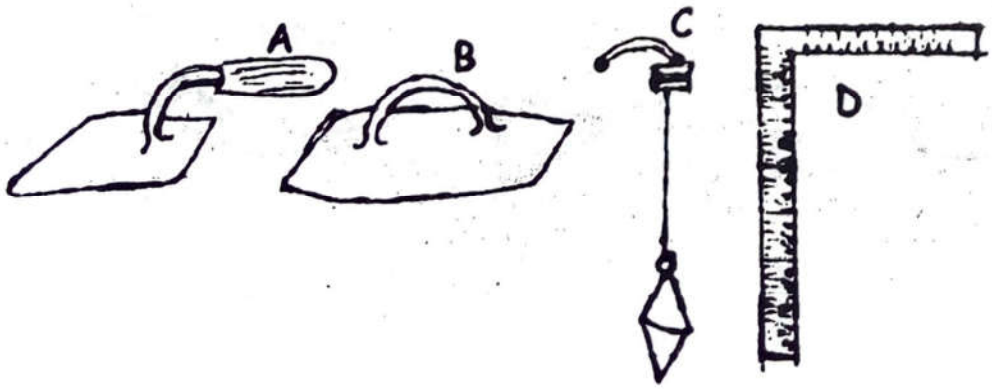


(a) Identify the above tools and state their uses. (4 marks)
(b) Name six other tools / equipment used together with the two above. (6 marks)

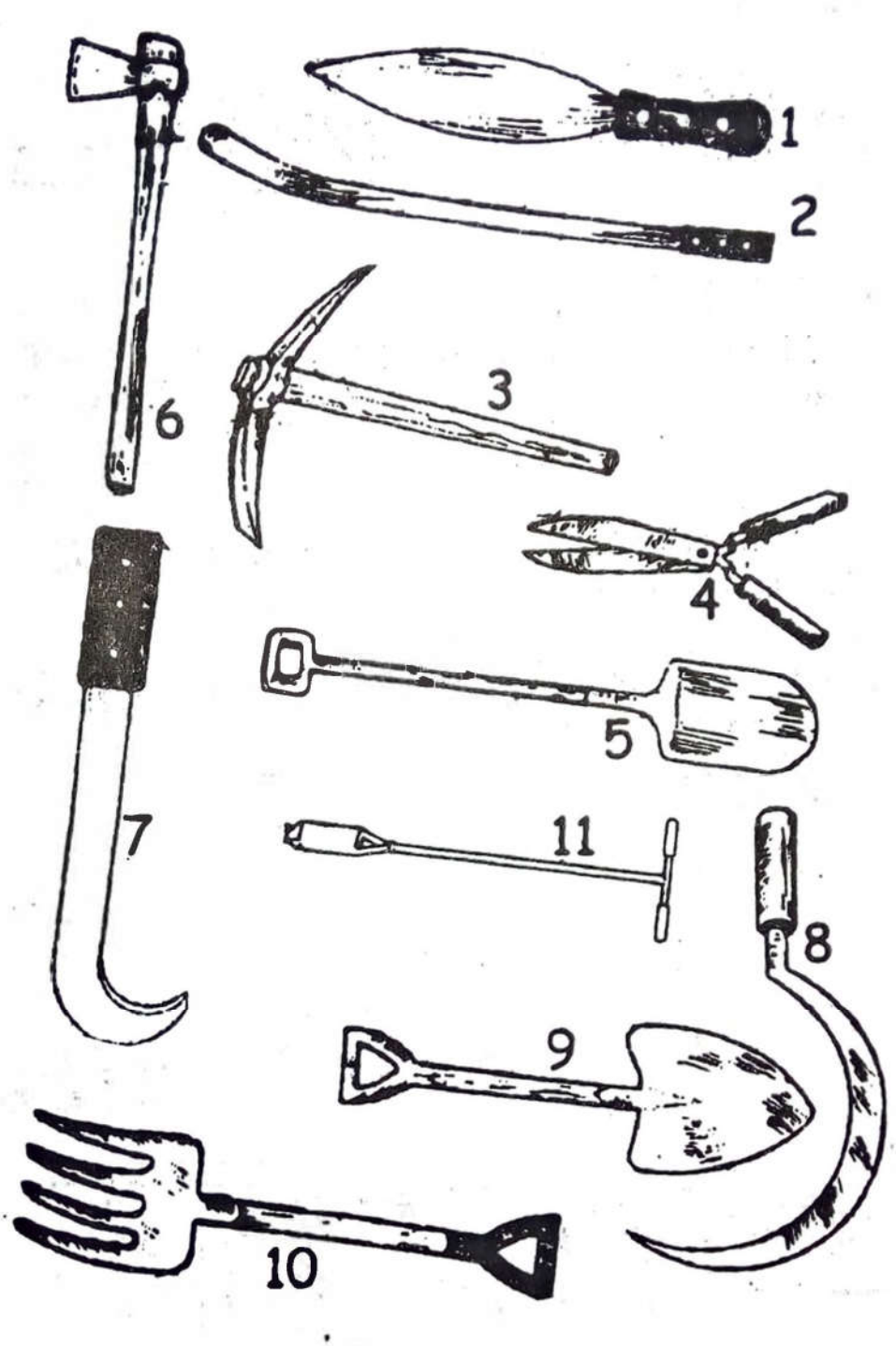
42. Outline five maintenance practices carried out on masonry and plumbing tools. (5 marks)

43. Name the other tool used together with the ones listed below. (5 marks)
a) Wood chisel and.....
b) Hand drill and .....
c) Cold chisel and.....
d) Screw driver and.....
e) Mason's trowel and.....

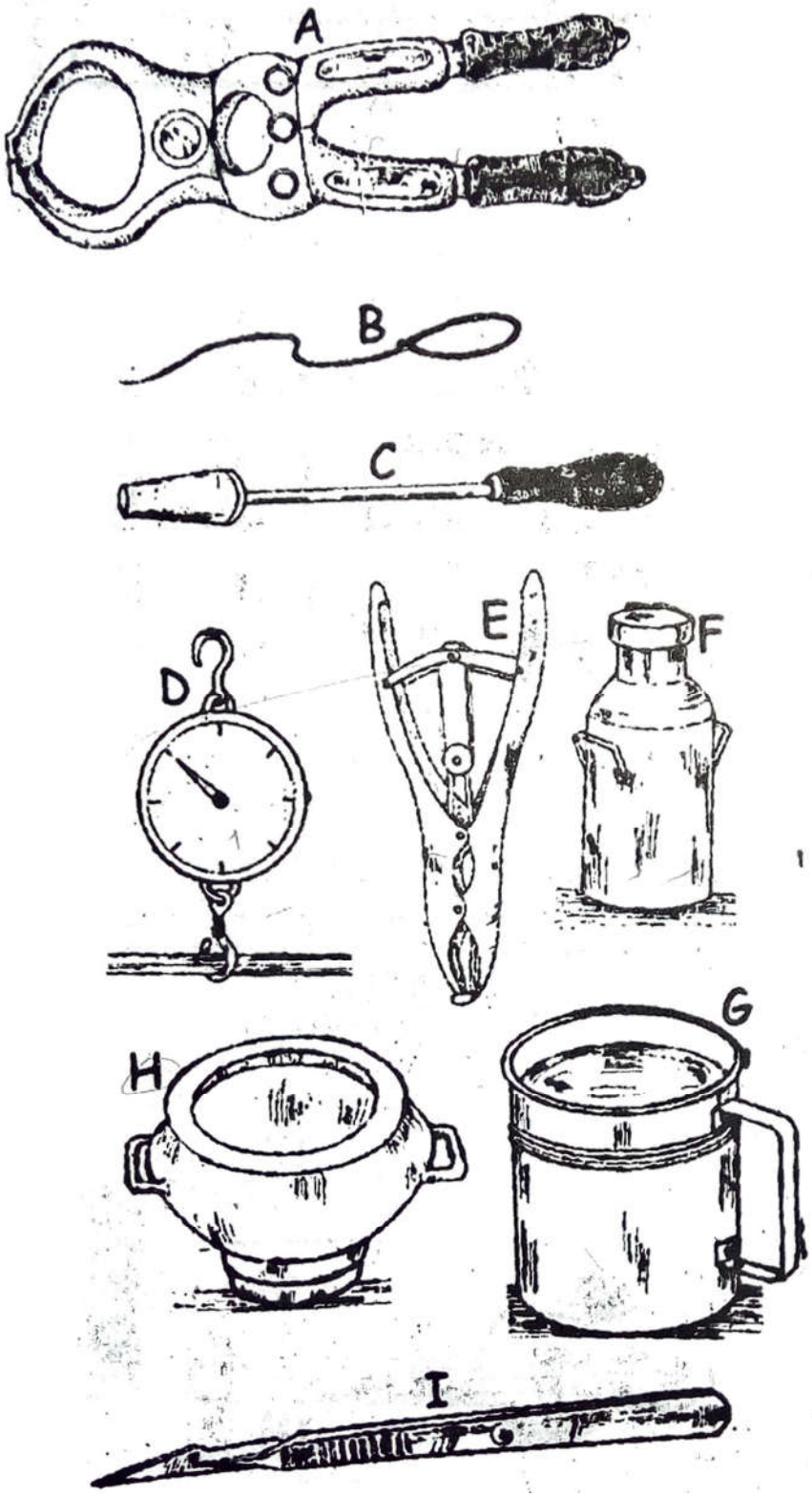
44. Identify the tools / equipment below and state their uses. (8 marks)



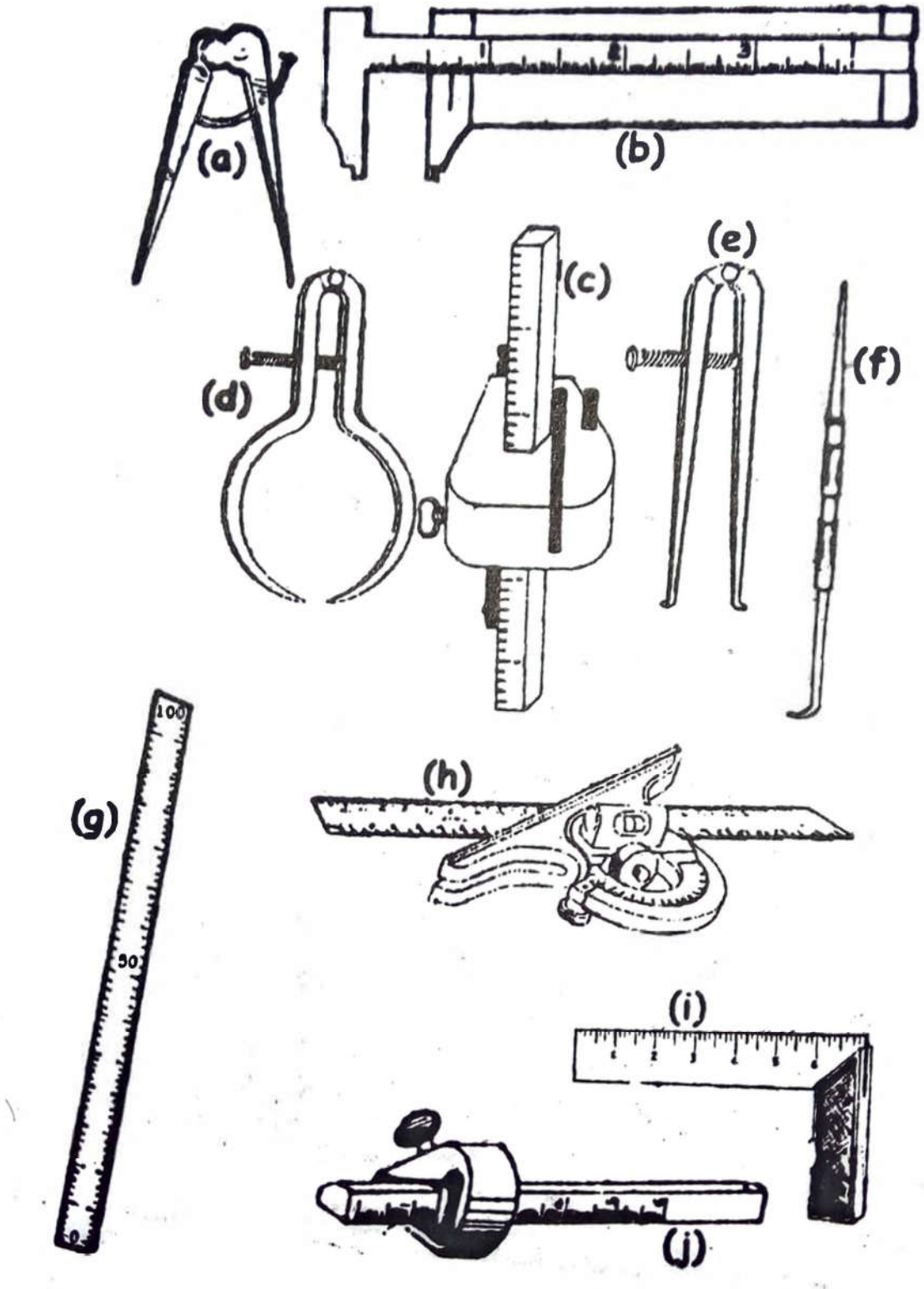
45. Identify the following garden tools. (11 marks)



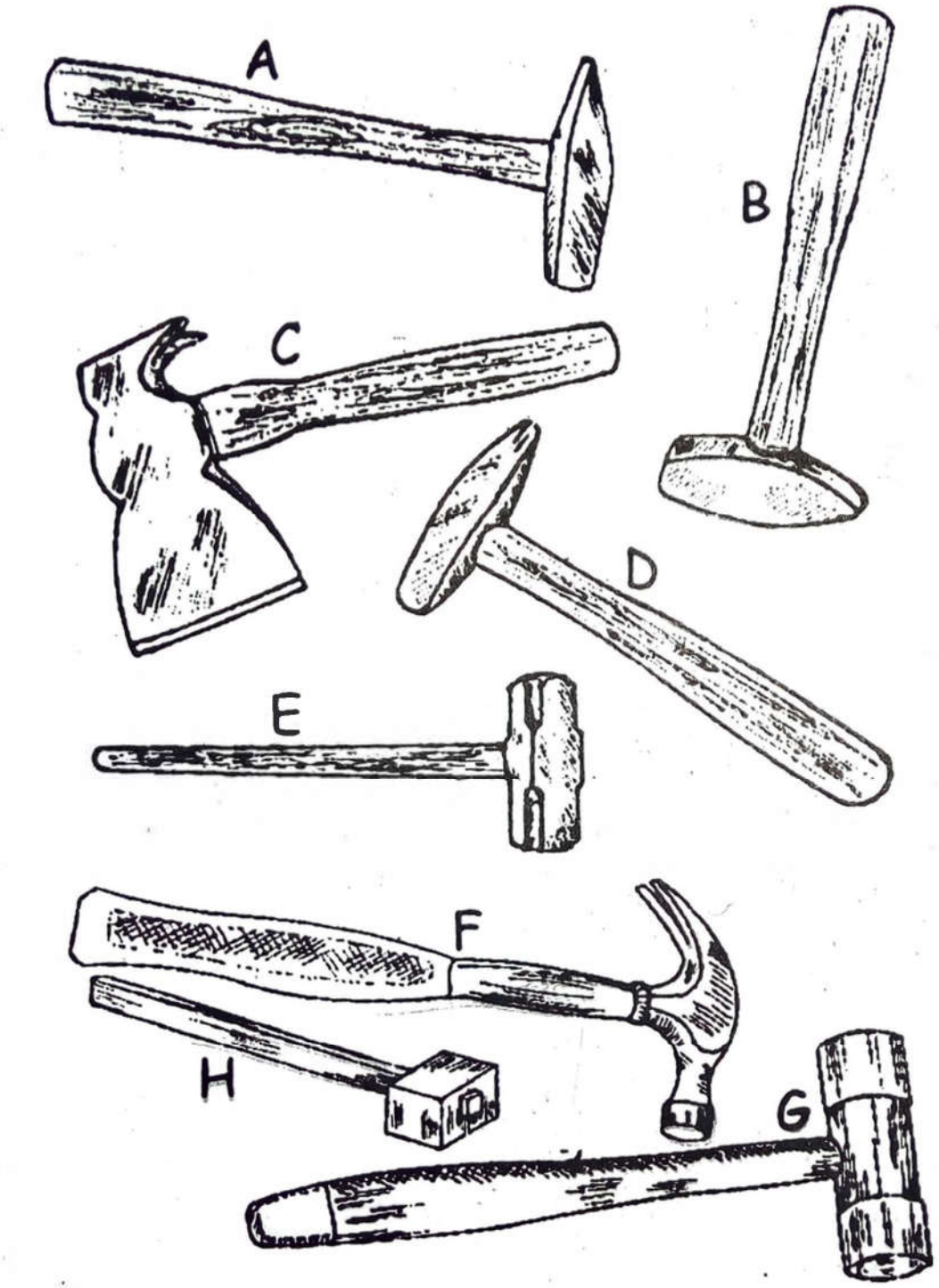
46. Name the livestock production tools and equipment shown below. (9 marks)



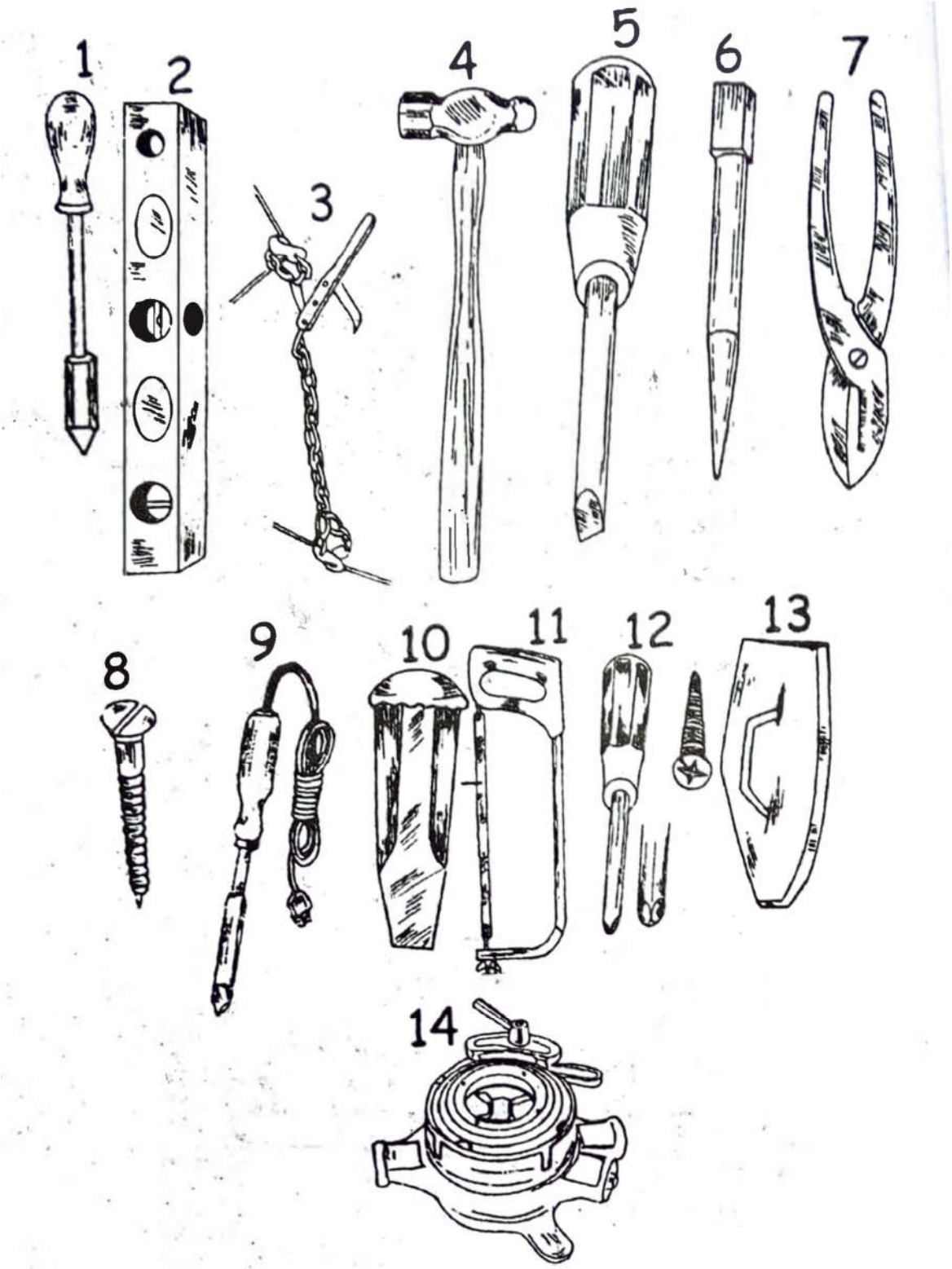
47 Identify the following farm tools/equipmem. (10 marks)



48. Name the following farm tools.



49. Name the tools and equipment shown below. (14 marks)



CHAPTER 06
Answers on
Farm Tools and Equipment

1. (a) Tool
   It is anything held in the hand and used to do work
   (b) Equipment
   It is something used for a specific purpose

2. Reasons for using farm tools and equipment:
   - To increase efficiency on the farm
   - To enhance production
   - To enhance safety on the farm
   - To ease work on the farm

3. Categories into which farm tools and equipment are grouped.
   D Garden tools and equipment
   - Workshop tools and equipment
   - Livestock production tools and equipment
   - Masonry tools and equipment
   - Plumbing tools and equipment

4. (a) These are tools/equipment used to perform most operations in the farm which lead to proper crop production
   (b) (i) Clearing
   panga, machete, axe, slasher, rake
   ii) Digging
   Jembe, Fork jembe, Pick axe, Spade, Garden fork
   iii) Irrigation
   Watering can, Sprinkler, Hose pipe
   iv) Pruning
   Pruning saw, secateurs, pruning shears, pruning knife, pruning hook

v) **Planting**

Garden line, dibber; garden trowel, measuring tape, leveling board, jembe

vi) **Lilting manure**

Shovel, spade, garden fork / manure fork

5. (a) Watering can

(b) A - Handle

B- Rose

C - Spout

(c) Watering seedlings in the nursery and after transplanting

6. Reasons for maintaining farm tools and equipment

- To increase durability
- To reduce replacement cost
- To increase efficiency
- To avoid injury to the user
- To avoid damage to the tool.

7

	Tool/ equipments	use
a)	Machete	Clearing the bush in the shamba
b)	Pick axe	Removing roots, large stones and breaking heavy soils, digging hard soils
c)	Pruning knife	Pruning tea
d)	Rake	Removes weeds from cultivated area and levels the ground used in the nursery preparation
e)	Garden Trowel	Lifting seedlings from the nursery.

8.

	Identity	Use
J	Dibber	Making hole for transplanting / planting
K	Secateurs	Pruning soft branches
L	Pruning saw	Pruning or cutting hard branches e.g. coffee
M	Leveling board	Leveling the nursery bed

9. Safety practices that should be taken when using farm took

- Leaving tools in a. safe place after use
- Using the tool for its right purpose
- Maintaining tools in good working condition
- Handling tools correctly when in use
- Using safety devices such as fire extinguishers and first aid kits in workshops to reduce accidents
- Storing tools properly in tool cabinets or in tool racks
- Cleaning tools after use.

10. Maintenance practices carried out on a wheel barrow

- Grease the wheel axle to minimize wear and tear
- Clean after use
- Replacing or repairing all broken parts

11. (a) Knapsack sprayer

(b) P: Spray tank
Q: Hose pipe
R: Trigger
S: Preumatic lever
T: Nozzle
U: Handlance

c) **Functions of parts labeled T, U and V**

T: Breaking into fine droplets the chemical solution
U: Applying pressure
V: To ease handling/carrying on the back

d) Stirrup (bucket) pump

12.

	Tool/ equipments	Function
a)	Soil auger	Making holes for fencing pests
b)	Garden shears	Trimming hedges
c)	Measuring tape	Measuring distances
d)	Pick axe	Cutting big trees and roots and splitting logs of wood
e)	Knapsack sprayer	Applying agro-chemical by spraying.

13.(a) (i) **Tools for** transplanting seedlings

- Garden trowel
- Dibber
- Watering can

ii) **Tools for** preparing nursery bed

- Rake
- Jembe
- Measuring tape
- Fork jembe
- Machete
- Wheel barrow
- Leveling board

b) Uses of the various hand tools in the construction of the Kenya top Bar hive.

	Tool	Uses
i)	Claw hammer	For driving nails in and removing nails from wood
ii)	tape measure	For measuring lengths of pieces of material to be used
iii)	Tinsnip	For cutting sheet metal
Iv)	Clamp	For holding pieces of wood together when joining or cutting

V)	Handsaw	For cutting wood
vi)	Mallet	For hitting the chisel when boring holes in wood
vii)	Pliers	For cutting wires
viii)	Jack plane	For smoothening wood
ix)	Try square	For determining right angles on cutting points on timber
x)	Marking gauge	For marking parts to cut
xi)	Ball pein hammer	Straightening and shaping sheets of metal

c) Tools / equipment required during milking and state one use for each

	Tools / equipment	Use
i)	Milk bucket/pail	Holding milk
ii)	Milk churn	Holding milk in transit and storage
iii)	Milk stool	sitting on while milking
iv)	Rope	Restraining the animal
v)	Strip cup	Testing / checking for mastitis.
Vi)	Milk weighing balance	Measuring amount of milk per animal
vii)	Milk strainer	Straining milk to remove sediments and hairs
viii)	Hand broom	Washing or scrubbing floors

14. a) Castration

Burdizzo, Elastrator and rubber ring, scapel

b) Dehorning

Elastrator and rubber ring, dehorning iron, dehorning wire

c) Administration of drugs ,
Drenching gun, Bolus gun, Hypodermic needle and syringe

15.

	Tools /equipment	Use
A ’	Wool Shears	Clipping fleece from sheep
B	Hoof cutter	Trimming / cutting elongated hooves
C	Trocar and canular	Treatment of bloat / removal of gases that cause bloat in ruminants
D	Bull ring	Restraining bulls / oxen
E	Dehorning wire	Cutting of mature horns

16.

	Tools /equipment	Use
a)	Stir-up pump	Hand spraying to control ticks on livestock
b)	Ear notcher	Cutting special shapes at the edges of ears in animals to indicate numbers for identification purposes
c)	Clinical/veterinary thermometer	Taking body temperature of the animal
d)	Chaff cutters	Cutting fodder into small bits before being fed to animals
e)	Lead stick	It is attached to the ring and used to read the bull thus control its movements
f)	Halter	Helps in the control of an animals movement especially during animal parades

17. General purposes of workshop tools and equipment
- Construction of farm structures
- Repair of other tools and equipment
- Maintenance of other tools and equipment

18. Factors that determine the type of workshop tools found in a farm.
- Type of enterprise
- Scale of production
- Availability of skilled labour

19. Broad categories of workshop tools and equipment
- Woodwork tools and equipments
- Metalwork tools and equipments

20. Categories of woodwork tools and equipment
- Cutting tools and equipment
- Smoothing tools and equipment
- Measuring tools and equipment
- Layout and marking tools and equipment
- Boring tools and equipment
- Holding tools and equipment
- Sharpening tools and equipment
- Wrecking tools and equipment
- Assembling tools and equipment

21. a) Cutting tools

b)

	Tool	Function
1.	back/tenon saw	Fine sawing and small work cutting
2.	Compass saw	Making curved or irregular slits on thin wood and timber
3.	Keyhole saw	Cutting or making key holes and slots in wood
4.	Coping saw	Cutting curves on thin wood

c) **Maintenance** practices carried out **on** the above tools

- Teeth setting
- Tightening loose screws and nuts
- Straightening the blade when bent
- Hanging them properly after work to prevent possible damage
- Oiling the blades when storing for long periods
- Regular cleaning
- **Replacing/repairing** broken handles
- Regular sharpening of the teeth

22. i) Hand saw

ii)

A - Back
B - Blade
C - Toe
D - Teeth
E - Heel

iii) Repair / replace it if broken

23. a)

- Rip saw
- Cross cut saw

b)

cross cut saw'	Rip saw
It has forward sloping teeth	Has teeth that are perpendicular to the blade
The teeth are filed at an angle to each other	It is filed at right angle to the blade
It is held at an angle of 45^0 to the work when cutting	It is held to an angle of 60° to the work when cutting
It is used to cut wood across the grain	It is used to cut wood along the grain

24. a) Wood chisel

b) A - Shoulder

B -Head

C - Handle

D - Bevel edge blade

E - Cutting edge

c) - Replace handle if broken

- Grinding bevel edge blade to maintain the angle
- Sharpen when necessary

25.

	Function	Tools
a)	Smoothing	Planes, scrapers, Routers, Sandpaper, rasp
b)	Measuring	Rulers, pocket tapes, calipers, squares
c)	Layout and marking	Marking gauge, mortise gauge, divider, scriber
d)	Boring	Hand drills, breast drills, bits, brace drills, electric drills
e)	Holding	G-clamp, quick action vice, sash clamp, F- clamp and bench vice
f)	Sharpening	Files, Grinding stones, Oil stones
g)	Wrecking	Wrecking hammer, mason's hammer, sledge hammers
h)	Assembling	Claw hammers, screw drivers, mallet.

26.

- Block plane
- Smoothing plane
- Jack plane

27. Robbot plane, Matching plane, circular plane, universal plane, bull nose plane.

28.
- Replace knobs or handles when broken
- Check or replace any worn out parts of a plane
- Replace worn out plane iron and cap iron
- Sharpen cutting edge of blunt plane iron on an oil stone
- Draw back the plane iron after work and place the plane on its side in the tool rock

29. (a) Plane iron
(b) P- cutting edge
Q-slot for lower cap screw
R- cap iron screw
S- slot for "y" adjustment
T- plane iron cap
U- slot for lateral adjustment
V- plane iron or blade
W- slot for lateral adjustment

30. Types of scrapers
Hand scraper, cabinet scraper, spoke shave

31. a) Try square
b) Calipers
c) Jack plane
d) Smoothing / finishing plane

32. Types of rulers used in measuring in farm work
Bench rule, folding rule, slide rule, zigzag rule

33. Functional difference between marking gauge and mortise gauge.
Marking gauge marks or scribes a line which is parallel to the edge of a piece of wood while a mortise gauge give two marking lines at the same time.

34. (a) X - Auger bit

Y- Expansive bit

Z- Countersink bit

(b) S- Tang

T- Shank

(c) It has spars while Y and Z do not

It has feeding screws while Y and Z do not

(d) Hand drill, bits -brace drills, electric drills

35. (a) 1 - G- clamp

2 - Oil stone

3 - Mason's hammer

4 - Mallet

(b) 1 - Holding objects securely on the bench during various operations

2- Sharpening the cutting edges of other tools

3 - Demolishing farm structures; breaking big stones

4 - Hammering or hitting wood chisels and wooden pegs

36. (a) - Star headed

- Straight slot

(b) Use of each of the screw driver named in (a) above.

Star headed screw driver is used for driving in or removing star headed screw while straight slot is used for removing or driving the slot head screw in wood and metal

37.

	Tools / equipment	**Use**
i.	**Hacksaw**	**Cutting metal rods and plates**
ii.	**Clod Chisel**	**Cutting thick sheets of metal**
iii	**Tinsnips**	**Cutting thin sheets of metal**
iv.	**Pliers**	**Cutting and straightening wires; tightening / loosening nuts and bolts**
V.	**Wire strainers**	**Tightening wires during fencing**
vi.	**Ball pein hammer**	**riveting and striking the head of cold chisel; straightening bent metal surfaces**

vii	Centre punch	Marking the point for drilling
viii.	Riveting machine	Fixing rivets when joining pieces of metal or plastic materials
ix.	Soldering gun	melting soldering rods when repairing or fabricating metal sheets
x.	Claw bar	Removing long nails from wood; straining fencing wires; digging fencing holes

b) Metal work tools and equipments.

38. - Replacing broken handles
- Fixing the hand firmly
- Storing them properly

39.

	Tool	Use
J	Open-ended spanner	Open or loosen specific sizes of bolts and nuts
K	Ring Spanner	Open or loosen nuts of specific sizes and gives them firmness
L	Adjustable spanner	Open and loosen nuts of different sizes

40.

	Use	Tools / equipment
a.	Placing mortar be tween construction stones and bricks	Manson's trowel
b.	Plastering to create a level surface of water walls and floors	Wood float
c.	Spreading creed over floors or walls	Steel float
d.	Checking whether a surfaces is vertical or horizontal	Spirit level

e.	Checking whether a tall wall is vertical	Plumb bob
f.	Checking right angles during construction	Mason's square
g	Scooping and mixing concrete or mortar	Spade
h.	Carrying loads and measuring sand and ballast	Wheel barrow
i.	Removing rough stone surfaces	Mason's hammer

41. (a) X- pipe cutter- cutting PVC pipes
Y- Pipe wrench - Holding, tightening and loosening metallic pipe.

(b) Stock and die; adjustable spanner; combination square; hacksaw; screw driver; sash clamp; tape measure;

42. Maintenance practices carried out on masonry and plumbing tools

-Clearing after use
- replacing hack-saw blade
- replacing broken handles
- Lubricating moving parts such as nuts and wheels to reduce friction
-Using a coolant oil to increase grip when cutting metals.

43. a) Mallet
b) Bits
c) Ball pein hammer
d) Screws
e) Wood float

44.

Tool / equipment	Use
Mason's trowel	placing mortar between construction stone and bricks
Steel floats	spreading creed over floors or walls
Plumb bob	checking whether a tall wall is vertical
Mason's square	checking right angles during construction

45.

1. Matchete
2. Slasher
3. Pick axe
4. Pruning shears
5. Shovel
6. Axe
7. Pruning knife
8. Sickle
9. Spade
10. Garden fork / manure fork
11. Soil auger

46.
A: Burdizzo
B: Rope
C: Dehorning iron.
Milk weighing balance.
E: Elastrator
F: Milking churn
G: Strip cup
H: Milk strainer
I: Scalpel

47. (a) Divider
(b) Caliper rule
(c) Mortise gauge
(d) Outside caliper
(e) Inside caliper
(f) Scriber
(g) Meter rule
(h) Combination square
(i) Try square
(j) Marking gauge

48. A: Wedge Hammer
B: Sledge hammer
C: Wrecking axe
D: Sledge hammer
E: Mason's hammer
F: Claw hammer
G: Plastic headed mallet
H. Mallet

49. 1. Non-electric soldering gun
2. Spirit level
3. Wire strainer
4. Ballpein hammer
5. Straight slot screw driver
6. Centre punch
7. Tinsman's snips
8. Straight - slot screw
9. Electric soldering gun
10. Cold chisel
11. Hacksaw
12. Star-headed screw driver and screw
13. Wood float
14. Stock and die

CHAPTER 07
Questions on Crop Production 1 (Land Preparation)

1. List any five reasons for minimum tillage. (5 marks)

2. Under what four conditions is clearing of land necessary? (4 marks)

3. Distinguish between land preparation and land clearing. (2 marks)

4. Give five reasons why the burning of bushes as a method of land clearing should be discouraged. (5 marks)

5. a) Define tertiary operations. (1 mark)
   b) Name three examples of tertiary operations. (3 marks)

7. a) What is meant by the term seedbed? (1 mark)
   b) Give six reasons for seedbed preparation. (6 marks)

8. Why should primary cultivation be done early before the onset of the rains. (3 marks)

9. Give three ways through which primary cultivation is achieved. (3 marks)

10. State three factors that determine depth of cultivation. (4 marks)

11. What three factors determine the choice of implements for primary tillage? (3 marks)

12. **Give** four reasons for carrying out secondary tillage. (4 marks)

13. List four factors that determine the number of secondary cultivation to be done on a seedbed. (4 marks)

14. a) Define minimum tillage. (1 mark)
    b) Outline five farming practices involved In minimum tillage. (5 marks)

15. a) What is meant by sub-soiling. (1 mark)
    b) For what reasons is sub soiling done. (4 marks)
    c) Name three implements used in sub soiling. (3 marks)

16. Explain the significance of the following tertiary operations. (3 marks)
    a) Ridging
    b) Rolling
    c) Leveling

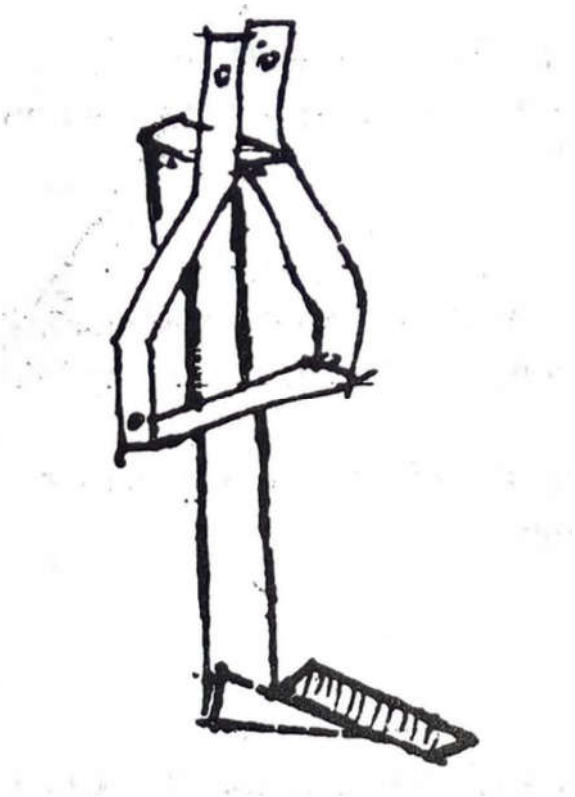
17. Define the following farming practices. (3 marks)
    a) Ridging
    b) Rolling
    c) Leveling

18. Name five methods of land clearing. (5 marks)

19. State the major operations earned out in seedbed preparation. (4 marks)

20. Define the following terms as used in land preparation.
    a) Land clearing
    b) Primary cultivation
    c) Secondary cultivation (3 marks)

21. the diagram below shows an implement used in land preparation.



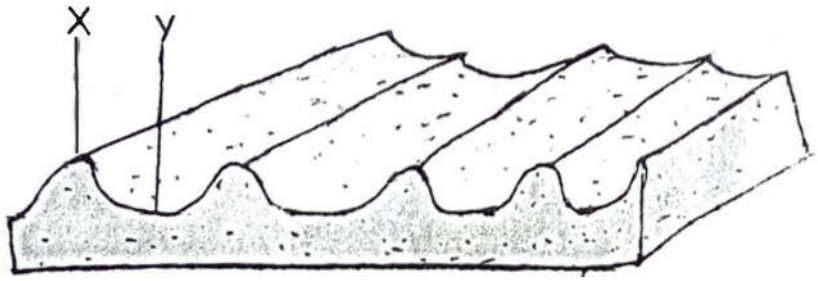
a) Identify the implement. (1 mark)
b) State four uses of the implement named in (a) above. (4 marks)

22. Give three advantages of using hand implements during primary cultivation. (3 marks)

23. Name four tractor-drawn implements that are used in primary cultivation. (4 marks)

24. Name four implements used to carry out secondary cultivation. (4 marks)

25. The diagram below shows a tertiary operation carried out on a seedbed.



a) identity the operation. (1 markj

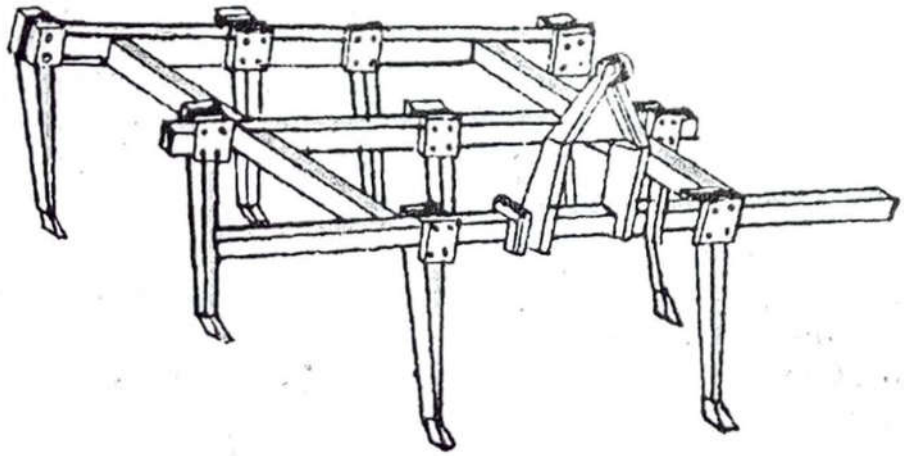
b) Name the parts labeled X and Y on the diagrams.

(2 marks)

c) State the importance of the operation named in a) above.

(1 mark)

26. The diagram below represents a tractor drawn implement used in land preparation.



(a) Identify the implement above. (1 mark)

(b) State the main use of the implement named in (a) above. (1 mark)

(c) Name two other implements that can be used for the same purpose as the one shown above. (2 marks)

CHAPTER 08
Answers on Crop Production 1 (Land Preparation)

1 Reasons for minimum tillage

- Plant roots are not disturbed
- Micro-organisms are not disturbed
- Moisture conserved in the soil
- Soil structure not destroyed
- Control soil erosion
- Prevent exposure of humus to adverse conditions such as sun's heat that cause volatilizations of nitrogen
- Reduces the cost of cultivation or ploughing.

2. Conditions under which clearing of land is necessary

- When opening up virgin land
- Where a stalk growing crop was previously planted
- Where the interval between primary and secondary cultivation is long such that land has reverted to the original virgin state
- Where land was left fallow for a long time.

3. **Land preparation** entails all activities that make land suitable for planting

Land clearing is the removal of vegetative cover from the surface before land is tilled.

4. Reasons why the burning of bushes as a method of land clearing should be discouraged

- Destroys organic matter
- Destroys soil micro-organisms
- Destroys plant nutrients
- Leads to water loss through evaporation
- Destroys soil structure
- Exposes soil to agents of erosion
- Fire may spread to unwanted parts.

5. a) **tertiary operations**

Operations carried out to suit production of certain crops. They are carried out after land clearing, primary and secondary cultivations,

b) Examples of tertiary operations

- Ridging
- Rolling
- Levelling

7. **a)** A **seedbed** is a piece of land that is prepared ready to receive planting materials,

b) **Reasons for** seedbed **preparation**

- To enable water to infiltrate
- To kill weeds
- To improve soil aeration
- To destroy pests and diseases
- To incorporate organic matter in the soil
- For easy planting
- To facilitate root penetration.
- To facilitate other operations

8. Why primary cultivation should be done early before the onaet of the rains

- Give time for soil organisms to act on organic matter
- Allows gaseous exchange to take place, thus carbon oxide diffuses out of the soil while oxygen enters into the soil
- Allow other operations to take place in time

9. Ways through which primary cultivation is achieved

- Hand digging
- Mechanical cultivation
- Use of an ox-plough

10. Factors that determine depth of cultivation

- The type of crop to be planted / size of seeds
- The implements available
- The type of soil

11. Factors that determine the choice of implements for primary tillage

- The condition of the land
- The type of tilth required / type of crop
- Depth of cultivation

12. Reasons for carrying out secondary tillage

- To remove the germinating weeds
- To break soil clods to produce required tilth
- To level the seedbed for uniform planting
- To incorporate organic matter / manure into the soil

13. Factors that determine the number of secondary cultivation to be done on a seedbed

- Soil moisture content
- Size of the planting materials
- Condition of the soil after primary cultivation

14. a) **Minimum tillage**

This is the application of a combination of farming practices with the aim of reducing the disturbance of the soil.

b) **Farming practices involved in minimum tillage**

- Use of herbicides
- Mulching and cover cropping
- Timely operations to prevent weed infestations
- Strip cultivation
- Uprooting and slashing of weeds

15. (a) **Sub-soiling**

Deep cultivation into the subsoil layer to break up only hardpan which might have developed

b) Reasons for sub soiling

- To facilitate drainage
- Bring up leached nutrients to the surface
- increase aeration of the soil
- **To** improve root penetration

c) **Implements used in sub soiling**

- Chisel ploughs
- Cultivators
- Sub-soilers
- Rippers

16.a) **Ridging** - It allows root expansion and for soil and water conservation; Ease harvesting of root crops.

b) **Rolling** - It increases seed-soil contact and prevents wind erosion

c) **Leveling** - It promotes uniform planting

17.a) **Ridging**

The process of digging soil on a continuous line and heaping on one side to produce a furrow and a bund (ridge)

b) **Rolling**

It is the compaction of soil to produce a firm surface

c) **Leveling**

It is the production of an even uniform surface

18. **Methods of land clearing**

- Tree felling
- Burning
- Slashing
- Use of chemicals
- Removal of stumps
- Removal of trash

19. **Major operations carried out in seedbed preparation**

- Land clearing
- Primary cultivation
- Secondary cultivation
- Tertiary operations

20. (a) **Land clearance**

The removal of vegetative cover from the surface before land is tilled

b) **Primary cultivation**

This is initial opening of the land either after clearing the bush or following a previous crop.

c) **Secondary cultivation**

These are the operations which follow the primary cultivation.

21. a) Sub soiler

b) **uses of the implement named in a) above**

- Loosening soil
- Breaking hard pan
- Burying residues of previous crop
- Removing deep-rooted perennial weeds

22. **Advantages of using hand implements during primary cultivation**

- It is economical to use small-scale operations
- Less skill is required to carry out the operations.
- Maintenance requirements and cost of tools used in land hoeing are less.

23. **Tractor-drawn implements that are used in primary cultivation**

- Mould board ploughs
- Disc ploughs
- Rotavators
- Subsoilers / chisel ploughs

24. Implements used to carry out secondary cultivation

- Rollers
- Rotavators
- Ridgers
- Harrows

25. a) Ridging

b) X - Ridge
Y - Furrow

c) **Importance of the operation named in a) above**

- It encourages tuber expansion
- It allows easy harvesting of root crops.

26. (a) Chisel plough.

(b) Sub-soiling/breaking up hard pans.

(c) □ cultivators
□ sub-soilers

CHAPTER 09
Questions on Water Supply, Irrigation and Drainage

1. Name three types of pipes used in conveyance of water. (3 marks)
2. Give the use of the following chemicals in water treatment.
   a) Alum
   b) soda-ash
   c) Chlorine (3 marks)

3. Name three methods of surface irrigation. (3 marks)

4. a) Explain the term conveyance of water. (1 mark)
   b) State three methods of conveyance of water. (3 mark)

5. Give three poor cultivation practices that cause water pollution. (3 marks)

6. Distinguish between wells and boreholes. (2 marks)

7. Name the four main types of water pumps. (4 marks)

8. List three surface water sources found in a farm. (3 marks)

9. Give two examples of each of the following categories **of** water pipes.
   a) Metal pipes
   b) Hose pipes

10. List three methods of treating water for use on the farm. (3 marks)

11. State four features considered when choosing water pipes for use on the farm. (4 marks)

12. Give four reasons for treating water for use on the farm. (4 marks)

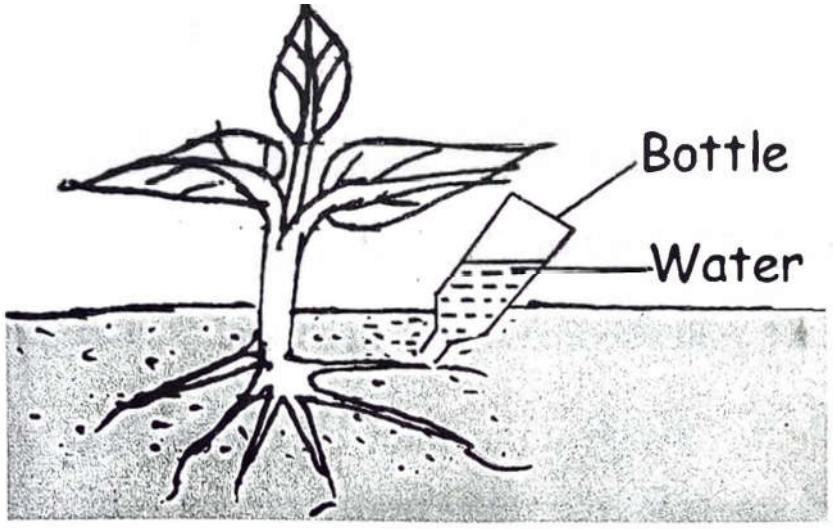
13. Distinguish between a dam and a weir. (2 marks)

14. Give four disadvantages of using plastic pipes for conveyance of irrigation water. (4 marks)

15. State six factors a farmer should consider when choosing the method of irrigation to use in an area. (6 marks)

16. a) Describe sub-surface irrigation. (1 mark)
b) Give six advantages of sub-surface irrigation. (6 marks)

17. The diagram below represents an irrigation system



a) Identify the irrigation system shown. (1 mark)
b) Give four advantages of the system named in (a) above. (4 marks)

c) Outline two disadvantages of the system above. (2 marks)

18. Give three ways by which water can be applied to crops in overhead irrigation. (3 marks)

19. List five advantages of overhead irrigation. (5 marks)

20. State five disadvantages of sprinkler irrigation. (5 marks)

21. How should sprinklers and pipes used in overhead irrigation be maintained? (3 marks)

22. Under what conditions are the following systems of irrigation practiced? (4 marks)
a) Surface irrigation
b) Sub - surface irrigation
c) Overhead or sprinkler irrigation
d) Drip or trickle irrigation

23. Define the term drainage? (1 mark)

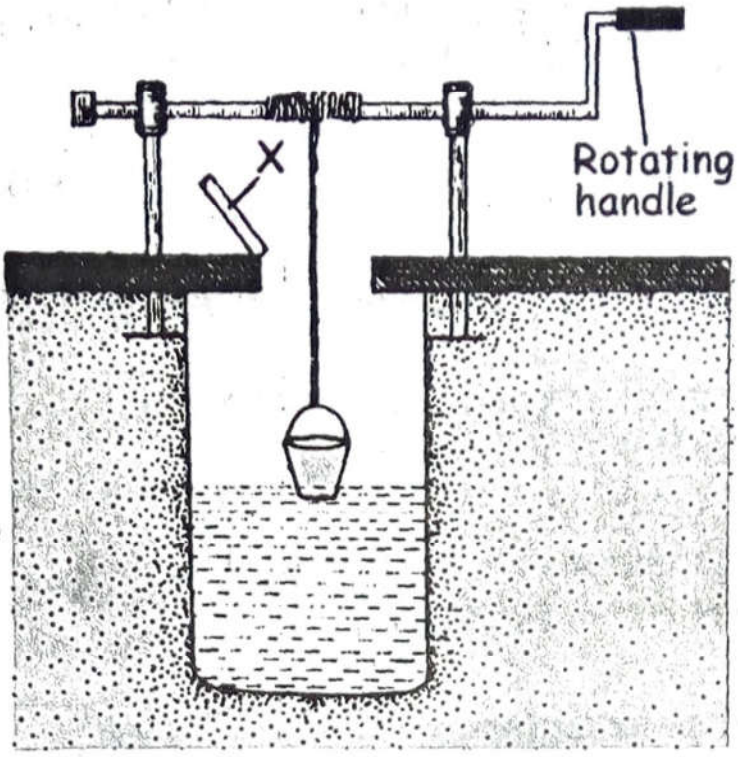
24. Give six reasons why farmland should be drained. (6 marks)

25. Outline five causes of poor drainage on farmland. (5 marks)

26. Name six methods that can be used to drain farmland. (5 marks)

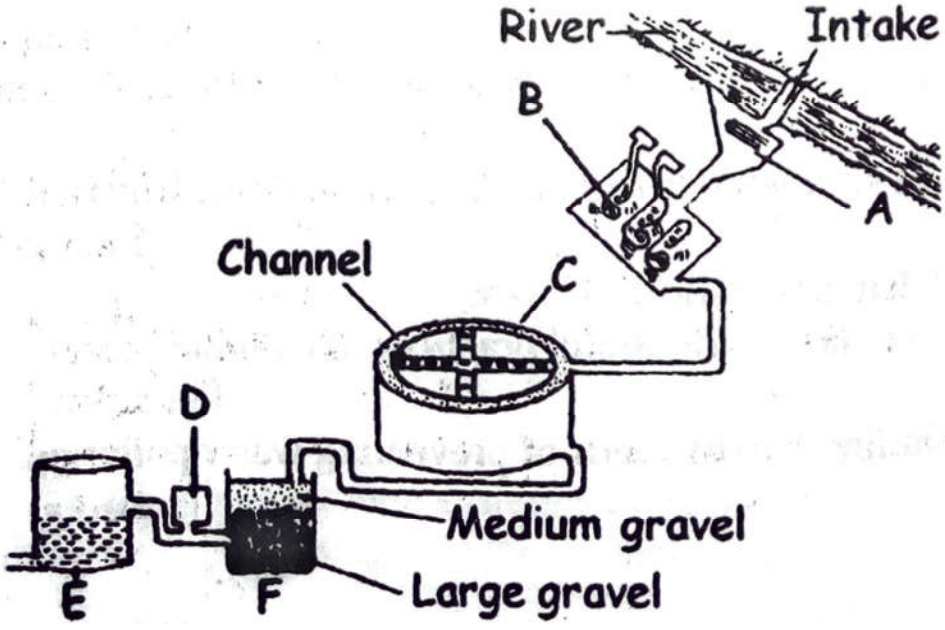
27. a) What is pollution. (1 mark)
b) Give three agricultural practices that pollute water. (3 marks)
c) Outline five methods of preventing water pollution. (5 marks)

28. The diagram below represents a water source.



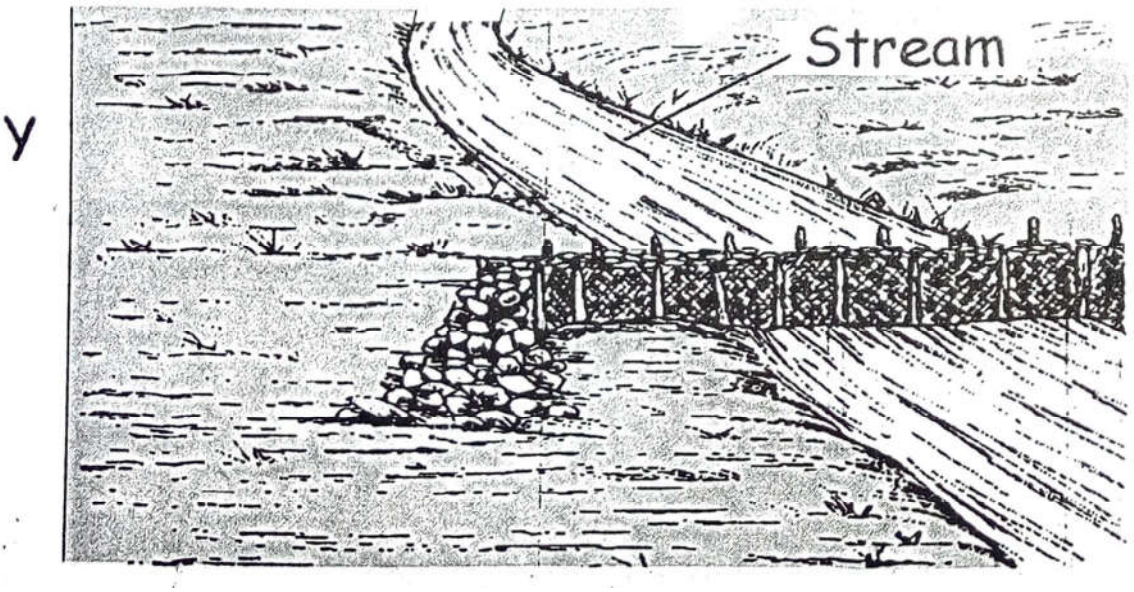
(a) Identify the source above. (1 mark)
(b) State two uses of the part labeled X. (2 marks)

29. Use the diagram below to answer the questions that follows.



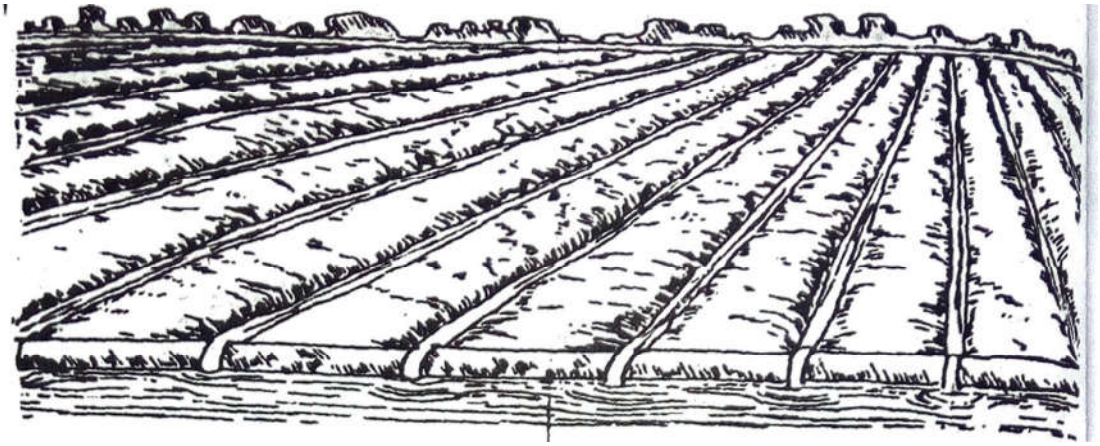
(a) What does the diagram above represent? (1 mark)
(b) Name the stages labeled A - F. (6 marks)

30. The figures below represent two methods of water collection.



(a) Identify the two methods shown. (2 marks)
(b) Other than water collection, state the other use of structure X. (1 mark)

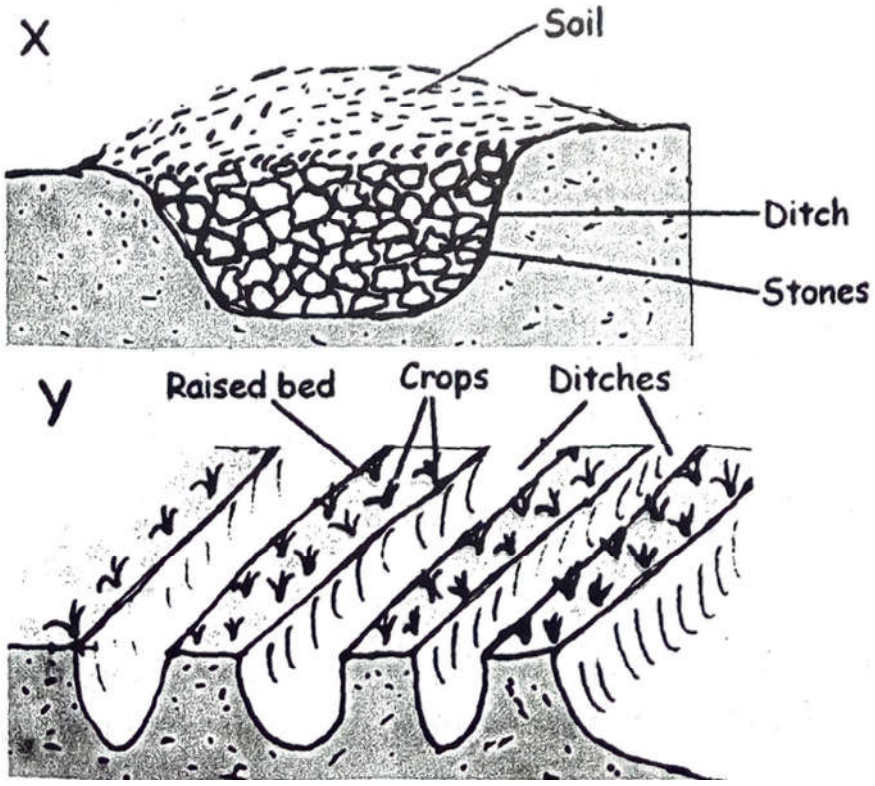
31. The diagram below shows a method of irrigation.



(a) Identify the method above. Imk

(b) State two advantages of the method named in (a) above. 2mks

32. The diagrams below represent two methods of drainage



(a) Identify the two methods. 2mks

(b) How does method X work? Imk

CHAPTER 10
Answers on Water Supply, Irrigation and Drainage

1. Types of pipes used in conveyance of water

- Metal pipes
- Plastic pipes
- Hose pipes

2. Use of the following chemicals in water treatment

a) **Alum:** Helps coagulate solid particles which finally settle down to the bottom of the sedimentation tank.

b) **soda-ash:** Softening the water

c) **Chlorine:** Kills micro-organisms in water

3. Methods of surface irrigation

- Flood irrigation
- Furrow irrigation
- Basin irrigation

4. a) Conveyance of water

The process of moving water from one point mostly the source or point of storage to where it will be used or stored.

b) **Methods of conveyance of water**

- Piping
- Use of containers
- Use of canals

5. Poor cultivation practices that cause water pollution

- Over cultivation
- Overgrazing
- Cultivation along river banks
- **Use** of fertilizers

6. **Difference between wells and boreholes**

Wells are shallow holes dug in the ground until the water table is reached whereas **boreholes** are deep holes drilled or sunk into the ground by use of drilling machines.

7. **Main types of water pumps**

- Centrifugal / rotar dynamic pumps
- Piston / reciprocating pumps
- Semi-rotary pumps
- Hydram

8. **Surface water sources found in a farm**

- Dams/ weirs
- Streams
- Rivers
- Ponds
- Lakes

9. **Examples of each of the following categories of water pipes**

a) **Metal pipes**

- Galvanised iron pipes / steel iron pipes
- Aluminium pipes
- Copper pipes

b) **Hose pipes**

- Rubber hose pipes
- Plastic hose pipes / PVC pipes

10. **Methods of treating water for use on the farm**

- Chemical treatment/chlorination/soda ash/ sodium hypochlorite
- Filtration
- Boiling
- Aeration
- Sedimentation/decantation/use of Alum

11. Features considered when choosing water pipes for use on the farm

- Durability
- Strength / ability to withstand pressure
- Diameter / size of the pipe
- Workability / maneuverability of the pipe
- Colour (plastic pipes)

12. Reasons for treating water for use on the farm

- Remove chemical impurities
- Kill disease causing organisms
- Remove bad smell and taste
- Remove impurities and solid particles

13. Difference between a dam and a weir

A **dam** is a barrier constructed across a river or a dry valley to hold and raise water level, forming a reservoir or lake while a **weir** consists of a barrier constructed across a river or a stream using stones or concrete to raise the water level and still allow water to flow over it

14. Disadvantages of using plastic pipes for conveyance of irrigation water

- They can burst under high pressure / have less working pressure
- They can become brittle when exposed to the sun.
- They can be grawned by rodents such as moles
- They are less durable compared to metal pipes.
- Can be destroyed during farm operations

15. Factors a farmer should consider when choosing the method of irrigation to use in an area.

- Capital or funds available to cater for initial and maintenance costs
- Soil type
- Topography of the land
- Type of crop to be established
- Source, amount and quality of water
- Chemical composition of the soil

- Economic aspects
- Size of the land to be irrigated
- Source of power to pump the water

16. a) **Sub-surface irrigation**
it involves laying perforated pipes underground to allow water to pass out through the holes and wet the soil around the root zones of crops.

b) **Advantages of sub-surface irrigation**
- It can be practiced on sloping or flat land
- It economizes on the use of water
- It minimizes labour requirements
- Fungal diseases are minimized as water does not accumulate on leaves
- Possible thefts of pipes are minimized
- The cost of constructing dykes or basins or even leveling land are minimized.

17. a) Drip / trickle irrigation

b) Advantages of the system named in (a) above
- Little quantities of water are required hence it is suitable in dry areas
- It reduces buildup pests and disease pathogens
- It reduces growth of weeds between the rows where there is no irrigation
- Water under pressure can be used so long as it flows along the pipe

c) **Disadvantages of the system named in (a) above**
- Pipes are expensive to buy and install
- It requires clean water only as dirty water blocks the pipes

18. Ways by which water can be applied to crops in overhead irrigation
- Use of sprinklers
- Use of watering cans
- Use of hose pipes

19. Advantages of overhead irrigation

- Water is evenly distributed over the required area
- There is less water wastage than in furrow irrigation
- It can be practiced on slopy ground
- Foliar fertilizers can be applied together with irrigation water thus reducing the labour costs.
- Sprinkler systems can easily be moved from one place to another

20. Disadvantages of sprinkler irrigation

- It requires expensive installations
- It encourages fungal diseases due to water accumulation on the leaves
- It causes soil erosion if it is not properly controlled, especially slopy ground
- It may require the establishment of windbreaks.
- Maintenance of the system requires a lot of skill and it is also expensive.

21. How sprinklers and pipes used in overhead irrigation should be maintained

- Lubricating the rotating parts to reduce friction
- Repairing of broken parts
- Cleaning to unblock nozzles

22. Conditions under which the following systems of irrigation practiced

a) **Surface irrigation**
In flat areas with plenty of water

b) **Sub - surface irrigation**
In slopy areas where water is inadequate

c) **Overhead or sprinkler irrigation**
In any area which is not steep

d) **Drip or trickle irrigation**
Where water is little and in relatively sloppy and flat areas

23. Drainage

A method of removing excess water or lowering the water table from a marshy waterlogged land.

24. Reasons why farmland should be drained

- To increase soil volume
- To increase soil aeration
- To raise soil temperature
- To increase microbial activities
- To reduce erosion
- To remove toxic substances

25. Causes of poor drainage on farmland

- Too much rainfall on low lying areas
- High amounts of clay particles in the soil
- Presence of impermeable rock near the soil surface
- Formation of hardpans in the soil
- High water table

26. Methods that can be used to drain farmland

- Open ditches
- Underground drain pipes
- French drains
- Cambered beds
- Planting trees

27. a) Pollution

It is any process which leads to harmful increase in the amount of chemical substance or forms of energy released into the environment by human activities.

b) **Agricultural practices that pollute water**

- Use of inorganic fertilizers
- Use of pesticides
- Poor cultivation practices.

c) Methods of preventing water pollution

- Terracing/cultivation along contours
- Fencing of water sources
- Enforcement by law the use of integrated methods of controlling pests and weeds
- Planting grass along river banks
- Adequate storm water control methods in heavy rainfall areas

28. (a) Well

(b) It prevents accidents and contamination of the well.

29. (a) A water treatment system.

(b) A: Filtration at water intake.

B: Softening of water.

C: Coagulation and sedimentation.

D. Chlorination.

E: Storage

F: Filtration

30. (a) X: Dam

Y: Weir

(b) Storage.

31. (a) Furrow irrigation.

(b) Reduced fungal diseases such as blight since there is no wetness of leaves.

It is cheap to establish and maintain and requires little skills.

32. (a) X : French drain

Y: Cambered beds.

(b) Water from the surrounding area seeps into the drains and is carried into a waterway.

CHAPTER 11
Questions on Soil Fertility I (Organic Manure)

1. Give six disadvantages of farmyard manure. (6 marks)

2. State two routine practices carried out on a compost heap. (2 marks)
3. State four factors considered when selecting site for making compost manure. (4 marks)

4. When is soil said to be unfertile? (5 marks)

5. Explain how mono cropping causes loss of soil fertility. (2 marks)
6. Describe the procedure of preparing farmyard manure. (5 marks)
7. State three benefits of humus in the soil. (3 marks)

8. Give six factors that affect the quality of farmyard manure. (6 marks)
9. List five characteristics of organic manures. (5 marks)

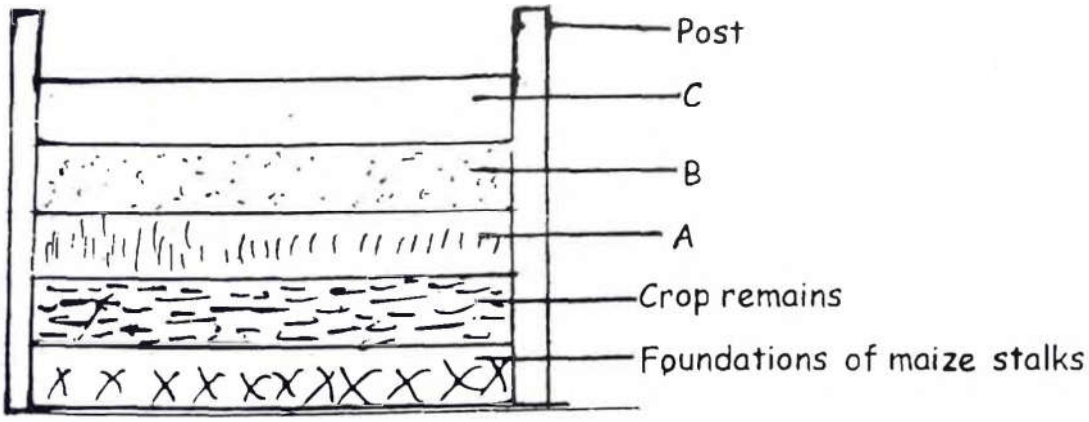
10. Outline six ways through which soil loses fertility. (6 marks)
11. Give eight ways through which soil fertility can be maintained. (8 marks)

12. Name the two methods of preparing compost manure. (2 marks)

13. (a) Define the term soil fertility. (1 mark)
    (b) State five characteristics of fertile soil. (5 marks)

14. (a) What is meant by green manure? (1 mark)
    (b) Give six characteristics of a good green manuring crop. (6 marks)
15. State Five problems associated with the use of manures. (5 marks)
16. Why are green manures not commonly used? (4 marks)

17. Briefly describe the procedure of preparing green manure. (4 marks)
18. The diagram below shows a method of preparing compost manure.



    a) Identify the method. (1 mark)
    b) Name the layers labeled A, B, and C. (3 marks)
    c) Give the reason for including the materials named in b) above into the method of preparation as shown in the diagram above. (3 marks)

19. Outline six factors that determine the quality of compost manure. (6 marks)

20. Explain how burning of vegetation causes loss of soil fertility. (4 marks)

21. How does crop rotation maintain soil fertility? (3 marks]

22. Why are leguminous plants preferred for green manure? (1 mark)

23. Give two precautions taken when preparing compost manure using indore method. (2 marks)

24. State seven benefits of organic matter to the soil. (7 marks)

25. Define the following terms as used in soil fertility.
    a) Manure
    b) Humus (2 marks)

26. Give three types of manures. (3 marks)

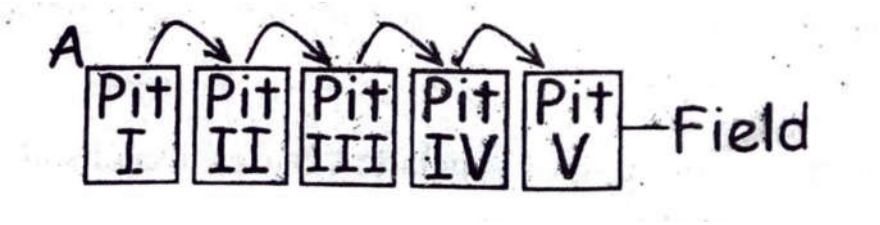
27. State four limitations of compost manures. (4 marks)

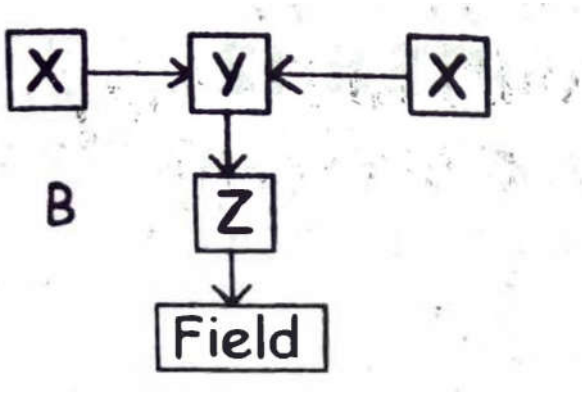
28. Outline three indicators of well decomposed manure. (3 marks)

29. Give five farming practices involved in minimum tillage that maintain soil fertility. (5 marks)

30. List five advantages of compost manure. (3 marks)

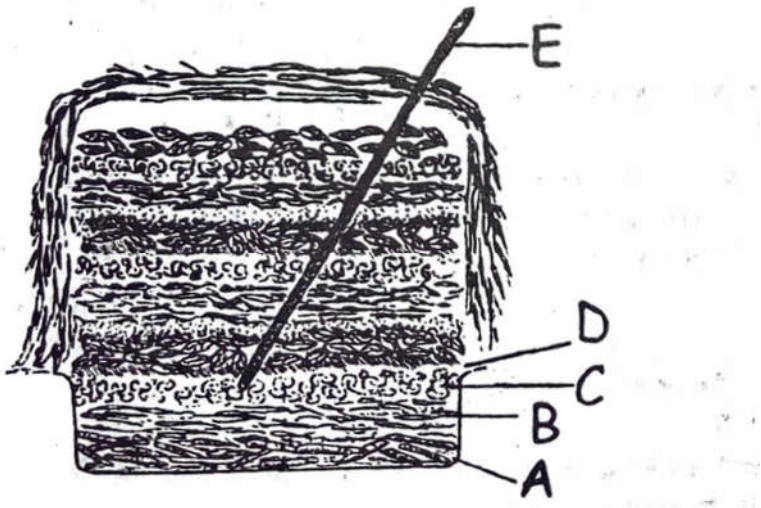
31. The flow diagrams below represent two methods of preparing compost manures.





(a) Name the two methods labeled A and B. (2 marks)
(b) After how long is manure ready for use while using method B? (1 mark)

32. The Figure below represents a compost heap.



(a) Identify the parts labeled A - D 4mks
(b) What is the function of part E? 2mks

CHAPTER 12
Answers on Soil Fertility I (Organic Manure)

1. **Disadvantages of farmyard manure**
   - Release of nutrients by decomposition is slow
   - It's bulky and hence costly to transport
   - It's laborious to handle and apply
   - Less nutrients per given volume or quantity
   - It may burn crop roots if used immediately after making
   - It may be means of spreading weeds
   - It may harbour and also help to spread pests and diseases
   - Nutrient content is very variable and hence it is not possible to determine the nutrient content in a given volume.

2. **Routine practices carried out on a compost heap**
   - Turning at least every three months to facilitate circulation of air within the heap for proper **decomposition**
   - Checking temperature within the heap using a stick (tester) if the temperature inside is high it can be corrected by adding water.

3. **Factors considered when selecting site for making compost manure**
   - A well drained place
   - Direction of the prevailing wind
   - Size of the farm
   - Accessibility

4. Soil is said to be unfertile when:
   - Shallow depth
   - Poorly drained
   - Poor water holding capacity
   - Inadequate nutrient supply

- Incorrect / unsuitable pH
- Excessively infested by soil borne pests and diseases

5. How mono cropping causes loss of soil fertility
   - The crop grown uses only those nutrients it needs while other nutrients remain unused
   - The crop grown exploits nutrients from a certain zone ' where roots can reach
   - There may be building up of pests and diseases if one crop is grown continuously

6. Procedure of preparing farmyard manure
   - Place beddings in the house of farm animals
   - Leave the animals to deposit their droppings and mix them through trampling
   - Replace the beddings after some time
   - The discarded beddings are deposited in a specially prepared shed
   - New layers of used beddings are continually added until a heap is formed.

7. Benefits of humus in the soil
   - It improves water retention and aeration of soil
   - It improves soil structure since it cements clay and other silty particles
   - It gives the soil a dark colour that helps to absorb and retain the sun's heat.

8. Factors that affect the quality of farmyard manure
   - Quality of food given to the animal
   - Type or species of the animal
   - Type of bedding or litter used
   - Method of storage
   - Age of the manure
   - Age of the animal

9. Characteristics of organic manures
    - They release nutrients very slowly
    - They have low nutrient value per unit volume
    - They have a variety of plant nutrients
    - They are bulky
    - They lack residual effects

10. Ways through which soil loses fertility
    - Soil erosion
    - Leaching
    - Denitrification of nutrients
    - Uptake of nutrients by weeds
    - Burning of land
    - Changes in soil pH
    - Development of hardpans and soil capping
    - Monocropping
    - Continuous cropping
    - Accumulation of salts

11. Ways through which soil fertility can be maintained
    - Control of soil erosion
    - Crop rotation
    - Control of soil pH
    - Proper drainage
    - Weed control
    - Intercropping (mixed farming)
    - Minimum tillage
    - Use of manure
    - Use of inorganic fertilizers

12. Methods of preparing compost manure
    - Pit method
    - Four-heap system / stack method

13. a) Soil fertility

    It's the ability of the soil to provide crops with the required nutrients in proper proportions for high production

b) Characteristics of fertile soil

- Good depth
- Proper drainage
- Good water holding capacity
- Adequate nutrient supply
- Correct soil pH
- Free from excessive infestation of soil borne pests and diseases

14 a) Green manure

This is manure obtained by growing a crop particularly legumes, up to the flowering stage and then incorporating it back to the soil.

b) Characteristics of a good green manuring crop

- Highly vegetative and less woody for faster decomposition
- Rich in nutrient content
- Fast growing
- Yields a large quantity of green foliage in a short period
- Adaptable to a vast range of conditions
- Free from pests and diseases
- Have deep well developed root system.

15. Problems associated with the use of manures

- Bulkiness
- Laborious in application and transport
- They spread diseases, pests and weeds
- Loss of nutrients
- If used when not fully decomposed may scorch the crop.

16. Why green manures are not commonly used

- Most of the crops grown are food crops and its hard people to use them as green
- Green manure crops might use most of the soil moisture and leave very little for the next crop
- Most of the nutrients are used up by micro-organism in the process of decomposing the green manure plant.

- It takes time for the green manure crop to decompose and therefore planting is delayed.

17. Procedure of preparing green manure

Plant the green manure crop, allow it to grow up to the flowering stage; incorporate it into the soil through ploughing; allow it to decompose; prepare the field for planting the major crop.

18. (a) Four heap system / stack method

b) A - Manure
B - Wood ash
C - Top soil

c) A - To provide micro-organism that break down the materials
B - To neutralize acidity which discourages bacterial activities
C - To provide micro-organisms which help in decomposition

19. Factors that determine the quality of compost manure

- Quality and variety of material used
- Method of storage
- Period taken by the material to decompose
- Size of the pit or heap
- Rate of mixing to allow air circulation
- Degree of precaution against rain, excessive temperature rise and drying

20. How burning of vegetation causes loss of soil fertility

- Burning destroys organic matter leading to the destruction of the soil structure
- Accumulation of ash formed after burning cause nutrient inbalance in the soil which may lead to unavailability of some nutrients
- Burning destroys micro-organisms thereby interfering with microbial activities such as nitrogen fixation and decomposition of organic matter
- Burning exposes soil to the agents of soil erosion.

21. How crop rotation maintain soil fertility
- It helps to control crop pests, diseases and weeds
- Growing a variety of crops which have significantly different growth habits and nutrient requirements ensures maximum utilization of soil nutrients
- Soil nitrogen content is improved when a legume is included in the rotational programme.

22. Why leguminous plants are preferred for green manure

Because they have a high nitrogen content

23. Precautions taken when preparing compost manure using indore method
- The materials should not be compacted to increase air supply for fermentation
- The pits should be covered to prevent entry of too much water causing water-logging which would otherwise leadto poor decomposition and leaching of nutrients

24. Benefits of organic matter to the soil
- It increases water holding capacity of the soil
- It improves soil fertility by releasing a wide range of nutrients into the soil
- It provides food and shelter for soil micro-organisms
- It improves soil structure
- It buffers soil pH / moderates soil pH
- It reduces the toxicity of plant poisons in the soil
- Moderates soil temperature by its dark colour

25. (a) Manure

These are organic substances that are added to the soil to provide one or more plant nutrients

(b) Humus

This is the end product of decomposition / decomposed organic matter

26. Types of manures
- Green manure
- Farmyard manure
- Compost manure

27. Limitations of compost manures
- It releases nutrients slowly into the soil
- Large quantities of compost manure are required to supply through plant nutrients
- Its preparation is labour intensive
- It may induce soil-borne pests and diseases

28. Indicators of well decomposed manure
- Absence of bad odour
- Materials are lighter
- Manure is brown in colour

29. Farming practices involved in minimum tillage that maintain soil fertility
- Use of herbicides
- Uprooting of weeds
- Mulching
- Strip cultivation

30. Advantages of compost manure
- One does not have to own livestock in order to prepare it
- A lot of manure can be produced within a short time
- A variety of materials can be used in the preparation
- Uses locally available materials thus cheaper than artificial fertilizers
- Improves the soil structure.

31. (a) A: Indore / pit method,
B: Four heap system / stack method.
(b) After six months.

32. (a) A: rough material
B. vegetation
C: manure
D. soil
(b) The stick is used for checking temperatures within the heap from time to time, if the temperature inside is high it can be corrected by adding water.

CHAPTER 13
Questions on Livestock Production I (Common Breeds)

1. Name four exotic dairy cattle breeds. (4 marks)

2. Define the following terms as used in cattle breeds.
   a) Bullock
   b) Steer (2 marks)

3. Name the three dual purpose breeds of cattle. (3 marks)

4. Describe the colour of Berkshire breed of pigs. (1 mark)

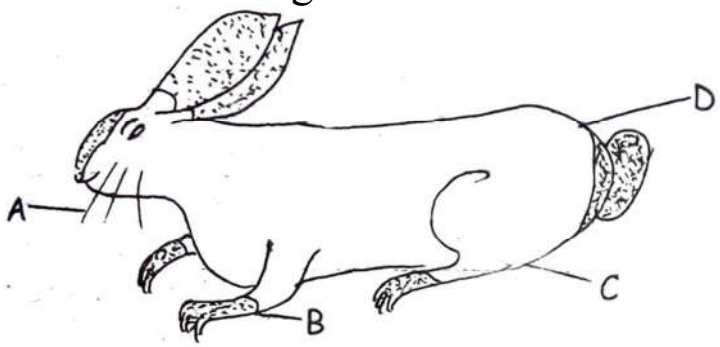
5. Define the following terms as used in livestock breeds.
   a) Gilt
   b) Capon
   c) Doe (3 marks)

6. Complete the table below

Breed	Origin	Colour
Aberdeen Angus		
Galloway		
Hereford		

7. Name four heavy breeds of poultry. (4 marks)

8. Below is a diagram of a rabbit breed



a) Identify the rabbit breed above. (1 mark)
b) Name the parts labeled A, B, C and D. (4 marks)

9. Give six characteristics of exotic cattle breeds. (6 marks)

10. Give two major breeds of camels. (2 marks)

11. Define the following terms as used in description of different age and sex of pigs and poultry. (5 marks)
a) pullet
b) Piglet
c) Gilt
d) Sow
e) Boar

12. Name the type of breed into which each of the following breeds of cattle are classified. (4 marks)
a) Aberdeen Angus
b) Guernsey
c) Sahiwal
d) Redpoll

13. a) Name two breeds of cattle that originated from the channel islands. (1 mark)

b) Give the distinguishing colour for each of the following breeds of livestock. (2 marks)
i) Chinchilla rabbit
ii) Toggenburg goat

14. State four physical characteristics of beef cattle. (4 marks)

15. Name goat breeds reared for production of:
a) Milk (2 marks)
b) Meat (2 marks)
c) Hair (1 mark)

16. Name the two categories of cattle breeds based on the place of origin. (2 marks)

17. Which is the only breed of sheep that produces high quality wool? (1 mark)

18. Differentiate between Essex saddleback and wessex saddleback in terms of colours. (2 marks)

19. List five differences between dromendary and bactrian species of camels. (5 marks)

20. How does the New Zealand white physically differ from California white? (2 marks)

21. Name any three breeds of poultry used to achieve hybrid vigour. (3 marks)

22. What advantages do beef cattle have over dairy cattle? (3 marks)

23. State three differences between large white and landrace breeds of pigs. (3 marks)

24. Arrange the following dairy breed according to their milk productivity starting with the highest producer. (1 mark)
Guernsey, Aryshire, Friesian, Sahiwal, Jersey

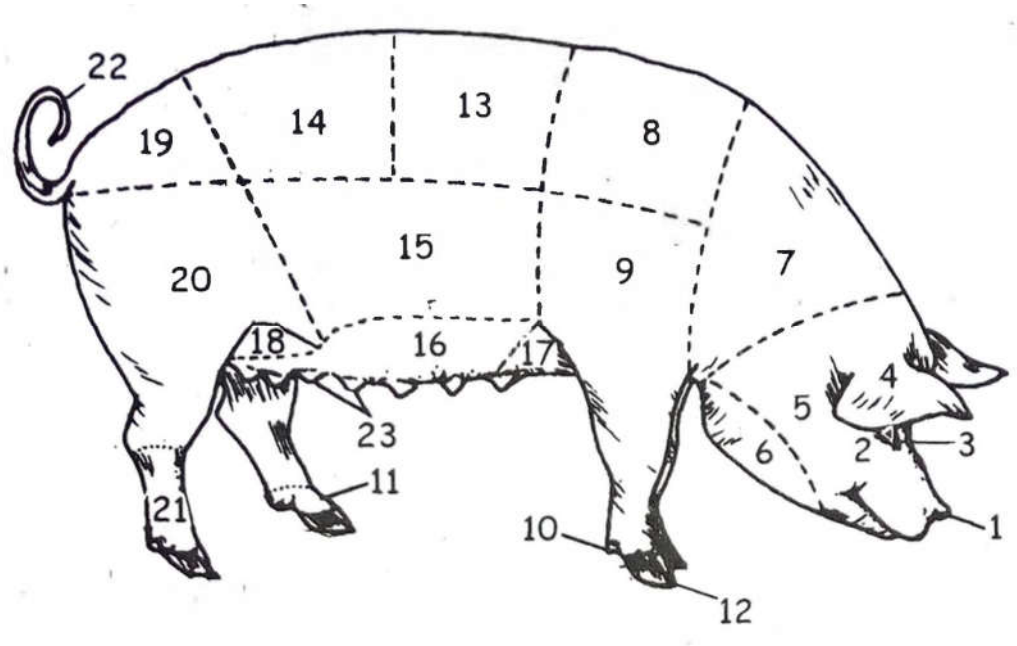
25. Give five characteristics of the original merino. (5 marks)

26. Outline the cultural importance of livestock. (5 marks)

27. Below is a photograph of a pig breed.

(a) Identify the breed. lmk
(b) Give three reasons for your answer in (a) **above.**
(3 marks)

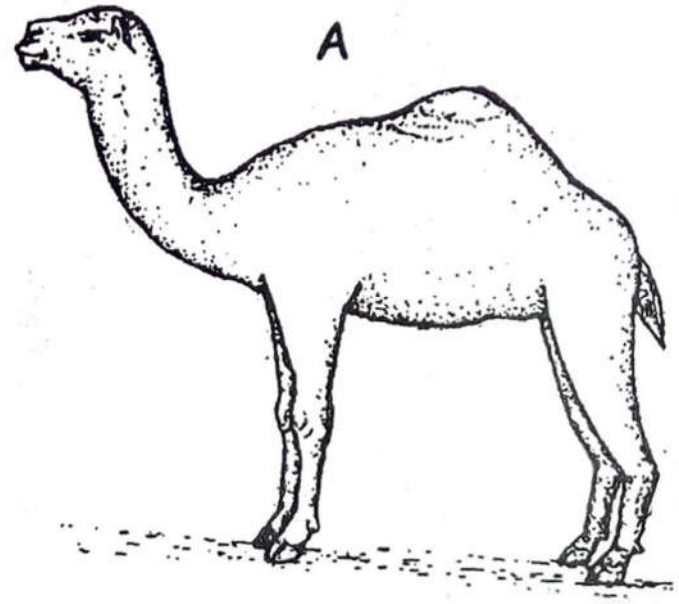
28. The figure below illustrates external parts of a pig. Name the parts labeled 1-23. (12 marks)

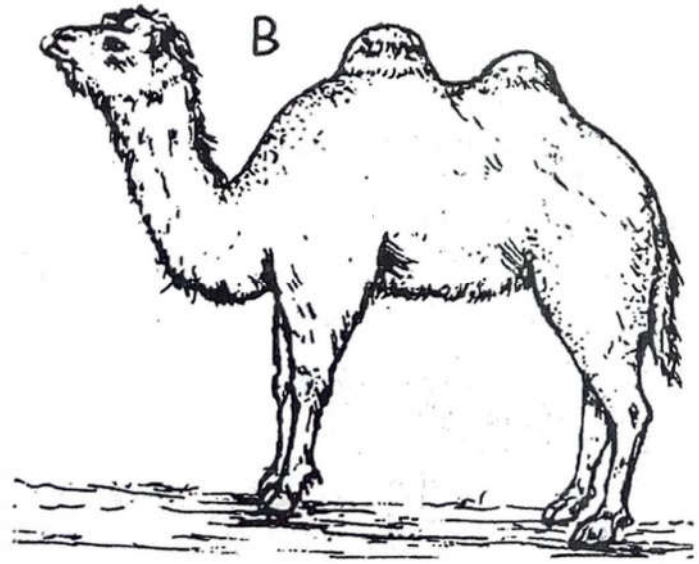


29. The figure below represents a pig breed.

(a) Identify the breed above, lmk
(b) State any three observable characteristics of the breed shown above. 3mks
(c) Where was the breed named in (a) above developed?

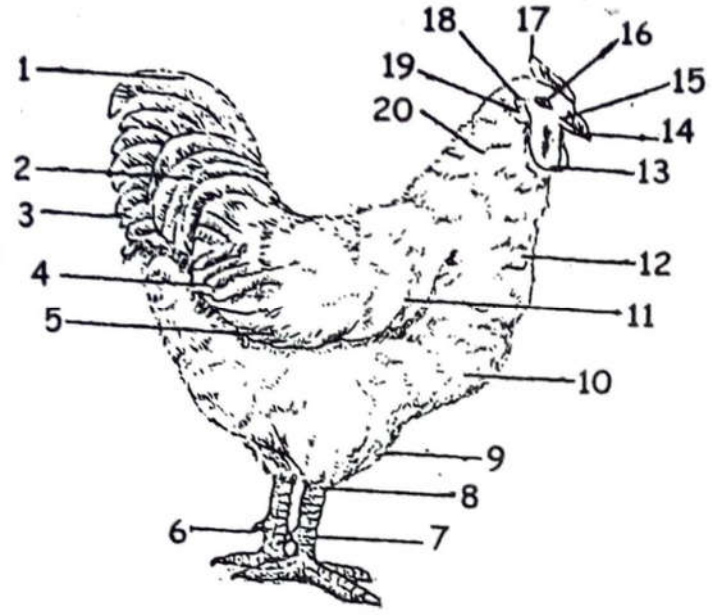
30. The diagrams below represent two species of a camel.





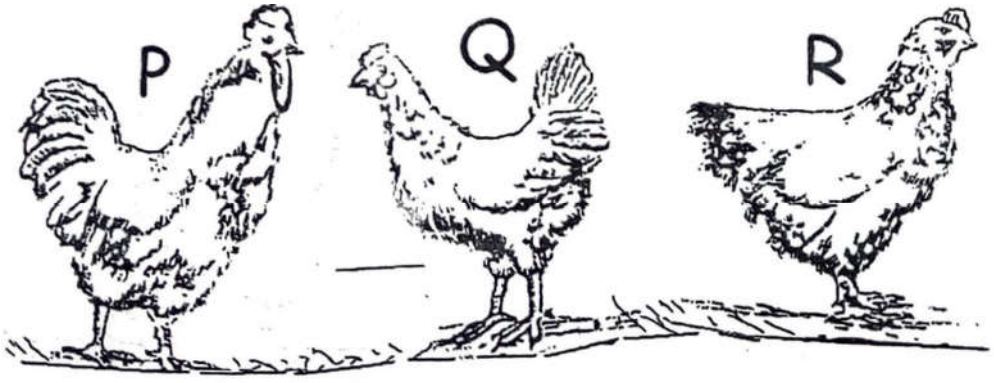
(a) Name the two species above. 2mks
(b) Differentiate between the two species of camels. (2 n
(c) For what purposes are the above two camel species reared. 4mks
(d) How are camels adapted to live in arid areas? 5mks

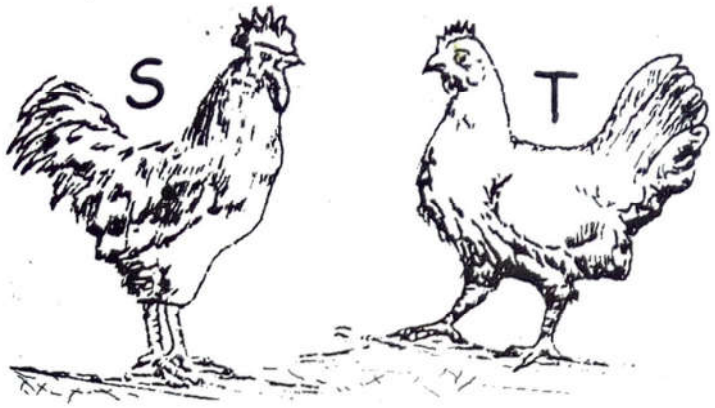
31. Use the diagram of the poultry below to answer the questions that follow



(a) Identify the parts labeled 1 - 20 (l0mks)
(b) State an important characteristic that present in a poultry hybrid and makes them produce eggs throughout the year. (1 mark)

32. Use the poultry breeds represented by the diagrams below to answer the questions that follow:





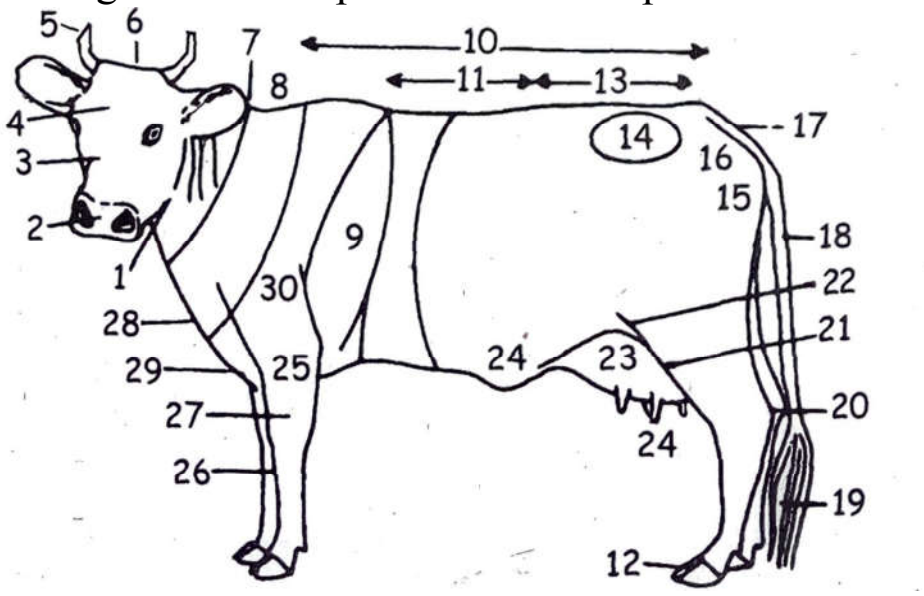
(a) Identify the five breeds of poultry. (5 marks)

(b) State the origin, colour, purpose and weight of the breeds labeled P, Q, R and S. (8 marks)

Breed	Origin	Colour	Purpose	Weight
P				
Q				
R				
S				

(c) How does breed labeled T differ from the other four? (1 mark)

33. The figure below represents external parts of a cow.



Identify the parts labeled 1-30. (15 marks)

34. The diagram below shows a breed of sheep. Use it to answer the questions that follow.

(a) Identify the breed. (1 mark)
(b) Give three observable characteristics of the breed named in (a) above. (3 marks)

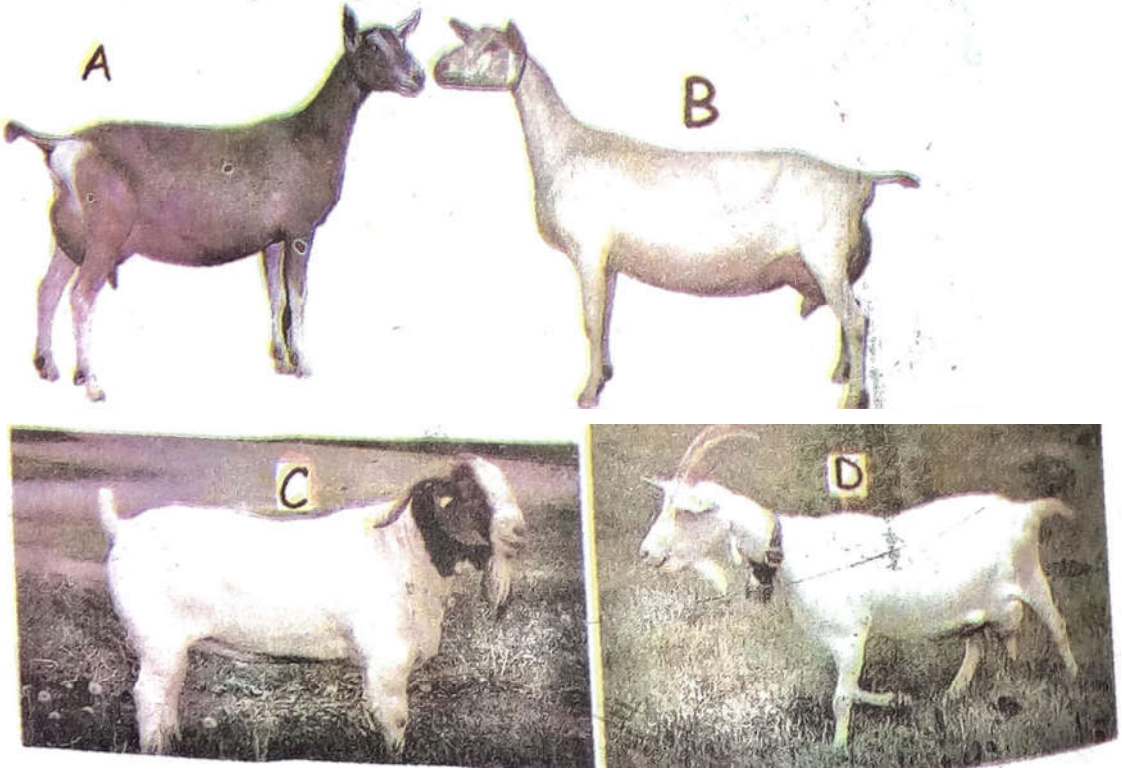
35. Use the illustration of the goat breed below to answer the questions that follow.

(a) Identify the breed. (1 mark)

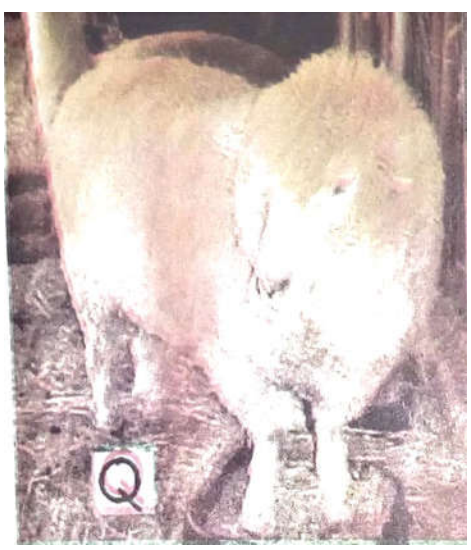
(b) State the distinguishing characteristics of the breed named in (a) above. (1 mark)

(c) Why is the breed above most popular in Kenya? (1 mark)

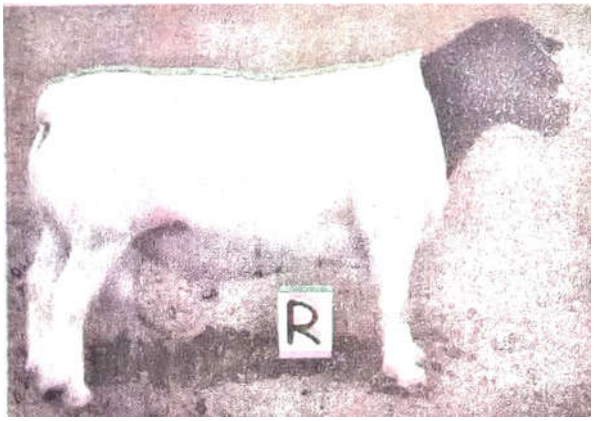
36. Identify the goat breeds shown below, (4 marks)

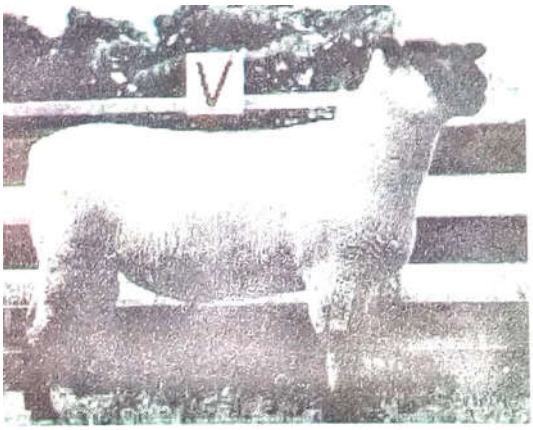


Identify the sheep breeds illustrated below. (7 marks)


Q


U


R

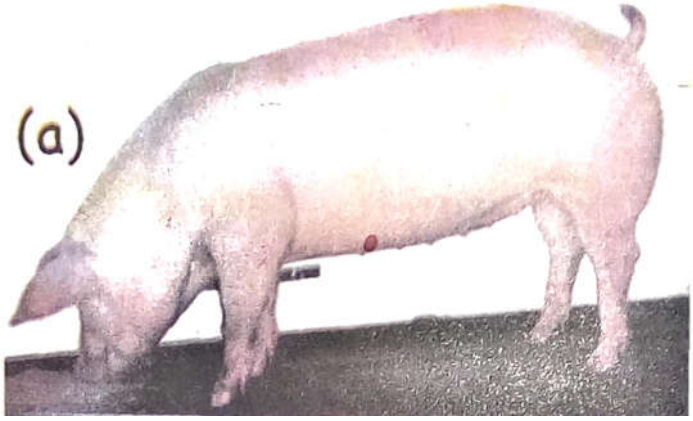

V

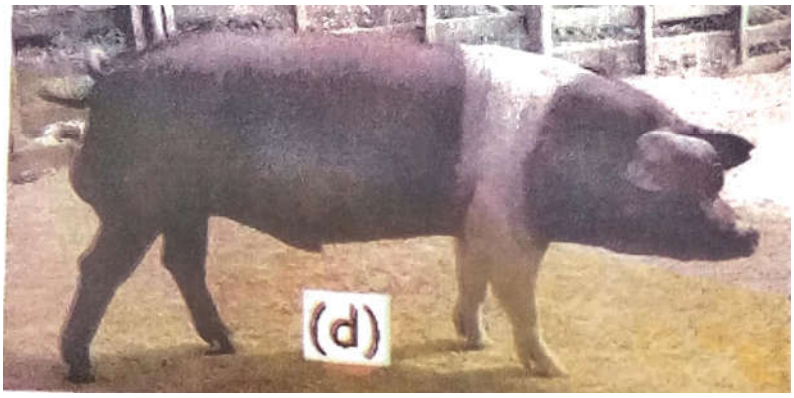

S


W

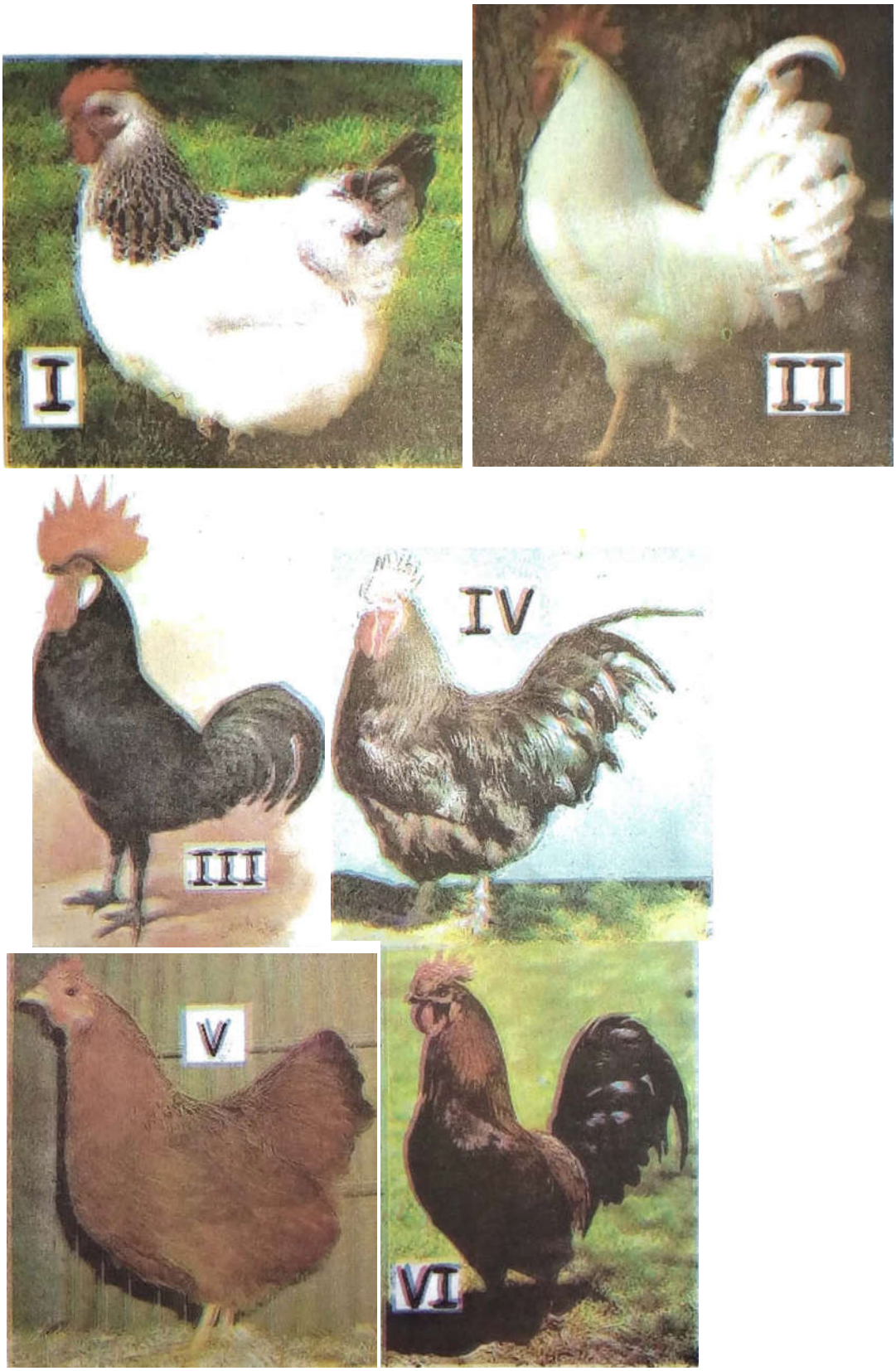
38. Name the pig breed represented by the figures below.

(4 marks)

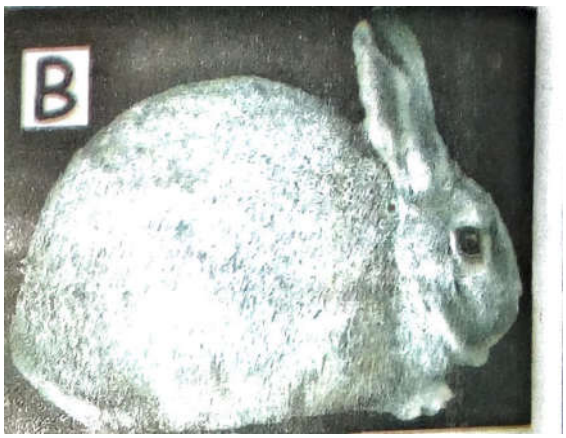


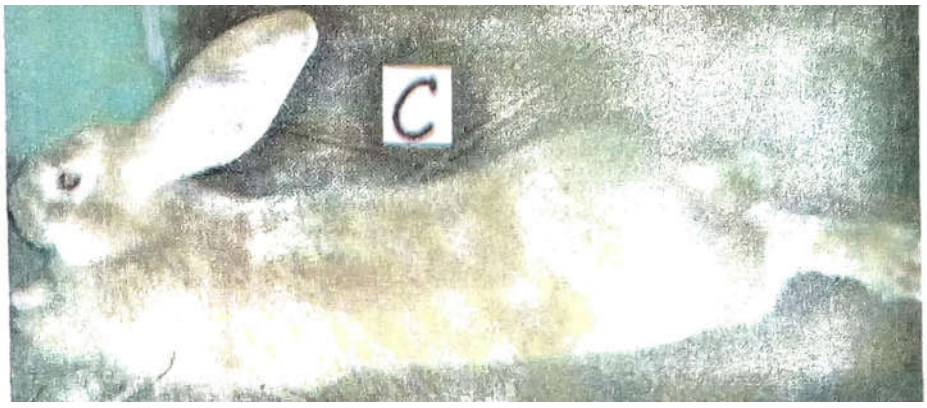


39. Identify the poultry breeds shown below. (6 marks)



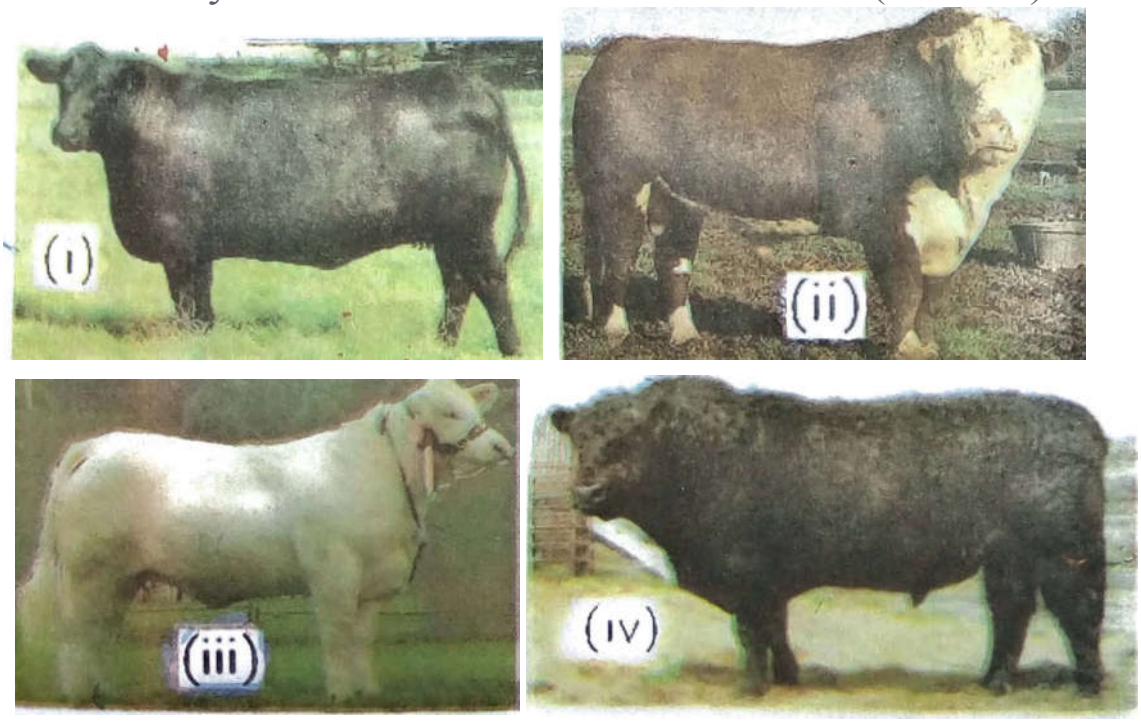
40. Name the rabbit breeds represented by the following photographs. (5 marks)





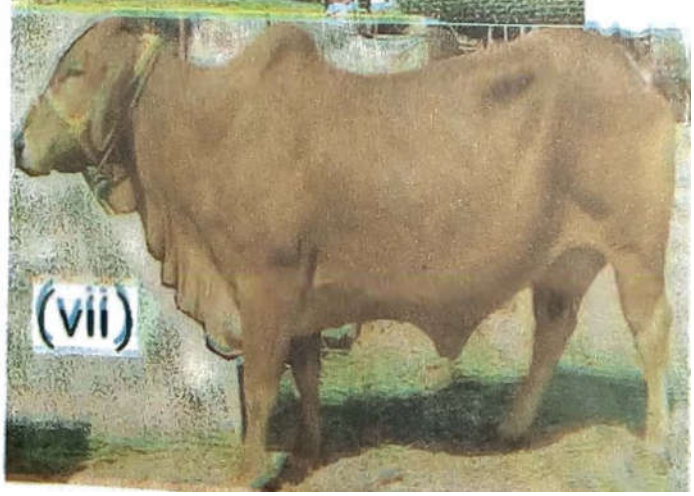
41. Identify the dairy cattle breeds represented by the following figures. (4 marks)

42. Identify the cattle breeds illustrated below. (7 marks)




(v)


(vi)


(vii)

CHAPTER 14
Answers on Livestock CHAPTER Production I (Common Breeds)

1. Exotic dairy cattle breeds

- Friesian
- Aryshire
- Guernsey
- Jersey

2. (a) **Bullock**
Mature castrated male cattle
b) **Steer**
Young castrated male cattle

3. Dual purpose breeds of cattle

- Sahiwal
- Redpoll
- Simmental

4. Black with white colour on the feet, nose and tail

5. (a) **Gilt**
A young female pig from weaning up to. the first parturition
b) **Capon ~**
Bird which has been rendered sterile
c) **Doe**
Mature female goat/ rabbit.

6

Breed	Origin	Colour
Aberdeen Angus	North Scotland	Black
Galloway	Scotland	Black with brown tinge on coat
Hereford	England	Deep red with white face, leg parts below knees and hocks, tail switch, flank, udder line and briskets

7. Heavy breeds of poultry
   - Rhode island red
   - Light Sussex
   - New Hampshire red
   - Black australops

8. (a) California white
   (b) A - Avibrisae / whiskers
   B - wrist
   C - shank
   D - rump

9. **Characteristics of exotic cattle breeds**
   - They have no humps
   - They have low tolerance to high temperatures
   - They are highly susceptible to tropical diseases
   - They have fast growth rates leading to early maturity
   - They are good producers of both meat and milk
   - They can not walk for long distances
   - They have short calving intervals of one calf per year if well managed.

10. **Major breeds of camels**
    - Dromendary camel
    - Bactrian camel

11. (a) **Pullet**
Young female bird from eight weeks up to maturity.
b) **Piglet**
A young pig from birth to weaning
c) **Gilt**
A young female pig from weaning up to the first parturition
d) **Sow**
A mature female pig after first parturition
e) **Boar**
A mature male pig

12. (a) **Aberdeen Angus**
Beef cattle
b) **Guernsey**
Dairy cattle
c) **Sahiwal**
Dual purpose breed
d) Redpoll
Dual purpose breed

13. (a) **breeds of cattle that originated from the channel islands**
Jersey
Guernsey
(b) (i) **Chinchilla rabbit**
Greyish
ii) **Toggenburg goat**
Brown with two white stripes running from the eye to the nose

14. **Physical characteristics of beef cattle**
- Thick muscles / well fleshed
- Block / rectangular in conformation
- Deep chest and wide heart girth
- Have square rumps
- Short strong legs / low set
- Short thick neck
- Small sized udder

15. (a) Milk

Saanen, Toggenburg, British alpine, Anglo-nubian, Jamnapari

b) Meat

Galla, Boer

c) Hair

Angora

16. Categories of cattle breeds based on the place of origin

- Indigenous breeds
- Exotic breeds

17. The only breed of sheep that produces high quality wool

- Merino

18. Essex has a black body with shoulders and all the four legs being white while **wessex** has a black body with the shoulder and front legs white.

19.

Dromendary	**Bactrian**
Has one hump	Has two humps
Has little fur coverage of the body	Has a lot of fur coverage on the body
Has lactation period of 9-18 months	Has a lactation period of 16- 18 months
Has great speed	Has low speed
Yields 1 kg of wool per year	Yields 5 — 12kg wool per year
Originated from Arabia and Syria	Originated from central America

20.

New Zealand white	**California White**
Pure **white**	White with black extremeties
Pink eyes	Black eyes
Average body weight is 4 - 51/2 kg	Average body weight is 31/2 - 5 kg
Big body	Small body

21. Breeds of poultry used to achieve hybrid vigour

Rhode Island Red, Light Sussex, Hampshire red
Black australops, the leghorns

22. **Advantages of beef cattle over dairy cattle**

- Grow fast
- Mature early
- Efficient feed converters
- Maintain weight even in dry conditions
- Are good foragers
- More resistant to diseases

23: **Differences between large white and landrace breeds of pigs**

Large white	Landrace
Dished snout	Straight face
Long bristles	Short bristles
Pork producer	Baconer
Erect ears	Drooping ears

24. Friesian -> Aryshire -> Guernsey -> Jersey -> Sahiwal

25. **Characteristics of the original merino**

- Small angular shaped body
- Have drooping hump
- Narrow in the chest
- Flesh coloured muzzle
- White wool, hooves and horns
- Good flocking instinct

- Hardy
- Produce fleece of high quality

26. **Cultural importance of livestock**
- Dowry payment
- Bull fighting
- Status symbol
- Medium of exchange\loan repayment
- Social ceremony
- Provision of garments.

27. (a) Large white

(b) Reasons for answer in (a) above

It is long (large and white)
Snout is broad and slightly dished.
Ears are upright.

28.

1. snout	9. foreleg	17. Fore flank
2. face	10. dewclaw	18. hind flank
3. eye	11. Pastern	19. rump
4. ear	12. Hoof (toes)	20. ham
5. cheek	13. back	21. Hind leg
6. jowl	14. Loin	22. tail
7. neck	15. side	23. teats
8. shoulder	16. Belly	

29. (a) Duroc Jersey

(b) **Observable characteristics of the breed named above**

□ Pure black
□ Long body
□Drooping ears.

(c) Britain

30. (a) A: Dromedary
B: Bactrian

(b) Differences between the two species of camels

A.	B.
Has one hump	has two humps
Has short hairs	has long hairs

(c) Purposes **of rearing** the camel species named above

- Source of milk
- Means of transportation.
- Source of meat
- Used for production of hides.
- For production of hair.

(d) **How camels are adapted to live in arid areas.**

- The have humps where they store fat that they oxidize for production of water.
- They can survive on poor pastures.
- They can survive without water for a long period of time.
- Their eyelashes are long, thus preventing the entrance of dust into their eyes.
- Their hooves have hard pads that enable them to traverse large areas of sandy ground.

31.

1. tail sickles	8. hock	15. nostril
2. tail coverts	9. thigh	16. eye
3. side hangers	10. breast	17. comb
4. saddle hackles	11. keel	18. ear
5. primary flights	12. Wing bow	19. earlobe
6. spur	13. wattle	20. Hackles
7. shank	14. beak	

(b) They do not go broody.

32. (a) P - Black Australops
Q - Rhode Island red
R - Light Sussex
S - New Hampshire Red
T - White leghorn

(b)

Breed	Origin	Colour	Purpose	Weight
P	Australia	Black	Meat	Cock - 4kg Hen - 3kg
Q	America	Reddish brown	Meat	Cock- 4kg Hen - 3kg
R	Britain	White	Dual purpose (meat & eggs)	Cock- 4kg Hen - 3kg
S	America	Light red	Meat	Cock- 4.5kg Hen-3.5kg

(c) It is a light breed while the rest are. heavy breeds.

33.

1. Jaw	11. Loin	21. Stifle joint
2. muzzle	12. hoof	22. Flank
3. nose-bridge	13. Rump	23. Udder
4. fore-head	14. Plate	24. Milk wells
5. horn	15. Hip joint	25. Elbow
6. poll.	16. Pin bone	26. Knee
7. neck	17. Tail head	27. Fore leg
8. weathers	18. Tail	28. Dewlap
9. heart girth	19. Switch	29. Brisket
10. back	20. Hock	30. Shoulder joint

34. (a) Black head Persian

(b) **Observable characteristics of the breed named in (a) above.**

- Black head and the rest of the body is white.
- Long legs
- Polled

35. (a) Toggenburg
    (b) It is brown in colour with two white stripes running from the eyes to the nose.
    (c) Has the ability to forage on local grass and shrubs.

36. A: Toggernburg
    B: Saanen
    C: Boer goat
    D: Galla goat

37. P: Corriedale
    Q. Merino sheep
    R: Dorper
    S: Maasai sheep
    T: Romney Marsh
    U. Dorset Horn
    V: Hampshire down
    W: Black-headed Persian

38. (a) Landrace
    (b) Large white
    (c) Berkshire
    (d) Essex saddleback

39. I. Light Sussex hen
    II. White leghorn (cock)
    III: Black Minorca (cock)
    IV. Black Australop (cock)
    V. New Hampshire (hen)
    VI. Rhode island red (cock)

40. A: New Zealand white
B: Chinchilla
C: Flemish Giant
D. California white
E. Earlops

41. (i) Jersey
(ii) Guernsey
(iii) Aryshire
(iv) Friesian

42. (i) Aberdeen angus
(ii) Hereford
(iii) Charolais
(iv) Galloway
(v) Boran
(vi) Beef shorthorn (bull)
(vii) Sahiwal (cow)

CHAPTER 15
Questions on Agricultural Economics I (Basic Concepts and Farm Records)

1 State three purposes of health records. (3 marks)

2. State six qualities of a good farm record. (6 marks)

3 State five reasons why a farmer should keep farm records. (5 marks)

5 Name five farm records a large scale dairy farmer should keep. (5 marks)

6. What kind of information should be indicated in a farrowing record? (5 marks)

7. Below is a sample of a farm record

Date	Commodity/ items	Quantity	Date	Issued to	Quantity	Balance stock

a) Identify the above record. (1 mark)
b) Name four commodities/ items included in the above record. (4 marks)

8. Define the term agricultural economics. (1 mark)

9. Explain the following basic economics concept. (3 marks)
   a) Scarcity
   b) Choice / preference

c) Opportunity cost

10. What are farm records? (1 mark)

11. State the information contained in the following farm records. (7 marks)
    a) Production records
    b) Inventory records
    c) Field operations records
    d) Breeding records
    e) Feeding records
    f) Health records
    g) Marketing records
    h) Labour records

12. Name the two types of labour records. (2 marks)

13. Give two conditions in agricultural production under which opportunity cost is zero. (2 marks)

14. Give three records of general nature kept in the farm regardless of the specific enterprises carried out (3 marks)

15. Describe the following farm records.
    a) Muster roll
    b) Labour utilization analysis. (2 marks)

16. What kind of information is shown by a muster roll? (5 marks)
17. Name three records a small scale rabbit keeper should keep (3 marks)
18. What determines the type of record each farmer keeps? (1 mark)

19. Into what two groups are all farm records categorized? (2 marks)

20. What three farm records are useful during selection and culling in dairy cattle? (3 marks)

21. Explain the relationship between scarcity and choice as used in agricultural economics. (2 marks)

22. Below is an illustration of a farm record.

Month of..... 20.....

Name/No of cows	DAYS IN THE MONTH								CONTINUED TO THE END OF THE MONTH	TOTALS
	1		2		3		4			
	AM	PM	AM	PM	AM	PM	AM	PM		
Komeni										
Thombu										
Eliza										
TOTALS										

(a) Identify the farm record above. (1 mark)

(b) Why is the above record kept by farmers? (2 marks)

23. The following are examples of farm records.

S

RECEIPTS			ISSUES			
DATE	COMMODITY/ITEM	QUANTITY	DATE	ISSUED TO	QUANTITY	BAI. INSTOCK

T

Date	Commodity/Item	Quantity	Written off	Balance in Stock	Comments

(a) Name the two records above. (2 marks)

(b) What is the significance of the two records named in (a) above? (1 mark)

24. The table below illustrates an example of farm records.

Dam Dam No		Breed Colour	Porent: Sire		Dam
1st Service	2nd Service	3rd Service	4th Service	Remark	No. of Service
Dale of Service	Date of Service	Date of Service	Date of Service		
Time of Service	Time of Service	Time of Service	Time of Service		
Bull No. Breed	Bull No. Breed	Bull No. Breed	Bull No. Breed		
Pregnancy Diagnosis: Date..... Result					
Expected Date of Calving					
Actual Date of Calving					
Weight of Calf at Birth					
Sex of Calf					
No. of Calf					

(a) Give the name of the record above. (lmark)

(b) For what reason should farmers keep the record named in (a) above? (1 mark)

25. The table below represents a farm record.

Date	Disease Symptom	Animal(s) Affected	Drugs Used	Cost of Treatment Given	Remarks

(a) Identify the record above. (1 mark)
(b) What type of information should be put in remarks column? (3 marks)

26. Below is an example of a farm record.

Dote	No. of Animals	Amount received (kg)	Amount Used (kg)	Balance in Stock (kg)	Remarks

(a) What name is given to the record shown? (1 mark)
(b) Why should a farmer keep the record named in (a) above? (1 mark)

27. The following is an example of a farm record.

Date	Amount sold	Price per unit (Kshs)	Total value (Kshs)	Where sold	Remarks

(a) Identify the above record. (1 mark)
(b) Other than the information shown what else should be included in the record shown? (1 mark)

28. Use the following farm records to answer the questions that follow.

Farm record X

Name of person	Pay roll No.	Days					Days worked	Rate of Pay (KSh)	Total pay (KSh)	signature of worker
		1	2	3	4	5				
Kamau	11						20	@ 800	16000	
Ali	10						20	@ 800	16000	

Farm record Y

NO. of hours worked	Livestock Production	Crop Production	Machinery Maintenance	Date of working	Remarks
Cost/hour					
Total cost					

(a) Name the two records shown above. (2 marks)
(b) What is the purpose of the two records? (2 marks)

29. The table below represents a farm record.

SEASON..... Field No.....
Net area.....
Crop grown..... Variety ..... .
Ploughing date..... Planting date.....

Inputs:
Seed rate Kg/ha..... :.....
Fertilisers at planting:type ..... Amount.....
Top-dressing: fertiliser..... Amount.....
Other treatment.....

Pest..... Control.....
Diseases..... Control.....
Weeds..... Control.....
Other treatment

Output:
Harvesting date..... Method used .....
Yield/ha .....

Remarks .....

(a) Identify the record shown. (1 mark)
(b) Why is the record named in (a) above useful to the farmer? (1 mark)

CHAPTER 16
Answers on Agricultural Economics I (Basic Concepts and Farm Records)

1. Purposes of health records

Help during selection / culling of animals on health grounds
Help in future treatment and control measures
Help in the calculation of the cost of treatment
Help determine the common disease and parasites
Help to support livestock insurance claims

2. **Qualities of a good farm record**

Neat
Concise / brief
Complete
Accurate (Showing actual amounts, weights and dates as the case may be in true records)
Up to date
Methodically kept throughout the year
Legible / easy to read

3. **Reasons why a farmer should keep farm records**

To show history of the farm
To compare performance
To help him in planning and budgeting
To facilitate loan acquisition
To help detect losses and theft
To help assess income tax
To settle disputes among heirs
To determine the value of the farm

5. **Farm records a large scale dairy farmer should keep**
   Breeding record
   Health record
   Birth (calving) record
   Feeding record
   Milk production record
   Labour record
   Inventory record

6. **Kind of information that should be indicated in a farrowing record**
   Breed of pig
   Date of birth (farrowing)
   Weight of piglet
   Breed of sow (mother)
   Breed of boar (sire)
   Date of service (of mother)

7. a) Consumable goods inventory record.
   b) Commodities/ items included in consumable goods inventory
   Animal feeds
   Fertilizers
   Drugs
   Construction materials such as cement

8. **Agricultural economics** is a science that aims at maximizing output while minimizing costs by combining the limited supplies of land, capital, labour and management in production of goods and services for the society over a certain period of time.

9. a) **Scarcity**
   Economic scarcity means resources are limited in supply
   b) **Choice / preference**
   Human wants are many and varied and means to satisfy them are limited. Therefore, man has to make a choice among alternatives in order to use the resources available.

c) Opportunity cost

Opportunity cost is the revenue foregone from the best alternative. It exists only where there are alternatives. Where there are no alternatives the opportunity cost is equal to zero.

10. Farm records

These are documents kept in the farm showing farm activities earned out over along period of time.

11. a) Production records

The yields and yield per unit of each enterprise

b) Inventory records

All permanent and consumable goods in the farm

c) Field operations records

All field practices carried out together with the input used for all the crop enterprises.

d) Breeding records

All the breeding activities in the farm

e) Feeding records

Types of feeds used in the farm and their quantities

f) Health records

Health conditions of the animals in the farm

g) Marketing records

Commodities sold, quantities and value of all the sales

h) Labour records

Labour utilization and labour costs

12. Types of labour records

Muster roll

Labour utilization analysis

13. Conditions in agricultural production under which opportunity cost is zero

When there are no alternatives / choices in enterprises

When production resources are not limited / are abundant / free

14. Records of general nature kept in the farm regardless of the specific enterprises carried out

Labour records
Farm diary
Inventory records

15. a) **Muster roll**

It is a record of the available labour on the farm which is intended to check the number of days they worked and therefore determine how much they should earn.

b) Labour utilization analysis

It shows how labour is utilized on the farm and helps to determine labour allocation, labour requirement for the purpose of budgeting and when labour is in peak demand or when to lay-off unproductive labour.

16. Information that is shown by a muster roll

Name of the worker
The pay-roll number
Days worked
Rate of payment
The amount of salary or wage
Signature of workers

17. Records that a small scale rabbit keeper should keep

Feeding record
Breeding record
Health record

18. The type of farm projects and enterprises being undertaken

19. **Groups into which all farm records are categorized**

General records
Specific records (records on specific enterprises)

20 Farm records that are useful during selection and culling in dairy cattle

Production records
Breeding records
Health records

21. The relationship between scarcity and choice as used in agricultural economics

Scarcity is where production resources are limited in supply relative to demand, therefore, a choice has to be made on which enterprises to allocate the time.

22. (a) Production record / milk production record.
(b) It shows the total yields and yields per unit of each enterprise.

23. (a) S: Consumable goods inventory.
T: Permanent goods inventory
(b) They show all the assets on the farm at a given time of the year.

24. (a) Breeding record.
(b) To show breeding activities and programmes for different animals in the farm.

25. (a) Health record.
(b) Deaths, next vaccinations and frequency of diseases.

26. (a) Feeding record.
(b) To show the types and amounts of feeds used in the farm.

27. (a) Marketing record.
(b) Type of commodity.

28. (a) X: Master roll
Y: Labour utilization analysis.
(b) X: Helps in determining how much each worker should earn.
Y: Helps to determine labour allocation and labour requirement for the purpose of budgeting.

29. (a) Field operations record.
(b) It helps in calculation of cost of production.

QHAPTER ;l 7
Questions on Soil Fertility II (Inorganic Fertilizer)

1. Give the source of the following nutrients for plants
   a) Nitrogen and oxygen
   b) Hydrogen
   c) Magnesium (3marks)

2. a) What is meant by the term essential elements, (lmark)
   b) Name the two broad categories of essential elements. (2marks)

3. Distinguish between macro-nutrients and micro-nutrients. (1 mark)

4. List four examples of the following nutrients
   a) macro-nutrients (4marks)
   b micro-nutrients (4marks)

5. Give three macro-nutrients that are referred to as
   a) Fertilizer elements (3marks)
   b) Living elements (3marks)

6. Name two forms in which nitrogen is absorbed by plants. (2marks)

7. State four roles of nitrogen in plants. (4marks)

8. Give four symptoms of nitrogen deficiency in plants. (4marks)

9. a) In what form is phosphorus taken up by the plants. (1 mark)
   b) Mention five roles of phosphorus in plants. (5marks)
   c) State five deficiency symptoms of phosphorus. (5marks)

10. a) What form of potassium is absorbed by plants. (lmark)
    b) State five uses of potassium in plants. (5marks)

c) Which symptoms are shown by plants deficient of potassium. (5marks)

11. A plant showed the following symptoms; interveinal chlorosis, anthocyanin pigments on leaves, lack of branching in roots, death of tissues, weak and slender stalks.
    a) What nutrient was deficient in the above plant. (lmark)
    b) Give four roles of the nutrients named in (a) above. (4marks)
12. a) Name the form in which sulphur is absorbed by plants. (lmark)
    b) State five roles of sulphur in plants. (5marks)
    c) Give five deficiency symptoms of sulphur. (5marks)

13. a) In what form is calcium absorbed by plants? (lmark)
    b) What role does calcium play in plants? (4marks)
    c) State six deficiency symptoms of calcium. (6marks)

14. In what form are the following micro-nutrients absorbed? (4marks)
15. Name the metabolic reactions of plants catalyzed by the micro-nutrients listed below. (6marks)
    a) Copper
    b) Iron
    c) Molybdenum
    d) Zinc
    e) Boron

16. a) What are inorganic fertilizers. (lmark)
    b) State four factors considered in classification of inorganic fertilizers. (4marks)

17. a) Define the term straight fertilizer. (lmark)
    b) Give two examples of each of the following fertilizers.
        i) Nitrogenous fertilizers (2marks)
        ii) Phosphatic fertilizers (2marks)
        iii) Potassic fertilizers (2marks)

18. a) Define a compound fertilizer (1 mark)
b) Using one example in each case distinguish between incomplete and complete compound fertilizer. (4marks)

19. State six characteristics of nitrogenous fertilisers. (6marks)

20. Complete the table below. (8marks)

Fertilizer	Nitrogen content	Physical form	Colour	pH
Sulphate of Ammonia				
Ammonium sulphate nitrate				
Calcium Ammonium nitrate				
Urea				

21. Give four characteristics of phosphatic fertilizers. (4marks)

22. Compare the properties of single super phosphate and double super phosphate. (6marks)

	Single super phosphate	Double super phosphate
Phosphorus content		
Formulation		
Colour		

23. Give the two main characteristics of potassic fertilizer. (2marks)

24. State two similarities between potassium chloride and potassium sulphate (2marks)

25. Distinguish between fertilizer grade and fertilizer ratio (2marks)

26. State three properties of each of the following compound fertilizers
    a) Diammonium phosphate (3marks)
    b) Nitrophos (3marks)
    c) Mono ammonium phosphate (3marks)

27. Qive a reason why:
    a) Phosphatic fertilizer is applied during planting time. (1 mark)
    b) Nitrogenous fertilizers are applied after the emergence of the crop. (1 mark)

28. Name five methods of fertilizer application. (5marks)

29. Differentiate between the following methods of fertilizer application.
    a) Placement and side dressing method. (2marks)
    b) Band and ring application

30. Give two factors that determine the amount of fertilizer applied per unit area. (2marks)

31. If the following are to be applied in a field, 60kg N, 30kg P_2O_5 and 40kg K_2O per hectare. Calculate the amount of sulphate of ammonia, single super phosphate and potassium chloride required per hectare if the fertilizer available are sulphate of Ammonia (20%N), SSP (20% P_2O_5) and nitrate of potash (50% K_2O) (6 marks)

32. A maize fanner was advised to apply 150kg CAN/ha while top dressing the crops. CAN contains 21% N. calculate the amount of nitrogen applied /ha (2marks)

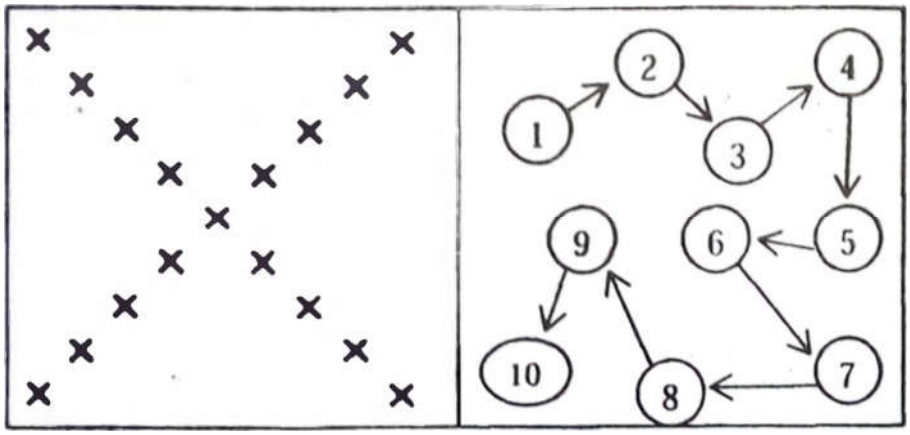
33. a) Define carbon cycle (1 mark)
    b) State two ways by which carbon is removed from the atmosphere (2marks)
    c) Give three ways by which carbon is returned into the atmosphere (3marks)

34. Explain the importance of the carbon cycle. (3marks)
35. a) Define the term nitrogen cycle (lmark)
    b) Give four ways by which nitrogen is removed from the atmosphere (4 marks)
    c) By what three ways is nitrogen returned into the atmosphere (3marks)

36. State two importance of the nitrogen cycle. (2marks)

37. a) What is soil sampling. (lmark)
    b) Give two reasons for soil sampling (2marks)
    c) Identify the methods of sampling shown below. (2marks)

Method X Method Y



38. Name five sites that should be avoided during soil sampling. (5marks)

39. Outline soil sampling procedures. (7marks)

40. a) What is soil testing (lmark)
    b) Give three reasons for soil testing. (3marks)

41. a) Define the term soil pH. (lmark)
    b) Name two main methods of pH testing. (2marks)
    c) Outline four procedures of determining soil pH using the colour indicator method. (4marks)

42. How does soil pH affect crop production? (4marks)

CHAPTER 18
Answers on Soil Fertility II (Inorganic Fertilizer)

1. a) Air
   b) Soil water
   c) Weathered rocks

2. a) **Essential elements**
   These are nutrients needed by plants for various uses.

   b) **Categories of essential elements**
   Macro-nutrients
   Micro-nutrients

3. **Macro-nutrients** are required by plants in large quantities
   Micro-nutrients are required by plants in relatively small quantities

4. a) **Examples of macro-nutrients**
   Carbon, Hydrogen, Nitrogen, Phosphorus, Potassium, Sulphur, Calcium, Magnesium.

   b **Examples of micro-nutrients**
   Iron, Manganese, copper, Zinc, Boron, Molybdenum, chlorine

5. a) **Fertilizer elements**
   Nitrogen, phosphorus, potassium

   b) **Living elements**
   Calcium, magnesium, sulphur

6. **Forms in which nitrogen is absorbed by plants**
   Nitrate ions (NO^-_3)
   Ammonium ions (NH_4^+)

7. **Roles of nitrogen in plants**

- Vegetative growth
- Chlorophyll formation
- Build-up of protoplasm
- Improves leaf quality in leafy crops such as tea and cabbages'

8. **Symptoms of nitrogen deficiency in plants**

- yellowing of the leaves/chlorosis
- stunted growth
- premature ripening
- premature shedding of the leaves
- light seeds

9. a) phosphates

b) Roles of phosphorus in plants

- encourage fast growth of the roots
- improves the quality of the plant
- hastens maturity of the crops
- Influence cell division
- Stimulates nodule formation in legumes

c) **Deficiency symptoms of phosphorus**

- Stunted growth
- Maturity is delayed
- Leaves become grey, purple in colour
- Yield of grains, fruits and seed is lowered.

10, a) Potassium ions (K^+)

b) **Uses of potassium In plants**

- Protein synthesis
- Essential in chlorophyll formation
- Aids in translocation
- Imparts disease resistance
- Aids in cell division
- Promotes root development
- Neutralizes organic acids in plants.

c) **Symptoms shown by plants due to deficiency of potassium**

- Leaf curling
- Chlorosis at margins and tips of the leaves
- Premature leaf fall
- Poorly-developed roots and tubers
- Lodging due to weak stems
- Leaf mottling (brownish spots on leaves)

11. a) Magnesium

b) **Roles of Magnesium in plants**

- Component of chlorophyll molecule
- Promotes nitrogen fixation
- Activates enzymes
- Synthesis of oil in oil crops

12. a) Sulphate ions (SO_4^{2-})

b) **Role of sulphur in plants**

- Protein synthesis
- Activation of certain enzymes such as co-enzymes
- Increases the oil content of oil crops
- Formation of vitamins for example vitamin B1
- Chrophyll formation

c) Deficiency symptoms of sulphur

-Leaf chlorosis
- Thin stems
- Reduced nodulation
- Stunted growth
- Delayed maturity

13. a) Calcium ions (Ca^{2+})

b) **Role of calcium in plants**

- Synthesis of proteins
- Elongation of plant apical meristems and root tips
- Formation of the middle lamellae
- Strengthens plant cell walls.

c) **Deficiency symptoms of calcium**

-Poor growth of terminal and root tips
- Leaf chlorosis
- Leaves may curl up

- Blossom end rot in tomatoes
  - Premature shedding of flowers and buds
  - Weak stems.

- a) Copper ions / cu^{2+}
  b) Iron ions/Fe^{2+}
  c) Molybdenum ions MoO^{-4}
  d) Zinc ions/Zn^{2+}

15.

	micro-nutrients	Metabolic reactions
a)	Copper	- Oxidation/reduction (Redox) - Respiration
b)	Iron	Protein synthesis in chloroplasts
c)	Molybdenum	Nitrogen fixation
d)	Zinc	- Formation of some growth hormones - Reproduction
e)	Boron	- Absorption of water - Translocation of sugar

16. a) **Inorganic fertilizers**
These are artificially processed compounds which are added into the soil to improve its fertility.

b) Factors considered in classification of inorganic fertilizers
- Nutrients contained
- Mode of application
- Time of application
- Effects on soil pH

17. a) Straight fertilizer
This is a fertilizer that contains only one of the primary macro-nutrients

b) i) Examples of Nitrogenous fertilisers
Calcium Ammonium nitrate, Ammonium Sulphate Nitrate, Sulphate of Ammmonia, Urea

ii) **Examples of Phosphate fertilizers**

Single super phosphate, Double super phosphate, Triple super phosphate

iii) **Examples of Potassic fertilizers**

Potassium chloride (Muriate of potash), potassium sulphate (Sulphate of potash).

18.a) compound fertilizer

It is one that contains two or three primary macro-nutrients.

b) **Incomplete fertilizer** contains only two of the primary macro-nutrients e.g. ammonium phosphate (18-46-0)
Complete fertilizer contains all the three primary macro-nutrients e.g. .20-10-10.

19.Characteristics of nitrogenous fertilizers

- Highly soluble in water
- Highly mobile in the soil hence it is applied as a top dress.
- No residual effect
- Has scorching or burning effect on plants.
- Easy to volatilize during hot season.
- Are hygroscopic and cake under moist conditions
- Corrode the skin as well as metal surfaces.

20.

Fertilizer	Nitrogen content	Physical form	Colour	pH
Sulphate of Ammonia	20-21	Crystals	White	Acidic
Ammonium sulphate nitrate	26	Granules	Brownish	Less acidic
Calcium Ammonium nitrate	21	Granules	Grey	Neutral
Urea	46	Granules	White	Negligible acidity

21. Characteristic of phosphatic fertilizers
- Sparingly soluble in water
- Have residual effect
- Have slight scorching effect
- Not liable to leaching
- Easy to share because they are not hygroscopic

22. Comparison between properties of single super phosphate and double super phosphate.

	Single super phosphate	Double super phosphate
Phosphorus content	20-21%	43 - 52 %
Formulation	Granules	Granules
Colour	White/creamy	Greyish

23. **Main characteristics of potassic fertiliser**
- Moderate scorching effect
- Moderate solubility in water

24. **Similarities between potassium chloride and potassium sulphate**
- Both contain 50% potassium oxide
- Both induce negligible acidity to the soil

25. **Differences between fertiliser grade and fertilizer ratio**
- Fertilizer grade indicates a guarantee of minimum content as a percentage of N:P_2O_5 K_2O in the fertilizer e.g. 10 -20-0.
- Fertilizer ratio is the relative percentage expressed as a ratio of the NPK present e g. 10-20-0 expressed as relative ratio will be 1:2:0

26. a) **Properties of Diammonium phosphate**
- It has a fertilizer grade of 18:46:0
- It is moderately acidic
- It contains both nitrogen and phosphorus

b) Properties of Nitrophos

- It has fertilizer grade of 20:20:0
- It is moderately acidic
- It contains both nitrogen and phosphorus

c) **Properties of Mono ammonium phosphate**

- It has a fertilizer grade of 11:48:0
- It is moderately acidic
- It has the same characteristics as DAP

27. a) Phosphorus is important in root development.
    b) Nitrogen is important in chlorophyll formation and vegetative growth.

28. **Methods of fertilizer application**

- Broadcasting
- Placement method
- Side dressing
- Foliar spraying
- Drip

29. a) **Placement** is the application of the fertilizer in the planting holes or drills whereas s**ide dressing** is the placement of nitrogenous fertilizer at the side of the crop being top dressed.

    b) Band application is the placement of fertilizer along a band in between the rows of crops whereas **ring** application is the placement of fertilizer around an individual crop just beneath the edge of the canopy

30. Factors that determine the amount of fertilizer applied per unit area

-The amount of nutrient needed
- Fertilizer grade available

31.

Total amount of sulphate of ammonia = $\frac{60kg\ N \times 100kg\ SA}{20kg\ N}$

= 300kg

Total amount of SSP = $\frac{30kg\ P_2O_5 \times 100kg\ ssp}{20kg\ P_2O_5}$ = 150kg SSP

Total amount of K_2O = $\frac{40kg\ K_2O \times 100\ kg\ KC1}{50kg\ K_2O}$ = 80kg KC1

32. 21kg N is contained in 100kg CAN

150kg CAN = $\frac{21\ kg\ N \times 150kg\ CAN}{100kg\ CAN}$ =31.5kg N/ha

33. a) Carbon cycle

This is the series which carbon undergoes in the atmosphere, water, soil and living organisms

b) Ways by which carbon la removed from the atmosphere

- Photosynthesis
- Acid rain

c) **Ways by which carbon la returned into the atmosphere**

- **Respiration**
- Combustion
- **Decomposition**

34. Importance of the carbon cycle

- **Maintains the volume of carbon (IV) oxide in the atmosphere**
- **Ensures constant supply of carbon (IV) oxide for use by plants**
- **Ensures balance between carbon (IV) oxide and oxygen to prevent the build up of carbon (IV) oxide to toxic levels**

35. a) **Nitrogen cycle**

This is the series of changes which nitrogen **undergoes** between the atmosphere, water, soil and living **organisms.**

b) **Ways by which nitrogen is removed from the atmosphere**

- Nitrogen fixation by lightning
- Nitrogen fixation by nitrogen fixing bacteria
- Nitrification
- The Harber- Bosch process

c) **Ways is which nitrogen returned into the atmosphere**

- Denitrification
- Combustion
- Volatilization

36. **Importance of the nitrogen cycle**

- ensures availability of nitrogenous compounds in the soil for plant use
- Ensures the survival of the anaerobic micro-organisms such as Clostridium which use nitrogen gas.

37. a) **Sampling**

This is the process of taking a small quantity of soil from the field to act as a representative sample of the soil in the particular field.

b) **Reasons for soil sampling**

- To test for soil nutrients
- To test for soil pH

c) X - Transverse method
Y - Zigzag method

38. **Sites that should be avoided during soil sampling**
- Dead furrows
- Terrace stands
- Old fence lines
- Old manure heaps
- Swampy areas
- Near trees and boundaries
- Between slopes and bottom land

39. **Soil sampling procedures**
- Clear vegetation from the sampling spot
- Make a vertical cut to depth of 15-25 cm from crop and 5cm for pasture land
- Take a slice from the vertical cut using a soil auger/spade
- Put the soil in a clean polythene bag or any suitable container
- Repeat the above steps in different parts of the fields preferably 15-20 spots depending on the sampling method being used.
- Mix, dry and crush soil from all the spots.
- Take a sub-sample composite mixture from the mixture and send to the laboratory for testing.

40. a) **Soil testing**

This is the process of analyzing the soil sample to determine the ability to supply the essential elements

b) **Reasons for soil testing**
- To determine the value of the soil hence determine the crop to grow.
- To determine the nutrient content hence find out the type of fertilizer to apply.
- To determine whether it is necessary to modify the soil pH

41. a) **Soil pH**

Soil pH refers to the hydrogen ion concentration in a soil solution

b) **Main methods of pH testing**

- The use of a pH meter
- The use of colour indicator dyes

c) **Methods of determining soil pH using the colour indicator method**

- BDH universal indicator method
- Soil test with universal indicator papers
- Field Test using printed colour standards
- Using a commercial soil testing kit.

42. How soil pH affect crop production

- Influences the physical and chemical properties of the soil
- Affects the availability of nutrients
- Influences the incidences of soil borne diseases.
- Determine the type of crop to be grown at a given area.

CHAPTER 19
Questions on Crop Production II (Planting)

1. a) Define the term planting. (lmark)

   b) Give the two main types of planting materials. (2 marks)

2. Describe the advantages of using seeds as a planting material (6marks)

3. What are the disadvantages of using seeds as planting materials? (4marks)

4. Explain the term vegetative materials, (lmark)

5. List six advantages of using vegetative materials for planting. (6marks)

6. State four disadvantages of using vegetative materials for planting. (4marks)

7- Give an example of a crop in which the following vegetative propagation materials are used. (7marks)

   a) Splits
   b) Slips
   c) Bulbils
   d) Stem tubers
   e) Stem cuttings
   f) Suckers
   g) Vines

8. The diagrams below represent vegetative materials

a) Identify the materials labeled A, B. and C. (3marks)

b) State six factors that affect rooting of cuttings. (6marks)

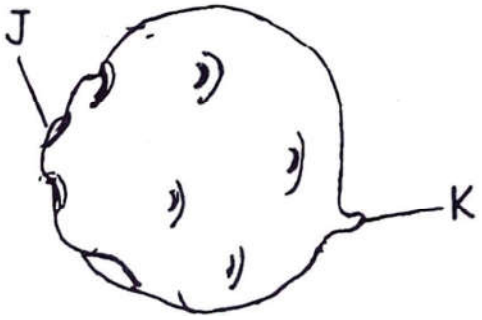
9. Give four factors considered when selecting planting materials. (4marks)

10. State four methods of preparing planting materials

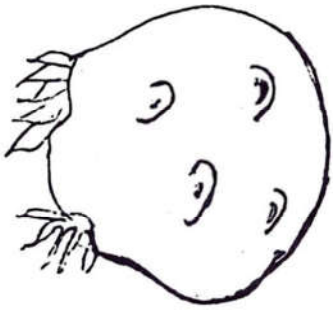
11. Define the following terms:
    a) Seed dressing
    b) Seed inoculation
    c) Chitting (3marks)

12. The diagrams below represent a method of preparing planting materials.

Before treatment



After treatment



a) Identify the method above. (1mark)

b) Name the regions labeled J and K. (2marks)

c) Describe the procedure of carrying out the practice named in (a) above (5marks)

13. State six factors considered in timing planting. (6marks)

14. Give five advantages of timely planting. (5marks)

15. Highlight the two main methods of planting. (2marks)

16. Differentiate between broadcasting and row planting. (2marks)

17. State four advantages of row planting. (4marks)

18. Which are the three disadvantages of row planting? (3marks)

19. Outline three,advantages of broadcasting as a method of planting. (4marks)

20. Give three disadvantages of broadcasting as a planting method. (3marks)

21. Distinguish between oversowing and undersowing. (2marks)

22. State two benefits of undersowing. (2marks)

23. a) Define the term plant population. (lmark)

b) Write the formula for calculating plant population (2marks)

(c) Given that maize is planted at a spacing of 75 cm x 25 cm, calculate the plant population in a plot of land measuring 4 mx3 m. (2 marks)

24. a) Define the term spacing, (lmark)
b) Complete the table below. (8marks)

Crop	Spacing
Maize (Kitale hybrid)	
Coffee (Arabica)	
Tea	
Beans (Erect type)	
Bananas	
Coconut	
Tomatoes (money maker)	
Kales	

c. Give i) the purpose of correct spacing. (lmark)
ii) The demerits of wider spacing and closer spacing. (2marks)

25. State six factors that determine spacing. (6marks)

26. The spacing of a certain crop was given as 100cm x 50cm. what does each of the figures stand for? (2marks)

27. a) Define the term seed rate. (1 mark)
b) State the purpose of correct seed rate. (1 mark)

28. Give five factors considered when choosing seed rates. (5marks)

29. a) Explain the meaning of planting depth. (lmark)
b) State and explain four factors that determine correct depth of planting. (4marks)

CHAPTER 20
Answers on Crop Production II (Planting)

1. a) **Planting**

This is the placement of planting materials in the soil for the purpose of regeneration in order to produce more of the plant species,

b) **Main types of planting materials**

- Seeds
- Vegetative materials.

2. **Advantages of using seeds as a planting material**

- Seeds are easy to treat against soil borne pests and diseases
- Seeds are not bulky hence storage is easy.
- Seeds are easy to handle during planting making the operation faster
- Seeds can be planted using machines such as planters and drillers
- Seeds can be planted together with manures and fertilizers
- Development of new crop varieties as a result of pollination is possible

3. **Disadvantages of using seeds as planting materials**

- Some seeds may need special treatment in order to germinate due to long dormancy
- Plants raised from seeds have variations some of which could be undesirable.
- Seeds may be damaged by soil borne pests.
- Some seeds may lose viability due to long storage.

4. **Vegetative materials**

These are plants parts which have the ability to produce roots, then grow and develop into new plants.

5. Advantages of using vegetative materials for planting

- Plants mature faster
- Crops show uniformity in qualities such as disease resistance
- Its possible to produce many varieties of compatible crops on the same root stock
- Use of the vegetative materials is easier and faster especially where seeds show prolonged dormancy.
- The resulting plant has desirable shape and size for ease of harvesting and spraying.
- It facilitates the propagation of crops which are seedless.

6. State four disadvantages of using vegetative materials for planting (4marks)

- It does not result in new crop varieties
- It is difficult to keep the materials free of disease
- They can not be stored for long.
- They are bulky thus difficult to store and transport.

7

	vegetative propagation materials	crop
a)	Splits	Py re thrum
b)	Slips	Pineapples
c)	Bulbils	Sisal
d)	Stem tubers	Irish potato
e)	Stem cuttings	Tea. Cassava, Sugar cane, Nappier grass
f)	Suckers	Pineapple, banana
g)	Vines	Sweet potato

8. a) A- Vine
B - Stem cutting
C - Root tuber

b) **Factors that affect rooting of cuttings**

- Temperature
- Relative humidity
- Light intensity
- Oxygen supply
- Chemical treatment
- Leaf area

9. **Factors considered when selecting planting materials**

- Suitability to the ecological conditions
- Purity of the materials
- Germination percentage
- Certified seeds.

10. Methods of preparing planting materials

- Breaking seed dormancy
- Seed dressing
- Seed inoculation
- Chitting

11. a) **Seed dressing**

This is the coating of seeds with a fungicide or an insecticide or a combination of the chemicals

b) **Seed inoculation**

This is the coating of legume seeds with the right strain of Rhizobium bacteria to encourage nodulation

c) Chitting

This is the sprouting of selected seed potatoes/setts before planting to break their dormancy.

12. a) Chitting

b) J - Rose end

K- Heel end

c) **Procedure of carrying out Chitting**

- Arrange setts of about 3-6cm in diameter in layers of 2 or 3 tubers in a partially darkened room.
- Arrange the setts with the rose-end facing upwards and the heel-end downwards

- **Allow diffused ight to pass through to encourage the** production of short, green and healthy sprouts.
- Dust and spray the setts with diamethoate to control potato aphids and tubermoth.
- Apply Rendite to break dormancy to induce sprouting.

13. Factors considered in timing planting
- Rainfall pattern/moisture condition of the soil
- Type of crop to be planted
- Soil type
- Market demand
- Prevalence of pests and diseases
- Weed control

14. Advantages of timely planting
- Crops make maximum use of rainfall and suitable soil temperature leading to vigorous growth.
- Crops usually escape serious pest and disease attack.
- Crops benefit from nitrogen flush which is available at the beginning of the rain.
- It ensures that the produce of horticultural crops is marketed when prices are high.
- Crops establish earlier than the weed smothering them.

15. Main methods of planting
- Broadcasting
- Row planting

16. Difference between broadcasting and row planting
- Broadcasting - Seeds are scattered all over the field in a random manner
- Row planting - Seeds or other planting materials are placed in holes, drills or furrows.

17. Advantages of row planting
- Mechanization (use of machines) is possible
- Correct plant population can easily be established
- Lower seed rate is used than in broadcasting

- Cultural practices such as weeding, spraying and harvesting can easily be carried out.

18. **Disadvantages of row planting**
~ It does not provide an ample foliage cover
- It consumes a lot of labour and time hence expensive
- It requires some skill in measuring the distances between and within the rows.

19. Advantages of broadcasting as a method of planting
- It is easier than row planting
- It is quicker than row planting
-It is cheaper than row planting
It gives a good ground cover

20) Disadvantages of broadcasting as a planting method
- Seeds are unevenly spread leading to crowding of plants
- Weeding cannot be mechanized
- Good results can only be obtained when the seedbed is weed free, firm and have a fine tilth

21 **Oversowing** is the introduction of a pasture legume such as desmodium in an existing grass pasture. **Undersowing** is the establishment of pastures under a cover crop, usually maize.

22. Benefits of undersowing
- Facilitating more intensive land utilization
- encouraging an early establishment of pastures

23. a) **plant population**
This refers to the ideal number of plants that can be comfortably accommodated in any given area, without overcrowding or too few to waste space.

b| Formula for calculating plant population

$$\text{Plant population} = \frac{\text{Area of land}}{\text{Spacing of crop}}$$

(c) Plant population = $\frac{400cm \times 300cm}{75cm \times 25cm}$ = 64 plants

24. a) **spacing**

Spacing is the distance between and within the rows.

b)

Crop	Spacing
Maize (Kitale hybrid)	75-90cm x 23-30cm
Cofffee(Arabica)	2.75m x 2.75m
Tea	1.5m x 0.75m
Beans (Erect type)	45-60cm x 25cm
Bananas	3.6-6.0m x 3.6-4.5m
Coconut	9m x 9m
Tomatoes (money maker)	100cm x 50cm
Kales	60cm x 60cm

c) i) **The purpose of correct spacing**

To obtain maximum number of plants per unit area which will make maximum use of the environmental factors

ii) Demerits of wider spacing and closer spacing

Wider spacing leads to a reduced plant population which means lower yields whereas closer spacing lead to overcrowding of plants and competition for nutrients **and** other resources.

25. **Factors that determine spacing**

- **The type of machinery to be used**
- **Soil fertility**
- **The size of the plant**
- **Moisture availability**
- **Use of the crop**
- **Pest and disease control**
- **Growth habit of the crop**

26. 100cm is **the** inter-row spacing /distance between **rows.** 50cm **is the** intra-row spacing / distance between **two** plants in the same row

27. a) **Seed rate** is the amount of seeds to be planted in a given unit area.

b) **Purpose of correct seed rate**

To obtain the maximum yields from a unit area without sacrificing quality

2S. **Factors considered when choosing seed rates**

- Seed purity
- Germination percentage
- Spacing
- Number of seeds per hole
- The purpose of the crops

29. a) **Planting depth**

This is the distance from the soil surface to where the seed is placed.

b) Factors that determine correct depth of planting

- Soil type: Seeds emerge from greater depths in light soils such as sandy soils than in heavy soils such as clay soils.
- Soil moisture content: Seeds are planted deeper in dry soils than moist soils
- Size of the seed: Large seeds are planted deeper in the soil than small seeds.
- Type of germination: Seeds with epigeal germination should be planted shallower than thpse with hypogeal type of germination

CHAPTER 21
Questions on Crop Production III (Nursery Practices)

1. Define the following terms as used in crop production.
   a) Seed bed
   b) Nursery bed.
   cj Seedling bed
   d) Pricking out.
   e) Nursery practices. (5 marks)

2. Why are nurseries used in crop propagation? (7 marks)

3. Give six factors considered when selecting a nursery site. (6 marks)

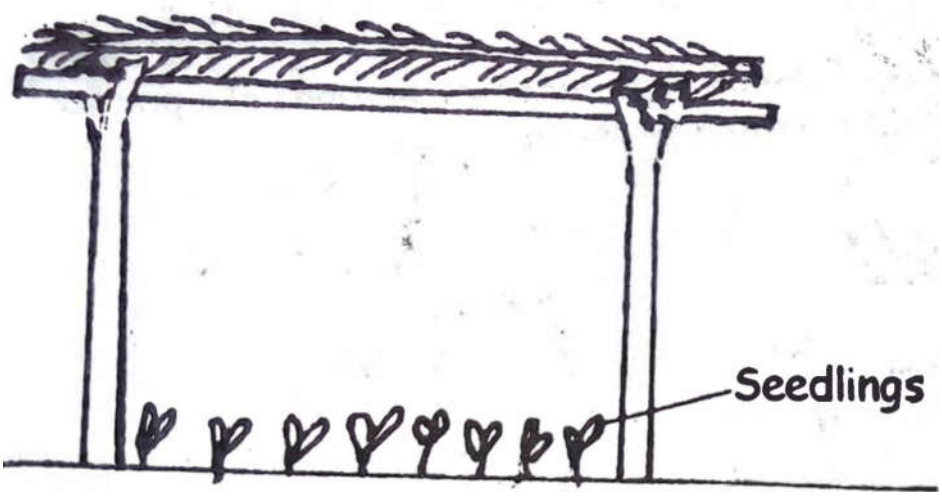
4. a) Name the three categories of nurseries (3 marks)
   b) State the purpose of each of the three categories of nurseries named in (a) above (3 marks)
5. Describe the establishment of a vegetable nursery. (l0 marks)

6. Describe the establishment of vegetative propagation nurseries. (l0 marks)

7. a) Define the term nursery management practices, (lmark)
   b) List the seven main nursery management practices (7marks)

8. Explain the meaning of the following nurseiy practices.
   a) Pricking out
   b) Hardening off (2marks)

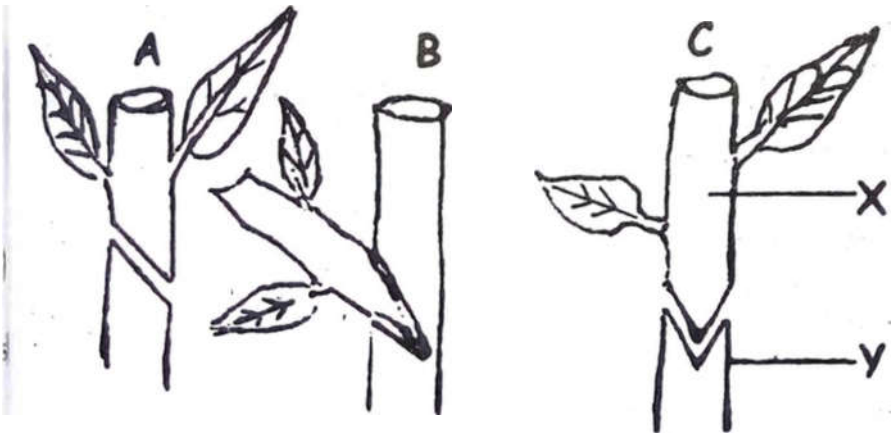
9. The diagram below represents a nursery practice



a) Identify the practice above, (lmark)
b) What precaution should be taken while carrying **out the** above practice? (1 mark)

10.a) Define the term grafting. (lmark)
b) Name five methods of grafting. (5marks)

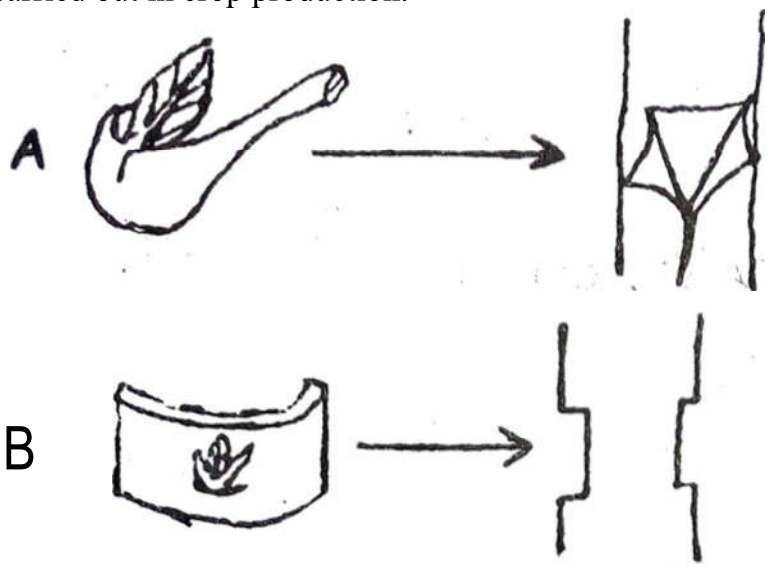
11. The following diagrams represent methods of grafting.



a) Identify the three methods shown above. (3marks)
b) Name the parts labeled X and Y. (2marks)
c) What term describes the ability of part X to form a successful union with part Y. (1 mark)

12. a) Define the term budding. (1 mark)
    b) Name three methods of budding. (3marks)

13. The diagrams below represent two methods of a practice carried out in crop production.



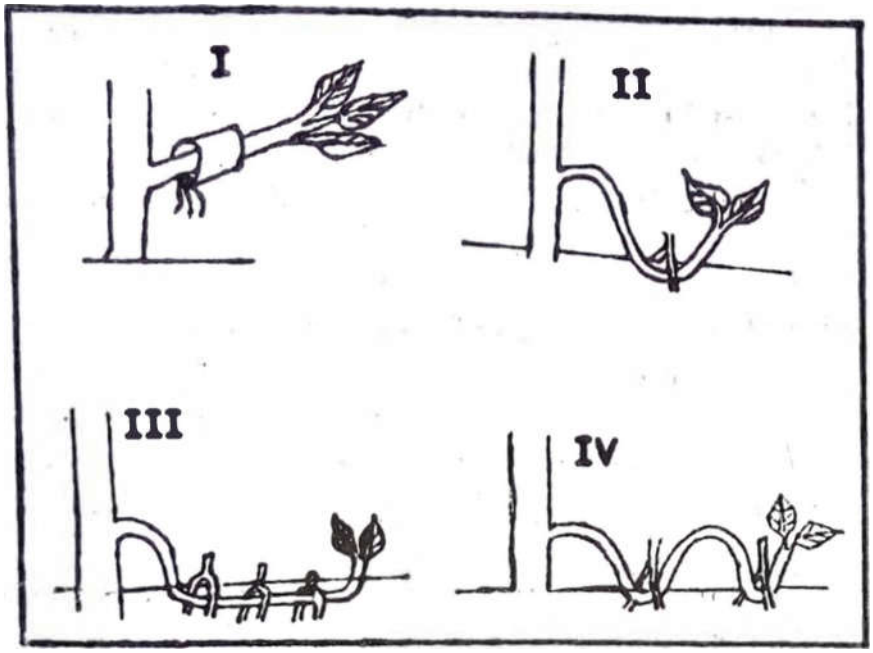
a) Identify the practice above. (lmark)
b) Name the two methods shown by A and B. (2marks)
c) What three materials can be used to firmly tie the two parts in each of the methods named above? (3 marks)

14. Outline the importance of grafting. (6marks)

17. a) Define the term layering. (lmark)

    b) Give the four types of layering. (4marks)

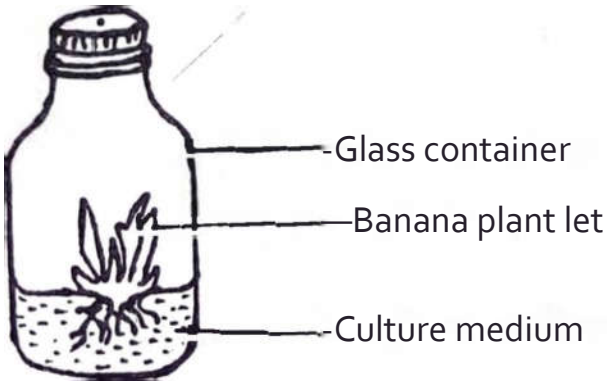
18. Below are diagrams representing four types of layering.



a) Identify the types of layering above. (4marks)

b| Under what conditions is layering type 1 above practiced (lmark)

19. The illustration below shows a vegetative material used in propagation of bananas



a) Identify the above material (lmark)
b) Name two essential substances provided by the culture medium (2marks)

c) Other than culture medium, name three other conditions required to promote development of roots and shoots in the banana plantlets (3 marks)

20. a) Outline the three stages followed in propagation of plants by tissue culture. (3 marks)
b) Give three ways of preparing propagules for establishment in the soil (3 marks)

21. Highlight the importance of tissue culture in crop production. (3 marks)

22. State two demerits of tissue culture as a means of crop propagation. (2 marks)

23. State four precautions taken when transplanting vegetable crop seedlings. (4 marks)

24. List three routine activities carried out on tree seedlings after transplanting. (3 marks)

25. Why is it important to water a nursery a day before transplanting? (2 marks)

26. Differentiate between transplanting in vegetable crop seedling and tree seedlings. (2marks)

CHAPTER 22
Answers on Crop Production III (Nursery Practices)

1. a) **Seed bed**
   - This is a piece of land which as been prepared ready to receive planting materials.

   b) Nursery bed.
   - This is a special nursery bed prepared for raising seedlings before transplanting.

   c) **Seedling** bed
   -This is a special type of nursery bed used for raising seedlings which have been removed from the nursery bed due to overcrowding before they are ready for transplanting.

   d) **Pricking out.**
   - This is the removal of seedlings from a nursery bed to a seedling bed.

   e) Nursery practices.
   - This refers to all activities carried out during the preparation and management of a nursery bed to raise planting materials.

2. **Why nurseries are used in crop propagation**
   - They facilitate production of many seedlings in a small area.
   - Routine management practices are easily and timely carried out.
   - They make provision of best conditions for growth, such as fine tilth, levelled field and shade possible.
   - They facilitate the planting of small seeds which develop into strong seedlings that are easily transplanted.
   - They ensure transplanting of only those seedlings that are healthy and vigorously growing.

- They facilitate transplanting of seedlings that are already established thus reducing the period taken in the field.
- Excess seedlings from the nursery may be sold, thus become a source of income to the farmer.

3. Factors considered when selecting a nursery site

- Nearness to the water source.
- Type of soil.
- Topography
- Previous cropping
- Security.
- Well sheltered place.

4. a) categories of nurseries

- Vegetable crop nurseries.
- Tree nurseries.
- Vegetative propagation nurseries.

b) purpose of each of the three categories of nurseries

- Vegetable crop nurseries are used for raising the seedlings of vegetable crops such as cabbage.
- Tree nurseries are used for raising tree seedlings.
- Vegetative propagation nurseries are used for introducing root production in cuttings before they are transported.

5. Establishment of a vegetable nursery.

I) Select and mark out the nursery site.
II) Clear the vegetation using slashers and pangas.
III) Remove the trash using a rake.
IV) Dig or plough the site deeply to remove all the perennial weeds especially the grasses.
V) Measure and divide various nursery beds
Vi) Leave 60cm wide paths between the, individual beds.
Vii) Hollow the bed to a fine tilth.
Viii) Broadcast phosphatic fertilizers or well rotten organic manure.

IX) Level the bed using a rake to mix the fertilizer or manure with soil and to remove the trash on the surface.

X) Make shallow drills 10 - 20cm apart and drill seeds uniformly.

XI) Cover the seeds lightly with the soil.

6. Establishment of vegetative propagation nurseries

I. Select the suitable site
II. Clear and level the site
III. Establish vegetative propagation unit measuring 3.66m by 1.22m
IV. Fill polythene sleeves measuring 7-10cm in diameter and 23-30cm long with a rooting mixture.
V. Water the sleeves
VI. Insert the cuttings seedling at the centre of each sleeve
VII. Arrange the sleeves in the vegetative propagation unit.
VIII. Erect wooden loops over the sleeved cuttings.
IX. Place polythene sheet on the loops.
X. Burry the polythene sheet into the ground at the edges.

7. **a) Nursery management practices**

These are the practices that are carried out in the nursery while the seedlings are growing.

b) Main nursery management practices

- Mulching
- Watering
- Weed control
- Pricking out
- Shading
- Pest and disease control
- Hardening off

8. a) **Pricking out**

This involves removal of excess seedlings from nursery bed to the seedling bed to allow them grow strong and healthy without much competition

b) **Hardening off**

This is the practice of preparing seedlings to adapt to ecological conditions prevailing in the seedbed by gradually reducing shade and watering.

9. a) Shading

b) Dark conditions should be avoided as they cause the seedlings to become etiolated and pale.

10. Grafting

This is the practice of uniting two separate woody stems.

b) Methods of grafting

- Whip or tongue grafting
- Side grafting
- Approach grafting
- Bark grafting
- Notch grafting

11. a) A - Whip/tongue grafting

B - Side grafting

C - Notch grafting

b) X - Scion

Y - Root stock

c) Compatibility

12. a) Budding

This is the practice cf uniting a vegetative bud (scion) to a seedling of another plant (root stock)

b) Methods of budding

- T-budding
- Top budding
- Patch budding

13. a) Budding
b) A-T-budding
B - Patch budding
c) - Adhesive tapes
- Rubber strips
- Polythene papers

14. Importance of grafting
- It facilitates change of the top of the plant from being undesirable to desirable.
- It makes it possible to grow more than one type of fruit or flower on the same plant.
- It helps to propagate crops that cannot be propagated in any other way.
- It helps repair damaged trees.
- It helps shorten the maturity age.
- It helps utilize plants with desirable root characteristics but undesirable products to produce desirable products.

17. a) **Layering**
This is the process by which a part of system **is induced** to produce roots while still attached to the **mother plant,**
b) **Types of layering**
- Marcotting/aerial layering
- Tip layering
- Trench layering
- Compound/serpentine layering

18. a) I - Marcotting/aerial layering
II- Tip layering
III - Trench layering
IV- Compound/serpentine layering
b) It is commonly used on hardwood plants where the stem cannot bend easily to reach the ground.

19. a) Tissue culture
b) Essential substances provided by the culture medium
- Correct nutrients
- Growth hormones

c) **Other than culture medium, the other conditions required to promote development of roots and shoots in the banana plantlets are:**

- Correct light intensity
- Correct temperature
- correct relative humidity

20. **Stages followed in propagation of plants by tissue culture**

Stage I - It involves establishing the asceptic culture and developing the propagule by enhancing cell division and enlargement

Stage 11 - It involves a series of sub-culturing to rapidly multiply the propagules through somatic development of embryos to produce auxiliary buds and adventitious roots.

Stage III - It involves preparation of the propagule for the establishment in the soil.

b) **Ways of preparing propagules for establishment in the soil**

- Rooting of the regenerated plantlets
- Hardening of plantlets by imparting some tolerance to moisture stress and attack by disease causing organisms (pathogens)
- Converting (being fed) to autotrophic state (making their own feed)

21. Importance of tissue culture in crop production

- It is used to recover and establish pathogen free plants especially in the Control of viral diseases.
- It is used in the mass production of propagules.
- It is fast and requires less space than use of cuttings.

22. **Demerits of tissue culture as a means of crop propagation**

- It requires high skilled man-power
- It requires special structures where temperatures and humidity can be controlled.

23. Precautions taken when transplanting vegetable **crop** seedlings

- Water the nursery adequately 3-4 hours to ensure that seedlings are lifted easily with a ball of earth around the roots thus minimize root manage.
- Select only the healthy and vigorously growing seedlings and lift them using a garden trowel.
- Transplant seedlings when the weather is cool preferably in the morning or evening.
- Plant seedlings at the same depth they were in the nursery and the lower leaves should not be in contact with the soil.

24. Routine activities carried out on tree seedlings after transplanting

- Watering
- Mulching
- Provision of temporary shade to conserve moisture

25. Why it is important to water a nursery a day before transplanting.

- It makes the soil stick around the roots.
- It eases the removal of the polythene sleeves during transplanting for seedlings raised in sleeves.
- Softens the soil and makes it easy to lift seedlings.

26. Differences between transplanting in vegetable crop seedling and tree seedlings

- Tree seedlings take a little longer to reach transplanting age compared to vegetable crop seedlings.
- Roots of tree seedlings are trimmed before lifting the seedlings unlike vegetable crop seedlings.
- After transplanting the young trees are protected individually from damage by animals while vegetable crop seedlings are protected collectively.

CHAPTER 23
Questions on Crop Production IV (Field Practices)

1. Define the term field practices. (1 mark)

2. Explain the meaning of crop rotation. (Imark)

3. Outline the importance of crop rotation. (6marks)

4. State six factors considered when designing a crop rotation programme. (6marks)

5. a) Name two types of rotational programmes. (2marks)
   b) Give an example of the two rotational programmes named in a) above (2marks)
   c) i) Why are beans included in the rotational programme (2marks)
   ii) Give a reason why maize is alternated with cassava

6. Define the following terms as used in crop production.
   a) Monocropping
   b) Intercropping
   c) Mixed cropping
   d) Mulching (4marks)

7. Outline the importance of mulching. (4marks)

8. a) Name the two types of mulching materials. (2marks)
   b) Give an example of each of the materials named in (a) above. (2marks)

9. State six advantages of mulching. (6rnarks)

10. Give four disadvantages of mulching. (4marks)

11. List four routine field practices. (4marks)

12. Define the following terms as used in crop production
    a) Thinning
    b) Gapping
    c) Roguing (3marks)

13. Name any three routine field practices and give a reason for each. (6marks)

14. a) Explain the term pruning. (2marks)
    b) List six reasons for pruning. (6marks)

15. State and explain the three methods of pruning. (6marks)

16. Name four tools used in pruning and state one use of each. (8marks)

17. What are the two methods of frame formation in tea production? (2marks)

18. The diagrams below represent two methods of frame formation.

a) Identify the two methods shown above. (2marks)
b) How else can the method labeled Y be carried out. (2marks)
c) At what height is the method X first done. (lmark)

19. a) Define the term tipping as used in tea production. (lmark)

b) What is the significance of tipping? (lmark)

c) Explain how the process of tipping is carried out. (3marks)

20. Explain the meaning of the following terms as used in tea production

a) Maintenance pruning

b) Rehabilitation (2marks)

21. Outline ten points observed when pruning tea. (l0 marks)

22. Give six reasons for pruning coffee. (6marks)

23. a) Name the two systems of pruning in coffee. (2marks)

b) Describe the two systems named in (a) above. (2marks)

24. a) Name the two types of multiple stem pruning system. (2marks)

b) Distinguish between the two types of pruning named above. (2 marks)

25. a) Give three advantages of non-capped multiple stem system. (3marks)

b) State four disadvantages of non-capped multiple stem system. (4marks)

26. Define the following terms as used in coffee production.

a) Capping

b) De-suckering

c) Changing the cycle (3marks)

27. How does annual pruning in single stem pruning differ from that of multiple stem pruning? (2marks)

28. Explain how a banana stool is managed. (3marks)

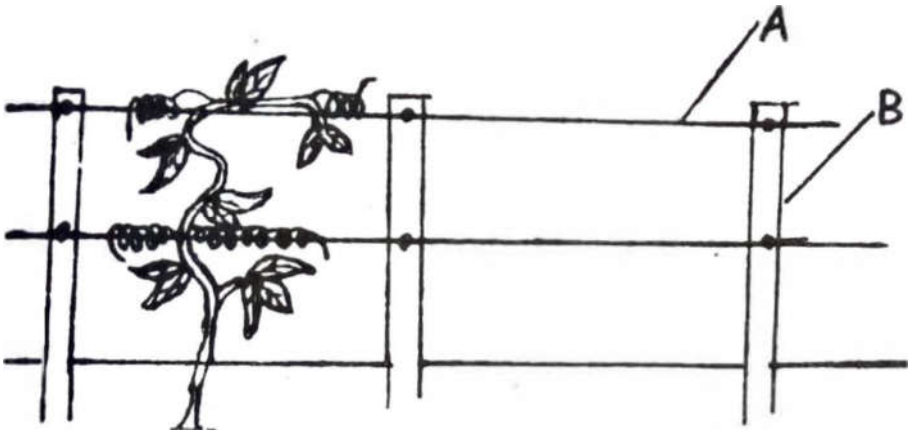
29. What is meant by the term cutting back in pyrethrum?
(lmark)

30. a) Define the term training as used in crop production.
(lmark)

b) Name three methods of training. (3marks)

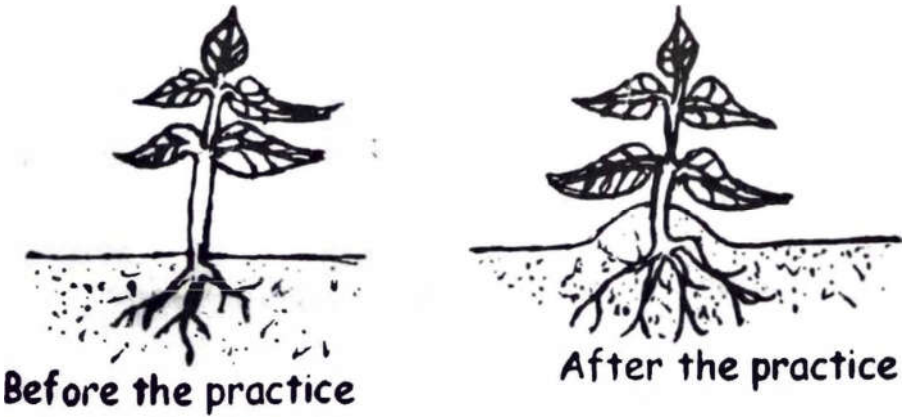
c) Describe the three methods named in b) above.
(3marks)

31. The figure below represents a field practice



a) Identify the field practice shown above. (2marks)
b) Name the parts labeled A and B. (2marks)
c) What two crops require the above practice? (2marks)

32. The following diagram represents a field practice. Use it to answer the questions that follow.



a) Identify the practice shown above, (lmark)
b) Give a reason for carrying out the above practices on the following crop.
   i) Irish potatoes
   ii) Groundnuts
   iii) Tobacco
   iv) Maize (4marks)
c) What precaution should be taken while undertaking the practice shown above? (lmark)

33. State three methods of crop protection. (3marks)

34. a) What is meant by harvesting. (lmark)
    b) List five factors that determine the time of harvesting. (5marks)

35. a) Give three factors that determine the method applied in harvesting. (3marks)
    b) Briefly explain the manual methods of harvesting the following crops (4marks)

Crop	Method of harvesting
Coffee	
Tea	
Irish potato	
Beans (Green)	

36. State three precautions taken during harvesting. (3marks)

37. a) Define the term post-harvest practices, (lmark)
    b) Name seven post-harvest practices. (7marks)

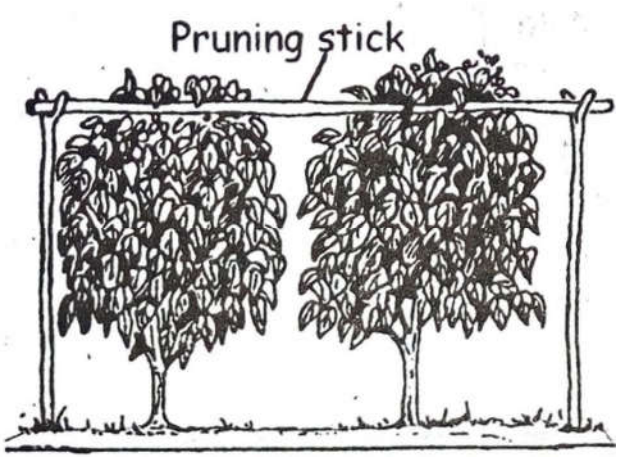
38. a) Name two main types of storage structures for farm produce. (2marks)
    b) Give two examples of each of structure named in a) above. (2marks)

39. Give three disadvantages of traditional storage. (3marks)

40. List seven characteristics of a good grain store. (7marks)

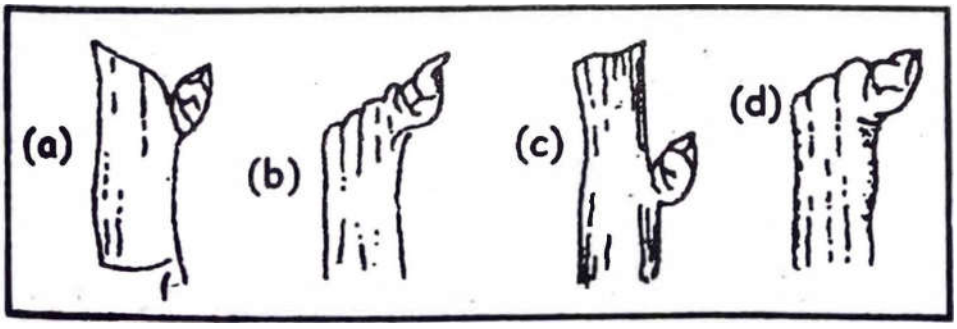
41. In what four ways should a store be prepared for storage of crop produce? (4marks)

42. The figure below shows a field practice carried out in tea production.



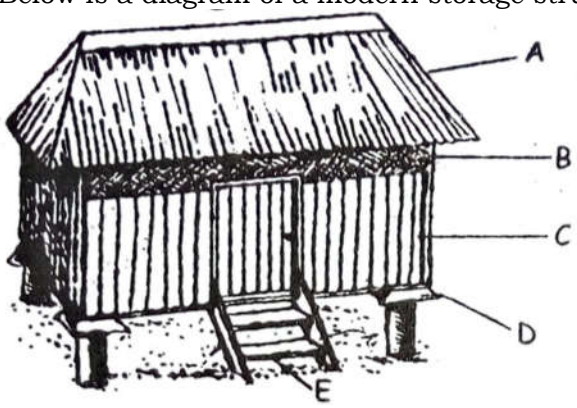
a) Identify the practice above. (lmark)
b) Why is the practice shown above important in tea production (1 mark)

43. The diagrams below represent ways of making pruning cuts in coffee.



a) Which one of the four ways above is correct? (lmark)
b) Give a reason why the other three ways are incorrect. (3marks)

44. Below is a diagram of a modern storage structure



a) Identify the parts labeled A to E.(5marks)
b) State the significance of the parts named in a) above.
(5marks)

CHAPTER 24
Answers on Crop Production IV (Field Practices)

1. Field practices

TheSe are operations carried out in the field to facilitate proper growth and optimum yield of the **various** crop grown.

2. Crop rotation

It is the growing of different types of crops or crops of different families on the same piece of land in an orderly sequence.

3. Importance of crop rotation

- Maximum utilization of nutrients
- Control of soil borne pests and disease build up
- Control of weeds
- Improvement of soil fertility
- Improvement of soil structure
- Control of soil erosion.

4. Factors considered when designing a crop rotation programme

- Crop root depth
- Crop nutrient requirement
- Weed control
- Pest and disease control
- Soil fertility
- Soil structure

5. a) **Types of rotational programmes**

- Three course rotation
- Four course rotation

b) Three course rotation

First year - Beans
2nd year - maize
3rd year - cassava

Four course rotation

1 st year - yams
2nd year - beans
3rd year - maize
4th year - cassava

c) i) Why beans are included in the rotational programme

It improves soil fertility through fixation of nitrogen with the help of the rhizobia bacteria

ii) Why maize is alternated with cassava

It leads to better utilization of nitrogen and potassium since maize use more of nitrogen and less of potassium whereas cassava uses more of potassium and less of nitrogen.

6. a) Monocropping

This is the practice of growing one type of crop in a farm or one piece of land.

b) Intercropping

This is the practice of growing of two or more crops in the same field at the same time.

c) Mixed cropping

This is the growing of two or more crops in the same field but in specific sections at the same time.

d) Mulching

This is the placement of materials such as banana leaves or polythene sheets on the ground next to the growing crop.

7. Importance of mulching

- Reduction of evaporation rate
- Smothers weeds
- Moderation of soil temperature
- Reduction of speed of run-off.

8. a) Types of mulching materials

- Organic materials
- Inorganic materials

b) Example of mulching materials

- Organic materials - dry grass
- Inorganic materials - polythene sheets.

9. Advantages **of mulching**

- Prevents water evaporation
- Acts as an insulator
- Reduce speed of running water, intercept rain drops and increase rate of infiltration
- Suppresses growth of weeds.
- Decomposed organic materials release humus that improves soil structure and water holding capacity.
- On decomposition organic materials release nutrients hence improves soil fertility

10. Disadvantages of mulching

- Provides a breeding ground and hideout for pests.
- Traps the light showers of rainfall
- It is a fire risk
- It is expensive to acquire, transport and apply

11. **List four routine field practices**

- Thinning
- Gapping
- Roguing
- Pruning

12. **a)** Thinning

This is the removal of excess seedlings to allow spaces for the remaining seedlings.

b) Gapping

This is the filling up or replacement of the dead seedlings.

c) Roguing

This is **the uprooting and destroying of the infected** plants

13.

Name	**Reason**
Thinning	To obtain an optimum plant population in a given unit area
Gapping	To ensure optimum plant population
Roguing	To control pests and diseases

14. a) Pruning

This is the removal of extra or unwanted parts of a plant. The unwanted parts maybe due to breakage, overcrowding (excess vegetation) pest or disease attack and un-productivity.

b) Reasons for pruning

- To train the plant so that it can have the required shape.
- To remove the diseased and unwanted parts of a plant, such as extra suckers, leaves, branches, flowers or even stems.
- To control cropping
- To facilitate picking
- To ease the penetration of the spray
- To control pests and diseases

15. Methods of pruning

• Pinching out: Involves removal of terminal buds

- Annual pruning: Involves removal of branches that have borne two crops and have undesirable growth characteristics

■ Coppicing/pollarding: Involves cutting of the tree branches at specified points in order to achieve a desired shape.

16. **Tools used in pruning and their** uses

Tool	use
Pruning saw	Cutting hard branches and stems in coffee and citrus
Pruning knife	Cutting or pruning tea by use of strokes
Pruning shears	trimming hedges
Secateurs	Pruning or cutting soft branches in coffee and citrus

17. Methods of frame formation in tea production

- Formative pruning
- Pegging method.

18. a) X: Formative pruning method
Y: Pegging method

b) - By use of rings and pegs
- Using parallel sticks / fitos and pegs

c) 15cm

19. a) **Tipping**

It is the cutting back of shoots to the desired table height that is at 20cm above the pegging height.

b) Significance of tipping

It encourages formation of a uniform and a flat plucking table.

c) **How the process of tipping is carried out**

- Two Y-shaped sticks of the same height (50cm) are fixed into the ground.
- A long straight stick about 2m long placed on the Y-shaped sticks
- Three leaves and a bud are removed from each shoot above the required height of the table.
- Tipping is done at 2-3 weeks interval, five times before the table is properly formed.

20. a) Maintenance pruning

Prevent rise in height of the plucking table by cutting back the tea bush to 5cm above the last pruning after 2-5 years.

b) Rehabilitation

The process of cutting back the bush to 45cm, above the ground to maintain the plucking table height every after 40-50 years.

21. Points observed when pruning tea

- Do not cut back side branches which are growing below the pruning height.
- Do not cut outside edge of the bush at a higher level than the centre.
- Prune the bush parallel with the slope of the ground and not on a horizontal plane.
- Cut the branches across in order to minimize the area of the wounds
- Remove small branches and twigs by hand.
- Place some branches on top of the frame to offer protection during the dry period.
- Leave all branches to rot in the field.
- Ensure that the pruning knife is always sharp.
- Cut back tea bushes to the original table after several prunings.
- Prune back the bushes to 5cm above the previous pruning level every three years.

22. Reasons for pruning coffee

- It regulates bearing
- To remove old and unproductive branches
- To make harvesting easy by regulating the height of tree.
- To open up the bush and allow better air circulation
- To facilitate the penetration of sprays.
- To economize on the use of chemicals

23. a) Systems of pruning in coffee
    - Single stem pruning stem
    - Multiple stem pruning system.

- **Single stem pruning** involves establishing one permanent stem with a strong framework of primary branches. This is achieved by capping the main stem first at 53cm second at 114cm and the final one at 168cm
- **Multiple stem pruning** establishing two or three main upright stems with laterals to bear the crop.

24. a) **Types of multiple stem pruning system**
- Capped multiple system
- Non-capped system.

b)

Capped multiple stem	Non-capped multiple stem system
It is established by capping the main stem at 38 cm and allowing two or three selected shoots to grow to a height between 1.5m and 1.8 m	It is established by capping the main stem at 38 cm above the ground and then allowing 2 Or 3 suckers to grow a bearing head of 0.9 m to 1.5 m is left on each stem.

25. a) **Advantages of non-capped multiple stem system**
- It requires less skill to establish
- It is easy to prune
- It does not allow accumulation of Coffee Berry Disease (CBD) due to frequent removal of old stem.

b) **Disadvantages of non-capped multiple stem system**
- Breaking of stems and branches
- Difficulty in gathering the berries from top points
- Difficulty in spraying the tall bushes
- Rotting of stumps with age

26. a) **Capping**

This is the process of cutting the main stem at a height of 53cm, when the young coffee is 69cm tall.

b) De-suckering

This is the removal of suckers from the coffee bushes

c) **Changing the cycle**

This is the replacement of old bearing stems by sucker.

27. **How annual pruning in single stem pruning differ from that of multiple stem pruning**

Annual pruning in a single stem system involves removal of suckers while in multiple stem pruning it involves removal of laterals that have borne two crops.

28. **How a banana stool is managed**

Pruning involves removal of extra-suckers in the stool 3-6 stems are left per stool. The suckers left should be at different stages of development, one sucker bearing one half grown and the other starting to grow to ensure that they come into bearing at different times.

29. **Cutting back in pyrethrum**

This is an operation which involves the removed of old stems down to the level of the top foliage at the end of each cropping year towards the end of the dry season.

30. a) **Term training as used in crop production**

This is the practice of manipulating plants to grow in a designed direction and shape.

b) **Methods of training**

- Staking
- Propping
- Trelishing

c) - **Staking** is the practice of supporting plants having weak stems with the help of thin strong sticks.

Propping is the practice of providing support to tall varieties of bananas and those that have heavy bunches using forked sticks.

- **Trelishing** is the practice of providing support of crops with vines using wires or sisal strings.

31. a) Trelishing
    b) A - Wire/sisal string
       B - Pole / post
    c) - Passion fruit
       - French beans.

32. a) Earthing up
    b) i) Irish potatoes - To improve tuber formation
       ii) Groundnuts - To promote production of seeds.
       iii) Tobacco - To improve drainage around the plant
       iv) Maize - To provide support and prevent lodging
    c) Avoid injuring the roots of the crop

33. Methods of crop protection
- Control of weeds
- Control of crop pests
- Control of crop diseases.

34. a) Harvesting
This is the final operation in crop production that is carried out in the field.

b) **Factors that determine the time** of **harvesting**
- The purpose of the crop or the use for which the crop was intended
- Market demand
- Concentration of the required chemicals
- Weather conditions
- Prevailing market price and profit margins.

35. a) **Factors that determine the method applied in harvesting**
- The growth habit of the plant
- The part which is to be harvested
- The scale of production

Crop	Manual method of harvesting
Coffee	picking cherry ripe berries
Tea	plucking two leaves and a bud
Irish potato	Lifting tubers with sticks
Beans (Green)	Picking green pods

36. Precautions taken daring harvesting

- Harvest at the right stage depending on intended use
- Harvest when weather is dry to avoid rotting
- Avoid delayed harvesting as it may lead to spoilage
- Prepare the store before harvesting

37. **a) Post harvest practices are the practices carried out on the crop after harvesting**

b) Post-harvest practices

- Threshing/shelling
- Drying
- Cleaning
- Sorting/grading
- Dusting
- Processing
- Packaging

38. a) **Types of storage structures for farm produce**

- Traditional storage structures
- Modern storage structures

b) - Traditional structures - granary, pot/guard
- Modern structures - silo, bin

39. **Disadvantages of traditional storage**

- Rats and weevils attack
- Rotting of grains
- Limited in size

40. Characteristics of a good grain store

-Rat or vermin proof
- Well ventilated
- Easy to load and oft' load
- Pest free
- Leak proof
- Well secured to minimize theft
- Cool conditions to prevent overheating that would crack the grains.

41. Ways in which a store should be prepared for storage of crop produce?

- Cleaning the store thoroughly
- Maintenance that is repairing or replacing broken/worn out parts
- Dusting using appropriate pesticides
- Clearing the vegetation around the store

42. a) Tipping
    b) It encourages formation of a uniform and a flat plucking table

43. a) d
    b) a - sloping wrong way
       b - Too close to bud
       c - Too far from bud

44. a) A-Roof
       B - Wire mesh
       C - Wall made of timber
       D - Rat-proof (guard) / metal plate.
       E - Removable ladder

    b) A - Makes the store leak proof
       B - Enhances proper ventilation
       C - Makes the store well secured to minimize theft
       D - Makes the store rat or vermin proof
       E - Makes it easy to load and off load.

CHAPTER 25
Questions on
Crop Production V
(Vegetables)

1. Define a vegetable. (lmark)

2. For what two main reasons are vegetables grown. (2marks)

3. Using an example in each case give six types of vegetables. (6marks)

4. Give the botanical names of the following vegetables.
   a) Tomatoes
   b) Cabbages
   c) Carrots
   d) Onions (4marks)

5. State three characteristics of vegetables. (3marks)

6. Outline the ecological requirements of tomatoes, cabbages, carrots and onions in the table below. (6marks)

	Tomatoes	Cabbages	Carrots	Onions
Altitude(m)				
Rainfall (mm)				
Soil				

7. With the aid of examples in each case name the categories of varieties of vegetables below.
   a) Tomatoes (4marks)
   b) Cabbages (4marks)
   c) Carrots (4marks)
   d) Onions (2marks)

8. Explain planting in production of each of the vegetables below (8marks)

	Tomatoes	Cabbages	Carrots	Onions
Planting depth				
Spacing				
Fertilizer rate				
Manure				

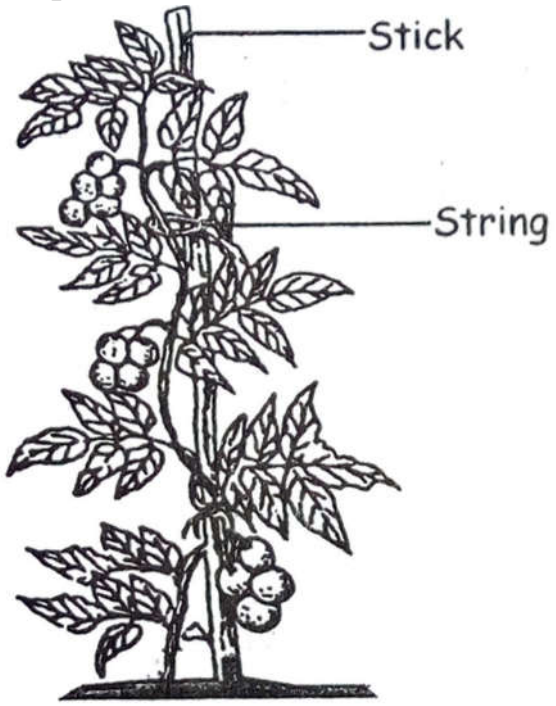
9. Briefly describe nursery establishment and management in tomato production. (l0 marks)

10. Why should manure not be applied during planting of carrots? (1 marks)

11. Give four field management practices carried out on the following vegetables. (8marks)
    a) Tomatoes
    b) Cabbage
    c) Carrots
    d) Onions

12. What are the effects of excessive application of nitrogenous fertilizers when top dressing tomatoes **(**4marks**)**

13. The diagram below represents a field management practice carried out on tomatoes



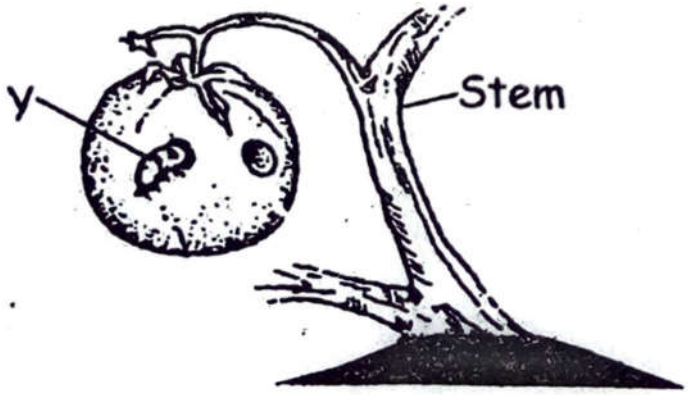
a) Identify the above practice. (1mark)
b) Give four reasons for carrying out the above practice. (4marks)

14. State two reasons why care should be taken when weeding tomatoes. (2marks)

15. Give reasons why tomatoes should be pruned. (3marks)

16. Name three tomato pests and state one control of each. (6marks)

17. The diagram below represents a tomato pest



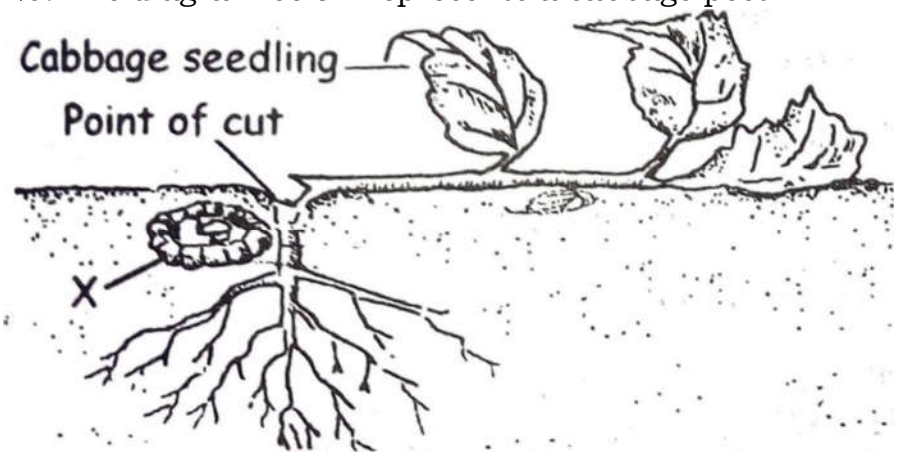
a) Identity the pest labeled Y above, (lmark)
b) What is the effect of the above pest on the plant? (lmark)
c) How can the above pests be controlled, (lmark)

18. Give one cause, symptoms and control of the following diseases of tomatoes. (9marks)

Disease	Causes	Symptoms	Control
Tomato blight			
Bacterial wilt			
Blossom-end-rot			

19. How does harvesting in canning varieties of tomatoes differ from that of fresh market ones. (2marks)

20. The diagram below represents a cabbage pest



a) Identify the pest labeled X above, (lmark)
b) State the observable effect of the pest shown above, (lmark)
c) How is the pest above controlled, (lmark)
d) Other than the above pest name two other pests that affect cabbages and give two control measures of each. (6marks)

21. Give three diseases of cabbages, their causes, symptoms and control in the table below. (6marks)

Disease	Cause	Symptoms	Control

21. Briefly outline the procedure of harvesting cabbages. (3marks)

22. Explain what happens if cabbages are not harvested in time especially during rainy season. (2marks)

23. a) Name the only field pest of carrots. (lmark)
    b) How is the above pest normally controlled? (1 mark)

24. Why should carrots be earthed up. (lmark)

26. At what rate should nitrogen be applied as top dress in carrots (lmark)

27. What is the harvesting method of carrots? (lmark)

28. Describe the following field management practices in production of onions.
    a) Thinning. (2marks)
    b) Weeding (3marks)
    c) Top dressing (2marks)

29. a) Name the common pest that attack onions, (lmark)
    b) State one control measure of the pest named in a) above (lmark)

30. Give two common diseases of onions and state their symptoms and control in the table below. (6marks)

Disease	Symptoms	Control

31. a) How is harvesting of onions done? (2marks)
    b) List four post-harvest practices carried out on onions (4marks)

32. Give the expected yields of the following crops under good management (3marks)
    a) Tomatoes
    b) Onions
    c) Carrots.

CHAPTER 26
Answers on Crop Production V (Vegetables)

1. Vegetable

It is any crop that is grown and eaten fresh

2. **Main reasons why are vegetables grown**

- Nutritional reasons such as provision of vitamins and minerals
- Commercial reasons such as generation of income

3. **Types of vegetables**

- Leafy vegetables e.g cabbages
- Root vegetables e.g carrots
- Fruit vegetables e.g tomatoes
- Pod vegetables e.g beans
- Stem vegetables e.g spring onions
- Bulb vegetables e.g bulb onion

4. a) Tomatoes - *Lycopersicon esculentum*
   b) Cabbages - *Brassica oleracea*
   c) Carrots - *Daucus carota*
   d) Onions - *Allium cepa*

5. Characteristics of vegetables

- They are highly perishable
- They mature early / take a short time to grow
- They are eaten when fresh

6.

	Tomatoes	Cabbages	Carrots	Onions
Altitude(m)	0-2100	1800-2900	0-2900	2100
Rainfall (mm)	760-1800	750	750-1000	Over 1000
Soil	Deep fertile well drained	Deep, rich well drained pH 6.5	Deep Fine tilth, well drained	Fertile, well drained, pH 6.0 -7.0

7. a) **Tomatoes**

i) Fresh market varieties e.g Money Maker, Hundred Fold, Bee Eater, Hotset, Ailsa Craig, Super Marmande, Ponderosa and Marglobe.

ii| Processing varieties e.g Primabel, San Marzano, Cal J, Seinz, Kenya Beauty, Rutgers and l0x hybrid.

b) **Cabbages**

i) Early maturity varieties e.g. Brunswick, sugarloaf, early jersey, mukuki, Copenhagen market, Golden Acres, main-crop and Gloria hybrid

ii) Late maturing varieties e.g drum-head, prize drum-head, sure-head, perfection and savoy cabbage.

c) **Carrots**

i) Fresh market varieties e g chantenary and Nantes

ii) Canning varieties e.g Nantes

d) Onions

- Red creole, tropicana hybrid , white creole

11. Field management practices carried out on the following vegetables

(a) **Tomatoes**

Gapping, top dressing, weeding, staking, pruning, pest control, disease control.

b) Cabbage

Top dressing, weeding, pest control, disease control, gapping.

c) Carrots

Thinning, weeding, topdressing, pest control, disease control

d) Onions

Thinning, weeding, top dressing, pest control, disease control

12. Effects of excessive application of nitrogenous fertilizers when top dressing tomatoes

- Prolonged maturity
- Cracking of fruits before maturity
- Blossom end rot
- Too much vegetative growth hinder fruit formation

13. a) Staking

b) - Production of clean fruits
- Facilitates spraying and harvesting of the crop
- Controls incidences of disease outbreaks such as blight
- Prevents infestation by soil borne pests.

14. **Reasons why care should be taken when weeding** tomatoes

- So as not to injure tomato roots and stems
- Too much shaking may cause immature fruit fall

15. Reasons for pruning tomatoes

- To promote fruit development rather than vegetative growth.
- To ease spraying
- To reduce wastage of chemicals
- To reduce chances of blight attack.

16.

Pest	Control
American bollworm	Spraying with insecticides
Cutworm	Use of appropriate pesticide
Nematode	Crop rotation

17. a) American bollworm
    b) It bores holes into the fruits
    c) Spraying with appropriate insecticide

13.

Disease	Causes	Symptoms	Control
Tomato blight	Fungus ***Phytophthora infestans***	Dry brown lesions on stems, leaves and fruit	Spraying using pesticides
Bacterial wilt	Bacterium ***Pseudomonas solanacearum)***	Plant withers then dry even in wet weather conditions	- Uproot and burn infected crops. - Certified seeds - Crop rotation
Blossom-end-rot	- Too much nitrogen in early stages of growth. - Irregular or infrequent watering - Calcium deficiency in young fruits	Blossom ends appear rotten and water soaked or rotten dry	- Regular watering - Top dressing with right amount of nitrogen - Application of calcium compounds in the soil

19. **Canning varieties** must be left to ripen on the plants before they are harvested while **fresh market varieties** are picked as a reddish colour starts to appear.

20. a) Cut worm
b) Cutting the stem at the base of the seedling
c) Mixing appropriate insecticide powder with soil in each hole during transplanting.

d)

Pest	Control
Aphids	Use of appropriate insecticide Irrigation during dry season
Cabbage sawfly	Use of Crop rotation appropriate insecticides
Diamond Blackmoth	Use of appropriate pesticide

21.

Disease	Cause	Symptoms	Control
Damping off	Fungi	Cobweb - like black mass of fungi that form a ring on the stem base	- Removing shade - Thinning of seedlings - Use of copper fungicide
Black-rot	Bacteria	A black ring in the stem	Crop rotation
Downey mildew	Fungi	Brown spores covering the leaves; death of the whole plant	- Uprooting and burning affected cabbage plants - Crop rotation - Nursery hygiene - Use of fungicides

21. Procedure of harvesting cabbages
    - Harvest 3-4 months after transplanting
    - Cut the head when they are solid and compact
    - Bag them first or just throw onto lorries or pick-ups then transport to the market.

22. The heads crack and start rotting except Gloria Hybrid. Flowers may also grow from the split heads to form seeds.

23. a) Green aphids
    b) Use of appropriate pesticide

24. To encourage root expansion.

26. 60kg per hectare

27. Lifting the plants out of the ground using a fork jembe or uprooting manually.

28. a) **Thinning**

It is carried out in the crop that has been directly planted so as to achieve an intra-row spacing of 8cm.

b) **Weeding**

This is done manually to keep the field weed free, taking care not to damage the shallow roots or compact the soil. Excess soil is removed from around the root region to expose the bulb for expansion.

c) Top dressing

This is done three months after planting using calcium ammonium nitrate at the rate of 250kg/ha

29. a) Onion thrips

b) Spraying with appropriate insecticide

30.

Disease	Symptoms	Control
Purple blotch	Oval greyish lesions with purple centres on leaves; leaf culling; die back	- Crop rotation - Use of appropriate fungicides
Downey mildew	Brown spores covering the leaves, death of whole plant	- Crop rotation - Use of appropriate fungicides

31. a) **How harvesting of onions is done**

- Tops are broken or bent at the neck as soon as leaves start drying and withering of stems. Bulbs are then dug up and left to dry in a shade for a few days.

b) **Post-harvest practices carried out on onions**

- Drying the bulbs under a shade
- Regular inspection to remove spoilt ones
- Grading according to size
- Packaging in net bags

32. **Expected yields of the following crops under good management**

a) **Tomatoes**

100 tonnes per hectare

b) **Onions**

17 tonnes per hectare

c) **Carrots-**

20 tonnes per hectare.

CHAPTER 27
Questions on Livestock Health I (Introduction to Livestock Health)

1. Define the following terms as used in livestock production
   a) Health
   b) Disease (2marks)

2. Why should a farmer be concerned about the health of livestock in the farm? (6 marks)

3. Give the three major signs that can be used to identifv healthy animals. (3marks)

4. State four aspects that can be considered when examining physical appearance of an animal. (4marks)

5. Describe the physical signs of good health in an animal. (4marks)

6. Give five factors considered when examining physiological body functions of a healthy animal. (7marks)

7. Briefly explain the physiological body functions of a healthy animal. (7marks)

8. State four factors that influence the variation of respiration in various farm animals. (4marks)

9. Give four factors that influence pulse rates of farm animals. (4marks)

10. Fill the table below with temperature, pulse and respiratory rates of healthy animals (9 marks)

Animal	Temperature	pulse rate	Respiration
Cattle			
Sheep			
Goat			
Chicken			
pig			
Horse/donkey			

1 1. What two morphological conditions of the animal's body may be observed to determine its health? (2marks)

12. How should morphological conditions of a healthy animal be? (2 marks)

13. a) Define the term predisposing factors as used in livestock health. (lmark)
    b) State five factors that may predispose an animal to certain diseases. (5 marks)
    c) How do the factors named in b) above predispose animals to diseases. (5marks)

14. Give six major causes of livestock diseases. (6marks)

15. Name the nutritional disorders resulting from deficiency of the following minerals (6marks)
    a) Iron
    b) Calcium and Phosphorus
    c) Calcium
    d) Phosphorus
    e) Copper
    f) Iodine

16. What metabolic disorder results from impaired metabolism of carbohydrates and volatile fatty acids? (lmark)

17. How does the amount of food eaten by an animal affect livestock health?

18. Give five physical causes of livestock disease. (5 marks)

19. State three chemical causes of livestock diseases. (3marks)

20. Name six organisms that cause diseases in livestock. Omarks)

21. Name the animals that are normally affected by the following bacterial diseases. (5marks)

Disease	Animals affected
Anthrax	
Black quarter	
Brucellosis (Contagious abortion)	
Calf pneumonia	
Foot rot	
Fowl typhoid	
Mastitis	
Enterotoxemia (pulp kidney)	
Pullorum disease / bacillary White diarrhoea	
Lamb dysenterv	

22. Differentiate between pathogenic bacteria and viruses. (4marks)

23. State two characteristics of viral diseases. (2marks)

24a) Name any six viral diseases of livestock. (3marks)
b) For each of the diseases named in a) above give an example of the affected animals. (3marks)

25. a) Give three arthropods that act as vectors for protozoan diseases. (3marks)

b) For each of the following animal diseases name the vector and animal affected. (6marks)

Disease	Vector	Animal affected
East Coast fever		
Red-water		
Anaplasmosis		
Heart water		
Try panosomiasis		
Coccidiosis		

26. Name the causal organism of the following livestock diseases. (6marks)
a) East Cost fever
b) Red water
c) Anaplasmosis
d) Heart water
e) Trypanosomiasis
f) Coccidiosis

27. a) Give two categories of living organisms that cause disease in livestock. (2marks)

b) Using examples distinguish between the two categories named in a) above. (4marks)

28. State three routine management practices carried out to control livestock diseases. (3marks)

29. List five preventive measures applied in the control of livestock diseases. (5marks)

30. Highlight five conditions that should be met by all livestock housing structures. (5 marks)

31. a) Define the following terms:
    i) Quarantine (lmark)
    ii) Notifiable disease (lmark)
    b) How does quarantine serve to control livestock diseases. (1 mark)

32. a) What are prophylactic drugs. (lmark)
    b) Give any four prophylactic measures. (4marks)

33. a) Why should farmers handle livestock in the most humane and technical way? (lmark)
    b) State five reasons for handling animals. (5marks)

34. Name four activities in livestock health that necessitates handling of animals. (4marks)

CHAPTER 28
Answers on Livestock Health I (Introduction to Livestock Health)

1. a) Health

It is a state in which all the body organs or parts and systems are normal and functioning normally,

b) Disease

It is any deviation or alteration in a state of body of animal or its organs which interrupts the proper performance of its functions.

2. Why farmer should be concerned about the health of livestock in the farm

- Healthy animals grow well and fast enough to reach maturity quickly.
- Healthy animals have a longer economic and productive life.
- Healthy animals produce good quality products and consequently fetch high market prices.
- Healthy animals maintain high productivity.
- Healthy animals will not spread diseases to either animals or human beings.
- Healthy animals are economical and easy to keep.

3. Major signs that can be used to identify healthy animals

- Physical appearance
- Physiological body functions
- Morphological conditions of the body

4. Aspects that can be considered when examining physical appearance of an animal.

- Behaviour of the animal
- General appearance of the animal
- Movement of the animal
- Posture

5. Physical signs of good health in an animal

- A healthy animal should look gentle or docile and produce normal sound.
- A healthy animal should always be alert, bright in manner and able to carry its own weight evenly.
- A healthy animal should have a normal gait and should move about and walk with ease.
- A healthy animal should have an easy and normal posture both while standing or lying down.

6. Factors considered when examining physiological body functions of a healthy animal

- Appetite and feeding
- Defecation
- Urination
- Body temperature
- Respiration rate
- The pulse rate
- The production level of the animal.

7. Physiological body functions of a healthy animal

- A healthy animal has a good appetite (e at well and drink well and regularly)
- A healthy animal will defecate normally and regularly
- A healthy animal show regular and normal urination as well as production of pale-yellow urine
- The body temperature of a healthy animal should be within the normal range.
- A healthy animal should have a normal range of the respiratory rate per minute
- A healthy animal should have a normal pulse rate.
- A healthy animal which is producing such products as milk, eggs and others should have a steady yield.

8. Factors that influence the variation of respiration in various farm animals

- The body size of the animal
- The amount of exercise done by the animal
- The degree of excitement
- The ambient or environmental temperature.

9. Factors that influence pulse rates of farm animals

- The degree of excitement
- The age of the animal
- The sex of the animal
- The physiological status of the animal for instance pregnancy.

10.

Animal	Temperature °C	Pulse rates Beats/min	Respiration Breaths/min
Cattle	38.5 - 39.5	50-70	10-30
Sheep	38.5 -40.5	70-80	12-20
Goat	38.5 - 40.5	70-80	10-20
Chicken	40.4 - 43.0	200 - 400	15-30
Pig	38.0- 39.0	60-80	8 - 1 8
Horse/donkey	37.5 - 38.5	2 8 - 4 0	8 - 1 6

11. Morphological conditions of the animal's body that may be observed to determine its health

- The visible mucous membranes
- The skin and animals coat

12. How morphological conditions of a healthy animal should be.

- Mucous membranes should be pink in colour, moist, soft, elastic, smooth and well lubricated.
- Healthy animal's skin should always be warm to touch, smooth, soft, pliable and moist especially around the muzzle.

13. a) Predisposing factors

- These are conditions inside or outside the body of an animal which lead to the animal contracting a disease or injury

b) Factors that may predispose an animal to **certain diseases**

- The species of the animal
- The breed of the animal
- The age of the animal
- The sex of the animal
- The colour of the animal

c) How the factors named in b) above predispose animals to diseases

- Species of the animal determines the type of disease that is likely to affect that species and not any other e.g swine fever affects only pigs.
- Some diseases affect only a specific breed of animal e.g cancer of the eye affects only Hereford breed of cattle.

* Young animals are more prone to diseases such as anaemia in pigs, dysentery in sheep and pneumonia in calves.
* Some diseases are associated with sex of the animal e.g orchitis only in males while vaginitis affect only females.

- Animals with black colour suffer from heat stress while those with light pigmented skins suffer from disorders such as solar erythema in large white breed of pigs.

14. Major causes of livestock diseases

- Nutritional causes
- Amount of food eaten by an animal
- Physical causes
- Chemical causes
- **Living organisms**

15. Nutritional disorders resulting from deficiency of the following minerals

a) Iron - Anaemia (in piglets)
b) Calcium and Phosphorus - Curled toe paralysis (in **poultry)**
c) Calcium - Milk fever (in lactating dairy)
d) Phosphorus - oesteomalacia
c) Copper - *Enzootic ataxia* or sway back (in lambs)
f) Iodine - Goitre (in young calves)

16. Metabolic disorder results from impaired metabolism of carbohydrates and volatile fatty acids

Bovine ketosis or aretonoemia

17. How the amount of food eaten by an animal affect livestock health

- Excessive intake of lush pasture cause bloat (ruminal tympany)
- Excessive intake of food may cause problems such as rapture of stomach, diarrhoea or constipation especially in animals with one stomach chamber.
- Low food intake or lack of food results in poor health or death (if starvation is prolonged)
- Intake of unbalanced diet makes the animal unproductive and prone to easy attack by other diseases.
- Feeding on unsuitable or poisonous feed such as aflatoxin in rotting grains can cause ill health or death.

18. Physical causes of livestock disease

- Fracture or tearing of skin
- Applying excessive'pressure on a part of the body for long c.g a rope tied around the neck of an animal.
- Application of excess heat, on a part of the body may cause blisters or burns
- **Mechanical displacement: or prolapse of an organ of the body due to sudden and violent movement e.g portion of the uterus**
- **Obstruction of the hollow organs of the body e.g oesophagus, urethra, intestines and blood vessels.**

19.Chemical causes of livestock diseases

- Chemicals such as acids, alkalis, insecticides and herbicides
- Stings from insects such as bees.
- Poisonous weeds such as thorn apple (*Datura stramonium)*

20. **Organisms that cause diseases in livestock**

- Bacteria
- Virus
- Protozoa
- Worms
- Insects
- Some Arthropods

21.

Disease	Animals affected
Anthrax	Cattle, sheep, goats, pigs
Black quarter	Cattle, sheep, goats
Brucellosis (Contagious abortion)	Cattle; goats
Calf pneumonia	Calves
Foot rot	Sheep, cattle
Fowl typhoid	Domestic fowls
Mastitis	Cattle, goats
Enterotoxemia (pulp kidney)	Sheep
Pullorum disease / bacillary White diarrhoea	Poultry
Lamb dysentery	Young lambs

22. Differences between pathogenic bacteria and viruses

- Viruses are smaller than bacteria
- Viruses can only grow and multiply in the living cells of other organisms unlike bacteria
- Viruses are more specific than bacteria i.e they affect only one host
- Viruses unlike bacteria do not produce toxins.

23. Characteristics of viral diseases

- They are very contagious

- They are highly infectious (they spread very fast)

24. a) Viral diseases of livestock

- Rinderpest
- Foot and mouth disease
- Swine fever
- New castle
- Mareks disease
- Gumboro disease

b)

diseases	**affected animals**
Rinderpest	Cattle
Foot and mouth	Cattle, sheep, goats and pigs
Swine fever	
Newcastle	Poultry
Marek s disease	poultry
Gumboro disease	Chicks

25. a) Arthropods that act as vectors for protozoan diseases

- Ticks
- Tsetse flies
- Mosquitoes

Disease	**Vector**	**Animal affected**
East Coast fever	**Brown ticks**	**Cattle**
Red-water	**Blue and brown ear ticks**	**Cattle and sheep**
Anaplasmosis	**Blue ticks**	**Cattle, sheep and goats**
Heart-water	**Bom ticks**	**Cattle, sheep and goats**
Trypanosomiasis	**Tsetse Hies**	**Most animals**
Coccidiosis	**Coccidia**	**Poultry and young animals**

26.

	livestock diseases	causal organism
a)	East Coast fever	*Theileria Purva*
b)	Red water	*Bebesia spp*
c)	Anaplasmosis	*Anaplasma marginale*
d)	Heart water	*Cowdria ruminantium*
e)	Trypanosomiasis	*Trypanasoma spp*
f)	Coccidiosis	*Eimeria spp*

27. a) categories of living organisms that cause **disease in livestock**

- Infectious diseases causing organisms
- Parasitic organisms

b) differences between the two categories named **in a) above**

- Infectious disease causing organisms are microscopic and invade the animal, multiply and produce toxins which harm the animals body. They include viruses, bacteria and protozoa.
- Parasitic organisms are relatively large and harm animals by sucking blood, transmitting other organisms that cause diseases, blocking internal organs and causing injuries to the body organs. They include external parasites such as ticks and tsetse flies as well as internal parasites such as roundworms and flukes.

28. Routine management practices carried out to control livestock diseases

- Proper feeding and nutrition
- Proper breeding and selection
- Proper housing and hygiene

29. Preventive measures applied **in the control of** livestock diseases

- Isolation of sick animals
- Imposition of quarantine
- Prophylactic measures and treatment
- Slaughtering the affected animals
- Use of antiseptics and disinfectants

30. Conditions that should be met by all livestock housing structures

- Be well ventilated but free from cold, wind (draughts)
- Provide adequate space for the number of animals housed
- Allow for proper drainage
- Be leak proof
- Be well lit and easy to clean.

31. a) i) Quarantine

It is the restriction of movement of animals and their products from and into the affected areas in the event of an outbreak of a notifiable disease,

ii) Notifiable disease

This is a disease whose outbreak must be reported to a government authority such as veterinary officer or the police.

b) How quarantine serve to control livestock diseases

It prevents the spread of the disease causing organisms to the healthy animals.

32. a). Prophylactic drugs

This refers to drugs administered to prevent diseases and parasites

b) Prophylactic measures

- Use of prophylactic drugs
- Carrying out regular vaccinations
- Control of vectors
- Treatment of sick animals

33. a) Why farmers should handle livestock in the most humane and technical way

To avoid stress or injury to the animal

b) Reasons for handling animals

- When diagnosing or inspecting the animals.
- When administering any form of treatment to the animal.
- When milking the animal
- When performing management practices such as dehorning, disbudding, castration and hoof trimming.

34. Activities in livestock health that necessitates handling of animals

- drenching
- Injection
- Mastitis Control
- Hand spraying

CHAPTER 29
Questions on Livestock Health II (Parasites)

1. Define the following terms
   a) Parasitism (lmark)
   b) Parasite (lmark)

2. List six effects of parasites on livestock. (6marks)

3. a) Name the two main types of parasites and give two examples of each. (6marks)

   b) Differentiate between the two types of parasites named in a) above (2marks)

4. a) Name two classes of parasites that belong to phylum arthropoda (2marks)

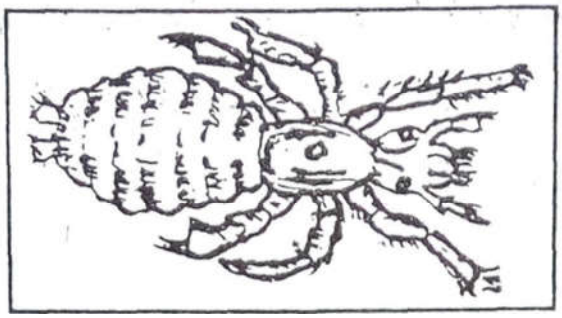
   b) Give three examples of parasites in each of the classes named in a) above. (3marks)

5. a) State three harmful effects of tsetse flies in livestock. (3marks)
   b) What measures can be put in place to control tsetse flies.

6. a) Name one species of livestock commonly infested by keds (1 mark)
   b) Give four effects of keds on the animal named in a) above. (4marks)
   c) State three control measures of keds. (3marks)

7. a) What type of livestock is mainly attacked by fleas. (lmark)
   b) Give five effects of fleas on their host. (5marks)
   c) Highlight three control measures of fleas. (3marks)

8. The diagram below represents an external parasite



a) Identify the parasite. (lmark)
b) List three harmful effects of the parasite shown above. (3marks)
c) State four control measures of the parasite named in (a) above. (4marks)

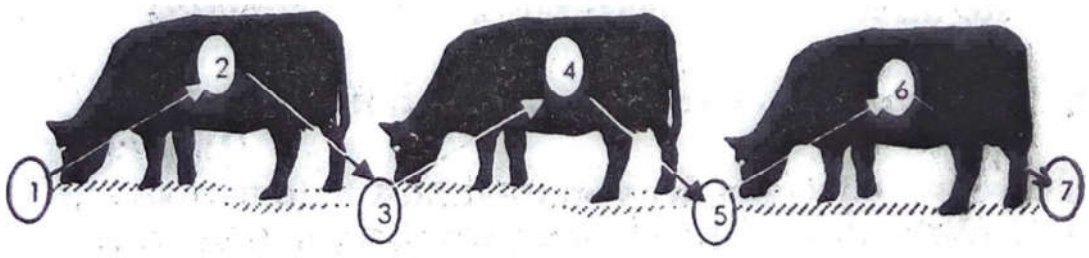
9. a) Name three types of animals normally attacked by ticks. (3marks)
b) State five harmful effects of ticks. (5marks)
c) List eight control measures of ticks. (8marks)

10. Name the four main stages of the life cycle of ticks. (4marks)

11. a) What is meant by one host tick. (lmark)
b) Give four examples of one host ticks. (4marks)
c) Describe the life cycle of a one host tick. (5marks)

12. a) Explain the term two host tick. (lmark)
b) List three examples of a two host tick. (3marks)
c) Describe the life cycle of a two host tick. (7marks)

13. The diagram below shows the life cycle of external parasite



a) Name the parasite. (1 mark)

b) Explain what happens at each of the stages labeled 1 to 7. (7marks)

c) List seven examples of the parasite named in a) above. (7 marks)

14. a) Name the three major categories of tick control measures. (3 marks)

    b) Briefly explain how each of the measures named in a) above are achieved. (8 marks)

15. Give four characteristics of an effective acaricide. (4 marks)

16. Name the three methods of acaricide application. (3marks)

17. Giving an example in each case give the three categories of endoparasites. (3marks)

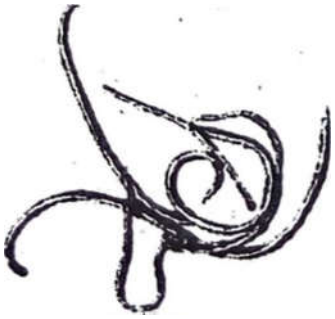
18. a) What animals are normally affected by tapeworms. (2marks)

b) List eight symptoms of tapeworm attack in livestock. (8marks)

20. a) Describe the life cycle of a tapeworm. (9marks)

    b) State six control measures of tapeworms. (6marks)

21. The diagram below represents a livestock parasite. Use it to answer the questions that follow.



a) Identify the parasite. (lmark)

b) What type of livestock are normally attacked by the parasite above. (3marks)

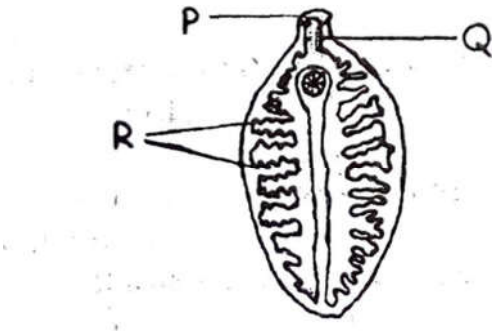
c) Give symptoms of attack by the parasite named in a) above. (8marks)

22. a) Describe the life cycle of a roundworm ***(Ascaris lumbricoides)*** (11 marks)

b) State six measures taken to control roundworms in livestock. (6marks)

c) Name the species of roundworms found in:
   i) Sheep
   ii) Pig
   iii) Poultry (3marks)

23. The diagram below represents a parasite



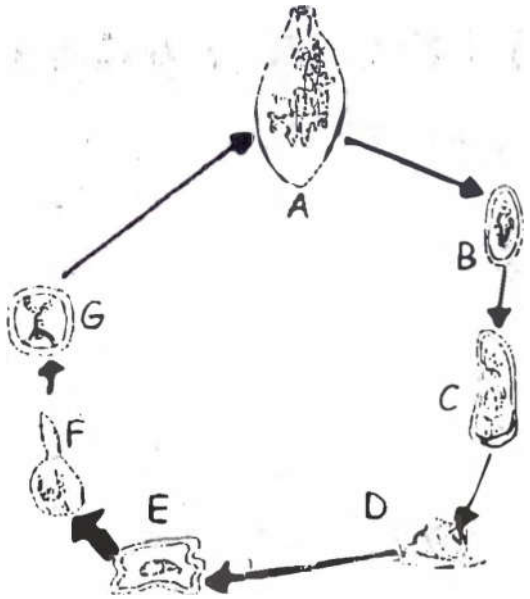
a) Identify the parasite. (lmark)

b) Give the species of the above parasite found in:
   i) Sheep
   ii) Cattle (2marks)

c) List eight symptoms of attack by the parasite named in (a) above. (8marks)

d) Name the part labeled P, Q and R. (3marks)

24. The diagram below represents the life cycle of an endoparasite.



a) Identify the stages labeled A - G. (7marks)
b) Describe the life cycle shown above. (9marks)
c) State six control measures of the parasite whose life cycle is shown above. (6marks)

25. Give seven factors considered when controlling internal parasites in livestock. (7 marks)

26. Outline the four basic rules followed to achieve success in control and treatment of internal parasites. (4marks)

27. State and explain the two methods of drug administering in control of livestock parasites. (4marks)

28. Give four factors that determine pasture management in control of internal parasites. (4marks)

29. How should livestock houses be managed to control internal parasites effectively. (4marks)

30. Give two ways of protecting young livestock from internal parasites. (2marks)

CHAPTER 30
Answers on Livestock Health II (Parasites)

1. a) Parasitism

This is an association between two organisms in which one is called a parasite and the other a host in the content of the association

b) Parasite

This is a living organism that lives in or on another organism and derives some benefits from the organism, without being useful to it in Any way.

2. **Six effects of parasites on livestock**

- Cause anaemia
- Deprive the host animal of food.
- Injury and damage to tissues and organs
- Disease transmission
- Cause irritation
- Obstruction to internal organs.

3. a) Main types of parasites

- External parasites or ectoparasites e.g ticks, lice, keds, fleas
- Internal parasites or endoparasites e.g roundworms, tapeworms, liverflukes, hookworms

b) External parasites are found on the outside of the body of the host organism whereas **internal parasites** live within the body of the host animal.

4. a) Classes of parasites that belong to phylum arthropods

- The class insecta
- The class Arachnida

b) Examples of parasites in each of the classes named in a) above

The class insecta: tsetse flies, keels. Mosquitoes, flies, lice, fleas

The class arachnida: ticks, mites, spiders.

5. a) Harmful effects of tsetse flies in livestock

- Transmit trpanosomiasis
- Cause anaemia bv sucking blood
- Damage the skin of the host.

b) Measures that can be put in place to control tsetse flies

- Destroying their breeding places.
- Spraying using suitable insecticides
- Sterilizing males
- Trapping using fly traps.

6. a) Sheep

by Effects of keds on sheep

- Cause irritation
- Cause anaemia
- Causes loss of condition / weight
- Cause retarded growth in lambs

c) Control measures for keds

- Dipping routinely
- Shearing of infested sheep
- Dusting with appropriate pesticide.

7. a) Poultry

b) Effects of fleas on their host

- Cause anaemia
- Cause irritation
- Cause scabby patches **on** the skin
- **Transmit bubonic plague**
- **Cause loss of weight**

c) Control measures of fleas

- **Animals sleeping places should be kept clean**
- **Dusting with appropriate pesticide**
- **Stick fast fleas can be controlled by covering them with petroleum jelly to suffocate them.**

8. a) Biting louse

fa) harmful effects of biting louse

- Cause irritation
- Cause loss of condition under heavy infestation
- Reduced production in birds.

c) State four control measures of biting louse

- Smearing perches in poultry houses with volatile insecticides.
- Spraying, washing or dusting animals with appropriate insecticides.
- Keeping animal houses clean
- Dusting birds with sodium fluoride

9. a) Types of animals normally attacked by ticks

- Cattle
- Sheep
- Goats

b) Harmful effects of ticks

- They transmit diseases.
- cause anaemia
- Cause irritation
- Damage skin
- Cause wounds that acts as routes for secondary infections
- Some produce toxins that may cause adverse effects **on** the host.

c) Control measures of ticks

- Hand-picking and killing
- Burning heavily infested pasture
- Ploughing heavily infested pasture
- Rotational grazing
- Double fencing of pasture land
- Use of appropriate chemicals
- Use of predator birds
- Zero grazing or restraining the movement of animals.
- Hand dressing using pygrease.

10. Main stages of the life cycle of ticks

- The egg
- The larva with six legs
- The nymph with eight legs
- The adult with eight legs

11. a) One host tick

It is a tick that completes all its stages of development **on** the same host.

b) Examples of one host ticks

eThe blue tick (*Boophilus decoloratus)*
eThe texas fever tick (*Boophilus annulatus)*
eThe cattle tick *[Boophilus microplus)*
eThe tropical Horse tick (*Dermacentor nitens)*

c) Life cycle of a **one host tick**

Eggs on the ground hatch into larvae; which climb onto host, suck blood, become engorged and moult w'hile still on the host. The emerging nymphs feed on the same host; become engorged and moult into adults; which feed on the same animal; mate and the female drops off to the ground to lay eggs;

12. a) Two host tick

This is a tick that completes its life cycle on two hosts.

b) Examples of a two host tick

- The Red legged tick (*Rhipicephalus evertsi)*
- The brown tick (*Rhipicephalus bursa)*
- The African Bont-legged tick *I Hyalomma truncatum)*
- The large Bont legged tick (*Hyalomma rufipes)*

c) Life cycle of a two host ti**ck**

- Eggs hatch into larvae;
- Larvae climb onto the first host and feed on blood;
- Engorged larvae moult on the host and the nymphs emerge;

- Nymphs feed on blood;
- Engorged nymphs fall and moult into adults;
- Adults climb onto the second host feed on blood and mate;
- Engorged female falls to the ground and lay eggs;

13. a) Three host tick

b) What happens at each of the stages labeled 1 to 7

1- Eggs hatch, larvae emerge

2. Larvae climb on to the first host and feed on blood

3. Engorged larvae fall to the ground and moult, nymphs emerge

4. Nymph climbs onto the second host and feed on blood,

5. Engorged nymphs fall to the ground and moult, adults emerge.

6. Adults climb onto third host feed on blood and mate

7. Engorged female falls to the ground and lays eggs.

c) Examples of three host tick

-The brown ear tick *(Rhipicephalus appendiculatus)*
- The East African bont tick *[Amblyomma uariegatum)*
- The Bont tick (*Amblyomma herbraeum*)
- The Gulf Coast tick *(Amblyomma maculatum)*
- The yellow dog tick (*Haemophysalis leachii)*
- The fowl tick (*Haemophysalis hoodi)*
- The brown dog tick *(Rhipicephalus sanguineous)*

14. a) Major categories of tick control measures

- Natural or biological method.
- Mechanical method
- Chemical method .

b) How each of the measures named in a) above are achieved.

Natural biological method

- Ticks are fed on by predators such as ants and birds.
-Animal self-lick itself to dislodge the ticks from the body.

***Mechanical** methods*

- Burning the infested pastures
- interfering with or altering the ticks environment by

either ploughing pasture land or dressing pasture using an acaricide

- Fencing off the pasture land and farm.
- Starving the ticks to death.
- Deticking/hand picking the ticks from livestock and killing them.

Chemical method

- Destroying the ticks using acaricides.

15. Characteristics of an effective acaricide

- Have ability to kill ticks
- Be harmless to both human and livestock
- Be stable
- Should remain effective after having been foiled with dung, mud or hair

16. Methods of acaricide application

- Spraying
- Dipping
- Hand dressing

17. Categories of endoparasites

- Trematodes e.g flukes
- Cestodes e.g tapeworms
- Nemathelminthes e.g roundworms

18- (a) Animals normally affected by tapeworms

Pigs, cattle, sheep, Goats, Donkeys.

b) Symptoms of tapeworm attack in livestock

- General emaciation
- Staring/rough coat
- Scouring/constipation
- Pot bellies especially in calves
- Oedematous swelling under the jaw.
- Blockage or obstruction of the intestines
- Parasites segments (Proglottides) are seen in faeces
- Anaemic condition
- Excessive appetite

20. a) Life cycle of a tapeworm

- Human drops segment (proglottides) which are full of eggs with faeces.
- Eggs are released from the segments
- Eggs are picked up by the right intermediate host (cattle or pigs) when feeding
- Eggs hatch in intestine of intermediate host
- embryos penetrate intestinal wall and enter bloodstream, the liver and then the muscles where they become cysts.
- Cooked beef or pork with those cysts is eaten by human being, cysts wall dissolves and the rest attach themselves to the wall of the intestine and develop into adult tapeworms.

b) Control measures of tapeworms

- Use of prophylactic drugs e.g antihelminthes or dewormers.
- Keep animal houses clean and disinfected
- Rotational grazing/resting pastures
- Cleaning feeding and watering equipments.
- Proper disposal of human excreta.
- Proper meat inspection
- Proper cooking of meat.

21. a) Roundworm

b) Livestock normally attacked by roundworm

Pigs, Cattle, Sheep, Goats, Donkeys, Poultry

c) Symptoms of attack by roundworm

- Anorexia
- Stiff dry coat or staring coat
- dehydration and a pale mucosa
- Eggs and adults are seen in faeces
- General emaciation
- Diarrhoea
- Anaemia
- Pot bellies especially in young animals.

22. a) Life cycle of a roundworm (Ascaris iumbricoides)

- Adult worms lay eggs in alimentary canal of the host animal
- Eggs are passed out of the host in faeces to the ground
- On the ground the eggs hatch into larvae
- The larvae climb onto vegetation, moult and finally become encysted
- The encysted larvae are swallowed by a host animal as it feeds.
- The larvae shed their cyst in the small intestine of the host animal to form juvenile worms.
- The juvenile worms penetrate through the wall of the intestines into the blood stream.
- They migrate to the heart then to the liver and lungs through blood.
- When in the lungs, larvae move up the trachea where they are coughed out and swallowed with sputum into the intestines.
- In the intestines, the larvae grow and develop into adult worms.
- Male and female worms mate and eggs are laid to restart the cycle again.

b) Measures taken to control roundworms in livestock

- Regular drenching/dosing
- Improving sanitation
- Rotational grazing and resting pastures.
- Proper disposal of human faeces.
- Keeping feed and watering equipment clean.
- creep grazing/grazing young animals ahead of mature ones.

c)

	Animal	**species of roundworms**
i)	Sheep	Ascaris *lumbricoides*
ii)	Pig	*Ascaris suum*
iii)	Poultry	*Ascaris galli*

23. a) Liver fluke

b)

	Livestock	Species of liver fluke
i)	Sheep	*Fasciola hepatica*
ii)	Cattle	*Fasciola gigantica*

c) List eight symptoms of attack by liver fluke

- Loss of weight and emaciation
- Pot belly
- Indigestion
- Damage of liver tissues and haemorrhage
- Anaemia
- Dullness/depression
- Swollen and painful abdomen
- Recumbency precedes death.

d) P - Mouth

Q - Muscular pharynx

R - Digestive gland

24. a) A. Adult fluke
B. Egg
C. Miracidium
D. Snail
E. Sporocyst
F. Redia
G. Cercaria

b) Description of the life cycle shown in (a) above

- Adult flukes in bile duct, liver or spleen lay egg
- Eggs develop, pass through blood vessels and out of intestines through faeces.
- Each egg hatches and releases a small larva called a miracidum within 9 days.
- Miracidia penetrate the body of a mud snail
- The miracidia migrate to the pulmonary chamber of the

mud snail where they develop into sporocyst then Redia.
- redia develop into cercaria which penetrate the intestinal wall of the snail and by use of long tail, swim around
- The ceicaiia climb leaf blades and encyst themselves on the under surface of leaves. Cercaria live up to 12 months.
- After being swallowed by primary hosts such as cattle and goats, young flukes migrate to the liver, bile duct or spleen where they develop into adult flukes. They make tunnels and live there for six weeks.

c) Control measures of the parasite whose life cycle is shown in (a) above
- Regular drenching using appropriate drugs
- Burning pastures to kill eggs of parasites during dry seasons.
- Draining swampy areas.
- Spraying stagnant water with moluscides to kill snails.
- Not grazing animals near marshy or waterlogged areas.
- Physically killing them.

25. Factors considered when controlling internal parasites in livestock
- The stock and its environment
- The nutritional status of the stock
- Pasture management and rotational grazing
- Housing management
- Protection in the young
- Prediction of an outbreak
- Treatment

26. Basic rules followed to achieve success in control and treatment of internal parasites
• Identify the parasite or causal agents correctly
- Use the best available drug at the right dosage
• Give the treatment at the most advantageous time in relation to the life cycle of the parasite.
■ Adjust livestock management to make best use of knowledge of the ecological requirements of the parasite when it is passed out in faeces.

27. Methods of drug administering in control of livestock parasites

- Strategic treatment: drugs are administered regularly at the same time each year.
- Tactical treatment: Drugs are administered during years of irregular rainfall as supplementary measure.

28. Factors that determine pasture management in control of internal parasites

- The concentration of livestock (that is the stoking rate)
- State of nutrition
- Climatic condition
- Herbage cover

29. How livestock houses should be managed to control Internal parasites effectively

- Avoid overcrowding the animals in the house
- Removal of manure or dung frequently
- Provision of clean beddings
- Raising feed and water troughs off the floor to avoid local contamination.

30. Ways of protecting young livestock **from internal parasites**

- Deworming breeding animals before parturition such as ewes before lambing begins, in calf cows before calving etc.
- Creep feeding (letting young stock graze ahead of the older stock).

CHAPTER 31
Questions on Livestock Production II (Nutrition)

1. Define the following terms as used in livestock nutrition.
   a) Food
   b) Nutrients (2marks)

2. Name six components of a balanced livestock feed. (6marks)
3. State **seven** functions of water in an animal s diet. (7marks)
4. Give three sources of water in the animal's body. (3marks)
5. Outline five factors that influence the amount of water taken by a farm animal. (5marks)

6. a) What is meant by carbohydrates. (lmark)

   b) Name the three forms of carbohydrates available to livestock. (3 marks)

7. Give five feed materials from which animals obtain their carbohydrates. (5marks)

8. Give the three functions of carbohydrates in the animals' body. (3marks)

9. Give three sources of fats and oils for animals. (3marks)

10. Distinguish between the two types of amino acids. **(4marks)**

11. Name four feed materials that supply proteins to animals. (4marks)

12. State five functions of proteins in livestock

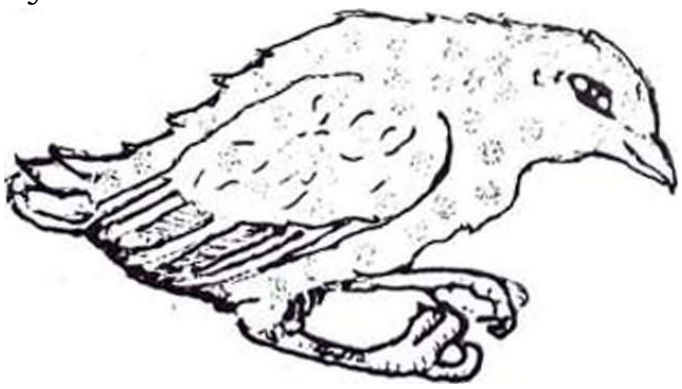
13. What are effects of feeding livestock with a feed that does not contain proteins? (5marks)

14 Give five functions of vitamins taken in livestock feed. (5marks)

15. State one source, use and deficiency of each of the vitamins in the table below. (18marks)

Vitamin	Source	Uses(s)	Deficiency symptoms
Vitamin A			
Vitamin B			
Vitamin C			
Vitamin D			
Vitamin E			
Vitamin K			

16 Below is an illustration of a chick suffering from a vitamin deficiency?



a) What vitamin deficiency leads to the above symptoms?

b) State three observable effects of the vitamin deficiency named in a) above. (3marks)

c) Name the food material that should be included in the chicks diet to correct the deficiency symptoms shown above (lmark)

17. The photograph below shows a chick with a condition caused by vitamin deficiency.

a) Give the name of the condition shown above (see arrow). (lmark)

b) What vitamin was deficient in the chicken shown above? (lmark)

c) How can the above condition be corrected, (lmark)

18. Give the source, function and deficiency symptoms of the following minerals
    a) Calcium and phosphorus
    b) Magnesium
    c) Iron
    d) Copper
    e) Iodine

19. Outline the source, functions and deficiency symptoms of the following minerals.
    a) Sulphur
    b) Zinc
    c) Cobalt
    d) Manganese. (12marks)

20. a) Give three functions of sodium, potassium and chlorine in livestock. (3marks)

b) List four deficiency symptoms of sodium, potassium and chorine in animals. (4marks)

21. The diagram illustrates a symptom of mineral deficiency in a chick.

a) What mineral is deficient in the chick. (lmark)
b) Describe the symptom above, (lmark)
c) Other than the symptom shown, give two symptoms of deficiency of the same mineral. (2marks)

22. a) Why is sodium very important in a livestock diet. (2marks)

b) What are the effects of sodium deficiency in laving birds? (3marks)

23. a) Define the following terms. (2marks)
i) Feed stuff
ii) Feed
b) Name the two classes of feed stuffs. (2marks)

24. a) What is meant by the term roughage, (lmark)

b) Give two reasons why roughage is important to animals. (2marks)

c) Name the two types of roughages. (2marks)

d) Giving an example in each case, distinguish between the two types of roughages named in c) above. (4marks)

25. a) What is a concentrate. (lmark)

b) Name the two types of concentrates. (2marks)

c) Using examples distinguish between the two types of concentrates named in (b) above. (2rnarks)

26. State four characteristics of succulent roughages. (4marks)

27. a) Why are mineral and vitamin supplements given to livestock. (lmark)

b) Name the recommended form in which mineral supplements should be provided to:
i) Lactating animals
ii) Layers (2marks)

28. a) Define the term feed additives.
b) What is the purpose of giving feed additives to livestock? (3marks)
c) Name three types of feed additives and give an example of each. (6marks)

29. Explain the meaning of the following terms as used in livestock nutrition
a) Ration
b) Maintenance ration
c) Production ration
d) Balanced ration
e) Rationing (5marks)

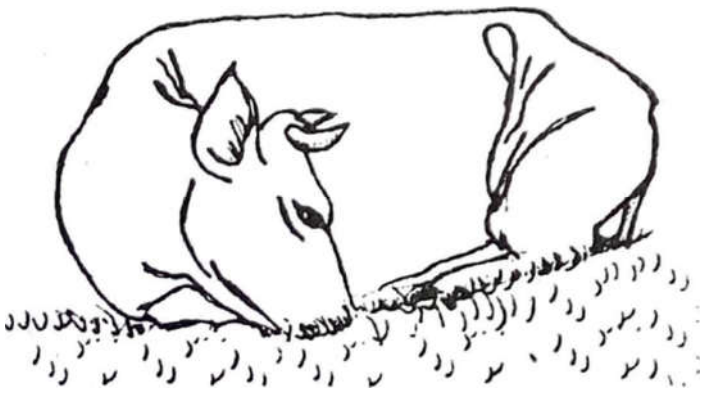
30. State and explain four factors that affect maintenance requirement. (8marks)

31. List five factors that determine the amount of food given to an animal. (5marks)

32. Define the following terms as used to express feed values.
    a) Digestibility
    b) Dry matter
    c) Calorific value
    d) Starch equivalent
    e) Total digestible nutrients
    f) Crude proteins
    g) Digestible crude protein
    h) Crude fibre (8marks)

33. a) Give two ways of determining the quantity of food retained in animals body. (2mark)
    b) Outline five factors that affect the digestibility of a feed
    • (5marks)

34. The diagram below is an illustration of a cow suffering from a mineral deficiency



    a) Identify the deficiency disease. (lmark)
    b) What mineral is normally deficient in such a case as shown above? (lmark)
    c) Describe the posture of the cow illustrated above. (lmark)

35. (a) Give the two methods used to compute a livestock ration. (2marks)

    b) Describe the two methods named in a) above. (2marks)

    c) Describe the procedure of computing feed ration using Pearson's square method. (7marks)

36. a) Using the Pearson's square method, compute a 100kg ration with 20% DCP oats which contains 10% DCP and simsim seed cake containing 60%DCP. (6 mks)

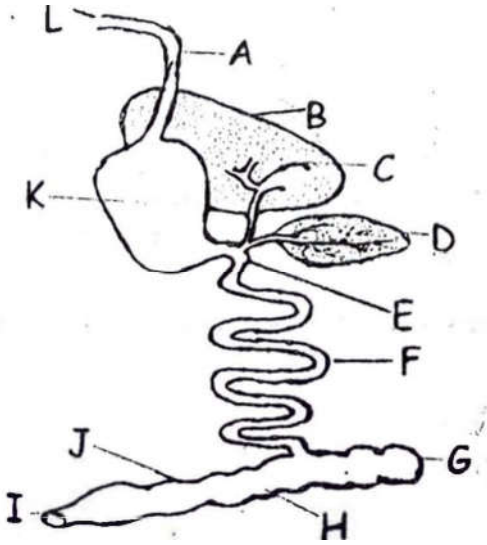
b) What condition must prevail for Pearson's square method to be used effectively? (lmark)

37. Define the following terms as used in livestock nutrition
a) Digestion. (lmark)
b) Absorption (lmark)

38. a) By what process does food move through the digestive tract of an animal? (lmark)

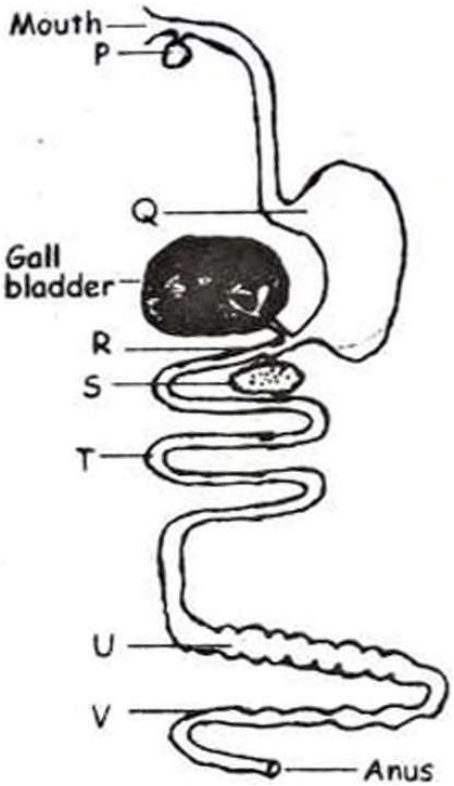
b) Give two roles of the process named in a) above. (2marks)
c) What causes the process named in a) above, (lmark)

39. The diagram below shows a general digestive system



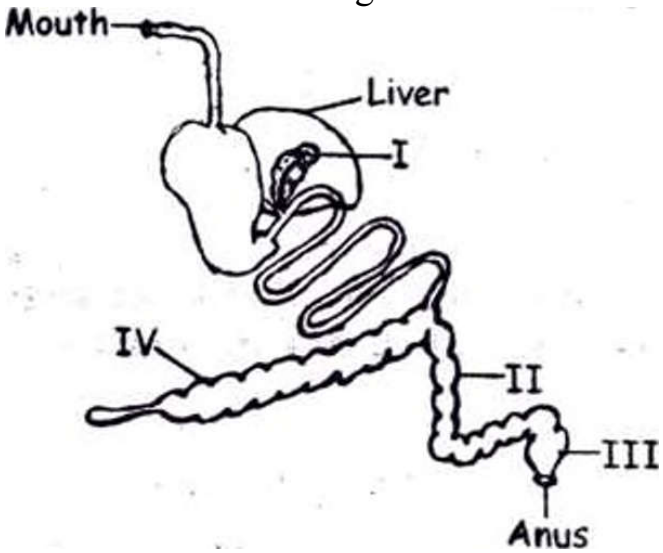
a) Identify the parts labeled A - L. (6marks)
b) Describe the digestive activities that occur at the following parts L, K, E, F, G and H. (6marks)

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



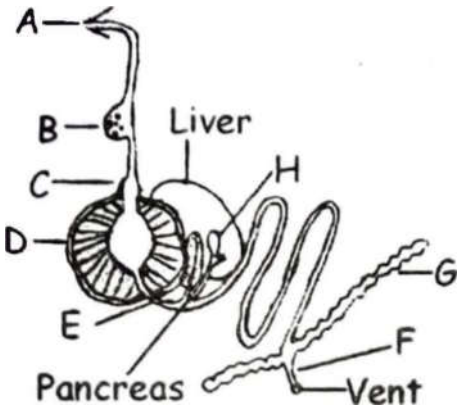
a) Give the term that best describes digestive system above. (lmark)
b) Identify the parts labeled P-V. (7marks)
c) Name one example of a livestock with a similar digestive system as the one shown above. (lmark)

41. The diagram below shows the digestive svstem of a rabbit



a) Identify the parts labeled 1 - IV. (4marks)
b) State the function of part IV. (lmark
c) Name three other animals that posses a similar type of digestive system as the one shown above. (3marks)

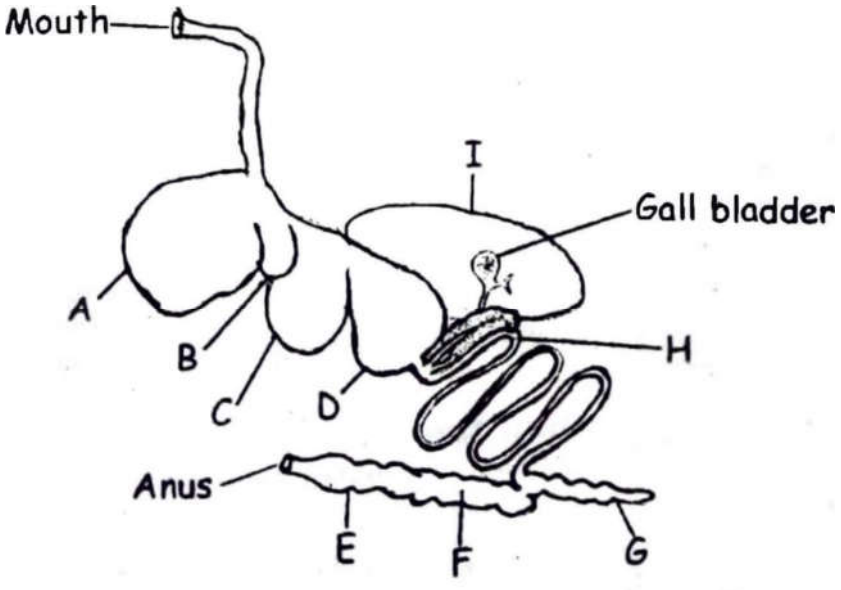
42. The diagram below shows the digestive system of a livestock.



a) Identify type of livestock that posses the digestive system shown above. (lmark)
b) Name the parts labeled A - G. (8 marks)

c) State the main functions of the parts labeled B, C. D and G. (4 marks)

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



a) Identify the parts labeled A - 1. (9m arks)

b) Give the functions of the parts labeled A, B, C and D. (8marks)

c) Name three examples of livestock with the type of digestive system shown above. (3marks)

44. a) Give six differences between ruminant and a non-ruminant animal. (6marks)

b) State three similarities between ruminants and non-ruminants. (3marks)

45. Why do cattle benefit more than pigs when fed on roughage? (2marks)

46. State two reasons for feeding livestock' (2marks)

47. a) What leads to chicken laying soft-shelled eggs or eggs without shells? (2marks)

b) How can the above problem be alleviated in birds? (lmark)

48. Give two reasons why feed evaluation in livestock nutrition is important to a dairy farmer. (2marks)

CHAPTER 32
Answers on Livestock Production II (Nutrition)

1. a) Food

This is any material which after it is eaten by animals is capable of being digested, absorbed and utilized in the body.

b) Nutrients

These are organic and inorganic substances in a food material which are absorbed and utilized in the body tissues.

2. **Components of a balanced livestock feed**

Water, carbohydrates, lipids, proteins, vitamins, minerals, roughage.

3. Functions of water in an animals diet

- It is a component of body cells and many body fluids such as blood.
- Transports nutrients from one part of the body to another
- It makes cells turgid, maintaining the shape of the body cells.
- It is used in the biochemical reactions such as digestion in the body.
- It helps to regulate body temperature through sweating and evaporation.
- It helps in the excretion of waste products from the body.
- It forms part of animal products for example, milk contains 83% water and an egg contains 55% water.

4. Sources of water in the animals body

- From drinking (free water)
- From food (bound water)
- From metabolism (metabolic water)

5. Factors that influence the amount of water taken by a farm animal

- Ambient temperature .
- Type of food eaten by an animal.
- Level of production or amount of \work.
- Weight of the animal or body size.
- Species of animal

6. a) carbohydrates

These are organic compounds which contain carbon, hydrogen and oxygen in varying proportions.

b) Forms of carbohydrates available to livestock

- Monosaccharides
- Disaccharides
- Polysaccharides

7. Feed materials from which animals obtain their carbohydrates

- Grains of cereals and their by-products
- Roots of crops such as sweet potatoes and cassava
- Tubers such as irish potatoes
- Molasses
- Pastures such as grasses and legumes

8. Functions of carbohydrates in the animals' body

- They supply energy for all the body processes such as respiration, digestion, blood circulation and others.
- They are used in the synthesis of products such as milk, meat, wool and eggs.
- Excess carbohydrates are converted into fats and stored for later energy production.

9. Sources of fats and oils for animals

- Oil seeds by- products such as seedcake
- Animal products and by-products such as milk, bone, meat and fish meal.

10. Differences between the two types of amino acids

Essential amino acids	Non- essential amino acids
- Can not be manufactured in the body	- Can be manufactured in the body
- Must be supplied in the animals diet	- Need not to be supplied in the animals diet

11. Feed materials that supply proteins to animals.

- Seed cakes from such crops as sunflower, groundnuts, cotton, simsim and others
- Foliage from leguminous plants such as Desmodium, Lucern and clovers
- Animal products and their by-products such as milk, meat and blood meal, liver and fish meal.
- Young green grass

12. Functions of proteins in livestock feed

- Growth, repair and replacement of worn-out body tissues
- Production of antibodies which protect the animal from diseases.
- Production of digestive enzymes to break food particles
- Production of certain hormones in the body.
- Production of such products like meat, milk, eggs and wool.

13. Effects of feeding livestock with a feed that does not contain proteins

- Retarded growth
- Low production
- Wearing out of body tissues
- Poor resistance to disease

14. Functions of vitamins taken in livestock feed

- Promote growth
- Help in blood clotting
- Help in bone formation
- Help in muscular activity
- Prevent diseases in animals
- Act as organic catalyst in various metabolic and physiological reactions

15.

Vitamin	Source	Uses(s)	Deficiency symptoms
Vitamin A	Green feeds (fresh grass), milk, cod liver oil	- Prevention of disease - Proper growth	- Retarded growth - Poor eye sight Reduced resistance to disease
Vitamin B	Whole grains and their by-products	- For Respiration - Formation of blood cells	Retarded growth - Slow heart beat - Reduced resistance to diseases - Poor reproduction
Vitamin C	Green feeds and fruits	- Increase resistance against diseases	- Defective boncs/tcoth - Continuous bleeding or fresh wounds - Sore gums
Vitamin D	Sunlight, milk, green grams	- Helps in hone formation	- Rickets - Softness of bones - Weak teeth - Production of soft shelled eggs in birds Enlarged joints
Vitamin.E	Whole grains, green vegetation	- Helps in reproduction	- Sterility - Premature birth (abortion)
Vitamin K	Green feeds	- Necessary for blood clotting	- Excessive bleeding

16. a) Vitamin B2 (Riboflavin)

b) **State three observable effects of** Vitamin B2 **(Riboflavin) deficiency**

- **Curled toes**
- **Paralysis**
- **Sitting posture.**

c) Whole grains and their by-products

17. a) Rickets

b) Vitamin D (Calciferol)

c) Providing sunlight and green plants.

18.

Mineral	Source	Function	Deficiency symptoms
Calcium and phosphorus	Milk, meal and bone meal. Ground limestone, oyster shells	- Formation of . strong bones and teeth -. Milk and egg production	- Milk fever in lactating cows -Oesteomalacia and rickets • soft shelled eggs - Pica (depraved appetite)
Magnesium	Leafy vegetables, cereals grains, milk	- Formation of strong bones and teeth - Activating metabolism enzymes - Proper fuctioning of the nervous system	- Grass tetany/grass staggers - Reduced blood pressure - Retarded growth
Iron	Cereal grains, green vegetables, fish, liver meals	- Formation of haemoglobin in red blood cells	- Anaemia
Copper	Minerals licks, green vegetables, fish and liver	- Catalyst of haemoglobin formation - Improves feed conversion - Improves growth rate in calves/piglets	- Enzootic neonatal ataxia / sway hack - Infertility
Iodine	Salt licks, grasses and plants	-formation of thyroxine hormone	Goitre

19.

Mineral	Source	Function	Deficiency symptoms
Sulphur	- Proteinous feeds	- Protein synthesis	- Loss of wool in sheep and feathers in birds
Zinc	Minerals licks, cereals grains, legumes and green herbage, meal and liver meal	- Activates enzymes	- Paraketosis or dry scaly skin on ears and nostrils. - Rough coat
Cobalt	Mineral licks, green herbage	- Increases appetite of ruminants	- Loss of appetite - Reduced growth rate - Premature births - Scaly skin - Low milk yields
Manganese	Minerals licks, cereals grains, legumes and green herbage	Helps in enzyme activation - Helps Carbohydrates metabolism	- Delayed sexual maturity - Irregular ovulation and sterility - Head retraction in chicks - reduced shell thickness - Reduced hatchability of eggs.

20. a) functions of sodium, potassium and chlorine in livestock

- To maintain osmotic pressure and acid-base equilibrium
- To control movement of food nutrients in the cell
- To regulate water metabolism.

b) Deficiency symptoms of sodium, potassium and chorine in animals

- Reduced appetite
- Loss of weight
- Decreased production of eggs, meat and wool.
- Decline in growth.

21. a) Manganese

b) Head retraction

c) - Reduced hatchability
-Reduced shell thickness

22. a) Why sodium is very important in a livestock diet

- Necessary for muscular contraction
- Promotes proper use of energy and proteins in the body.

b) Effects of sodium deficiency in laying birds

- Loss of weight
- Low egg production
- Cannibalism.

23. a) i) Feed stuff

A food material containing one or more nutrients

ii) Feed

A mixture of several feed stuffs which supply the required nutrients to animals

b) Classes of feed stuffs

- Roughages
- Concentrates

24. a) Roughage

It is a feed stuff with a high fibre and carbohydrate content and low in protein

b) Why roughage is important to animals

- It gives animals physical satisfaction
- Facilitates digestion (Peristalsis)

c) Types of roughages

- Dry roughages
- Succulent roughages

d) Difference between dry and succulent roughages

Succulents roughages	Dry roughage
- They are plant materials which contain a lot of moisture. - Examples are fresh grass, silage, nappier grass	- They are plant materials which contain very little moisture - Example are straw, hay, maize stocks

25. a) Concentrate

This is a feed stuff with high amount of proteins or energy/carbohydrates and low in crude fibre.

b) **Types of concentrates**

- Energy concentrates
- Protein concentrates

c) Difference between energy and protein concentrates

Energy concentrates	Protein concentrates
- They contain high percentage of carbohydrates -Examples are bran, malt extract, molasses and maize grains	- They contain high percentage of proteins in their dry matter. - Examples are cotton seed cake, bone meal, milk and sunflower cake

26. Characteristics of succulent roughages

- High fibre content
- High moisture content
- Low protein content
- High carbohydrate content

27. a) Why mineral and vitamin supplements are given to livestock.

- To guard possible deficiencies of minerals and vitamins

b) i) Lactating animals

Minerals licks e.g Maclick

ii) Layers

Oyster shell.

28. a) Feed additives

These are special substances which are added to livestock feed in small quantities.

b) Purpose of giving feed additives to livestock

- To stimulate growth.
- To improve feed efficiency
- To prevent diseases/worm infestation.

c) Types of feed additives

- Hormones e.g stilbestrol
- Antibodies e.g Tetramycine
- Medicants e.g coccidiostat

29. a} **Ration** - This is the daily amount of food given to an animal to cater for both maintenance and production requirement.

b) **Maintenance ration** - This is the daily feed allowance per animal given to sustain all the processes without losing or increasing weight.

c) **Production ration** - This is the daily amount of feed given to an animal over and above the maintenance requirement for the purpose of production.

d) **Balanced ration** - This is the daily feed allowance per animal in correct amounts and contains all the nutrients in their right proportions.

e) **Rationing** - This is the practice of giving known amounts of feed to livestock for instance a sow with piglets should be given 2.5kg of sow and weaner plus an extra 0.25kg per piglet per day

30. Factors that affect maintenance requirement

- Body size or weight of the animal: A large animal uses more energy to sustain essential body processes.
- Age of the animal: The minimum energy required for maintenance by a young animal is more than for an older animal.
- Animal activities: Active animals need more energy for maintenance since their mechanisms are always in action.
- Level of production. Higher producers need more maintenance requirement

31. Factors that determine the amount of food given to an animal

- Body si2e or weight of the animal.
- Environment conditions within which the animal is.
- Physiological conditions of the animals.
- Level of production
- Purpose which the animal is kept.

32. a) Digestibility

This refers to the portion of food retained in an animal's body after taking care of the losses through urine, faeces and gases.

b) Dry matter

This is the actual percentage of protein, carbohydrates and minerals in a feed.

c) Calorific value

This is a measure of energy used to express the energy of foods.

d) Starch equivalent

This is the energy value of a feed that is equivalent to the net energy value of a certain amount of pure starch.

e) Total digestible nutrients

This is the sum total of all the digestible nutrients in a feed.

f) Crude proteins

This refers to the sum total of all nitrogenous compounds in a feed.

g) Digestible crude protein

This is the term used to express the percentage of the protein absorbed from a feed by an animal's body.

h) Crude fibre

This includes cellulose and other carbohydrates which are so resistant and insoluble that they are not dissolved by weak acids and alkalis.

33. a) Ways of determining the quantity of food retained in animals body

i) Use of percentage digestibility i.e

$$\text{Percentage digestibility} = \frac{\text{Feed retained} \times 100}{\text{Feed intake}}$$

ii) Use of apparent digestibility

$$\text{Apparent digestibility} = \frac{\text{Feed intake - Wastage products (faeces +urine)}}{\text{Dry matter in the feed}}$$

. b) Factors that affect the digestibility of a feed

- Chemical composition of the feed e.g percentage of lignin or cellulose will influence digestibility.
- The form in which the feed is offered to the animal e.g crushed maize is more digestible than whole maize. The species of the animal e.g the digestibility of grass is higher in sheep than in pigs.
- The ration of energy to protein i.e the higher the ration the lower the digestibility.

* The quantity of feed already present in the digestive system of an animal.

34. a) Milk fever

b) Calcium

c) Lying down with the neck bent sideways.

35. a) Methods used to compute a livestock ration

- Trial and error method
- Pearson's square method.

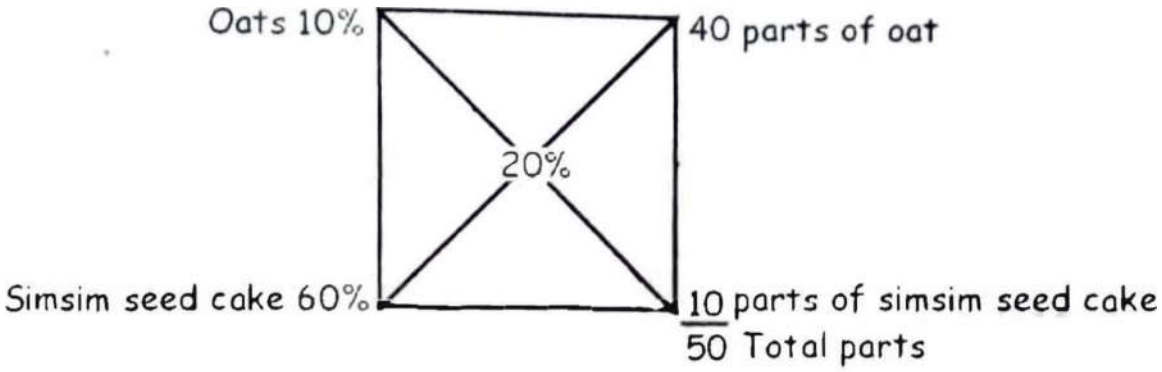
b) - Trial and error method: This involves giving Animal feeds mixed in various proportions and observing how they respond.

_ **Pearson's Square:** This is used when only two feedstuffs are available to determine the respective amounts of the two components that should be mixed together to get the desired ration.

c) Procedure of computing feed ration using Pearson's square method

- Draw up a square
- Write the percentage of the protein required in the feed at the centre of the square.
- Draw the diagonals of the square
- Write the protein values of the feed stuffs to be used at the left corners of the square.
- Subtract diagonally across the square the small number from the large one regardless of the sign and write the resultant values at the right corners of the square.
- The resultant number on the right gives the parts on proportions of each of the food stuffs needed to make the intended ration.
- Add the parts to obtain the base that will be used to calculate the amounts of each feedstuff to be used in the feed.

36. a)



Amount of oat needed will be 40_ xlOO = 80kg
50

Amount of simsim seed cake needed will be 10 x 100 = 20kg
50

b) Condition for Pearson's square method to be used effectively

One of the feedstuffs to be used must have a lower protein value than of the required feed.

37. a) Digestion

This is the process of breaking down food materials into simpler substances,

b) Absorption

This is the movement of digested foods substances across the intestinal wall to the blood stream.

38. **a)** Peristalsis.

b) Role of Peristalsis

- Mixing food with digestive juices and enzymes.
- Bring digested nutrients into contact with intestinal mucus for easy absorption.

c) Causes of Peristalsis

- The process is brought about by the contraction of the muscles of the intestinal wall.

39. a) A- Oesophagus
B - Liver
C - Gall bladder
D - Pancrease
E - Duodenum
F - Small intestines
G - Caecum
H - Colon
I - Anus
J - Rectum K - Stomach
L - Mouth

b) L - Food is chewed and mixed with saliva
- Starch is converted to maltose by salivary amylase/ptyalin.

K - Food is stored temporarily
- Enzyme pepsin breaks proteins into proteoses and peptones.
- Hydrochloric acid kills harmful micro-organisms in the food/
- Enzyme renin in young animals coagulates milk
- Food is churned and mixed up

E- Bile salts neutralize the acidic chyme and provide alkaline medium for action of enzyme trypsin
- Bile salts emulsifies fats
- Pancreatic amylase converts starch into maltose
- Lipase converts fats,to glycerol and fatty acids.
- Trypsin converts proteins to peptones and peptides.

F - Peptiddse converts peptones and peptides to amino acids
- Maltase/converts maltose to glucose
- Lactase converts lactose to glucose
- Sucrase converts sucrose to glucose
- Glucose, amino acids, acids, fatty acids are absorbed.

G - Cellulose is broken down by microbial activity.
- Volatile fatty acids released during break down of cellulose are absorbed

H - Water absorption.

40. a) Monogastric
    b) Identify the parts labeled P-V
        P - Salivary glands
        Q - Stomach
        R - Duodenum
        S - Pancrease
        T - Small intestines
        U - Colon
        V - Rectum
    c) Pig

41. a) I - Pancreas
        II - Colon
        III - Rectum
        IV - Caecum
    b) Function of part IV above
        - It contains micro-organisms that break down/digest cellulose in the roughage
    c) Horse
        Donkeys
        Camels

42. a) Poultry

    b) A - Beak
        B - Crop
        C - Proventriculus
        D - Gizzard
        E - Duodenum
        F - Rectum
        G - Caecum
        H - Gall bladder

    c) Functions of the parts labeled B, C, D and G
        B - Stores food temporarily; moisten food with water
        C - Produces enzyme pepsin
        D - Crush and grind food into a paste
        G - Contains micro-organisms that digest cellulose

43. a) A - Rumen / pauch
B - Recticulum/ honey comb
C - Omasum/manyplies/ the book
D - Abomasum/true stomach
E -Rectum
F - Colon
G - Caecum
K - Duodenum
I - Liver

b) Functions of the parts labeled A, B, C and D

A-Temporary storage of food before regurgitation
- Fermentation

B - Sieving and separating fine from coarse food materials
- Retaining foreign and indigestible materials such as polythene

C - Absorption of water
- Grinding and sieving food particles bv means of its folds.
- Temporary storage of food.

D - Proteins are digested by pepsin into proteoses and peptones
- Hydrochloric acid kills harmful micro-organisms
- Enzyme rennin coagulates milk in young animals

c) Cattle, sheep, Goats

44. a) Differences between ruminant and a non-ruminant animal

Ruminant	Non-ruminant
1. Chew cud	1. Do not chew cud
2. Have four stomach chambers thus polygastric	2. Have one stomach chamber thus monogastric
3. Regurgitate food	3. Cannot regurgitate food once swallowed.
4. Can digest cellulose. Have micro-organisms in the rumen that digest cellulose	4. Have no micro-organisms in the stomach hence cannot digest cellulose except those animals with micro-organism in the caecum
5. Have no ptyalin in saliva hence no enzymatic digestion in the mouth	5. Have ptyalin in the saliva hence enzymatic digestion starts in the mouth.
6. Most digestion and absorption takes place in the rumen	6. Most digestion and absorption takes place in the small intestines.
7. Have alkaline saliva due to presence of ammonia	7. The saliva is neutral in pH

b) Similarities between ruminants and non-ruminants

- Digestion in young ruminants is similar to that in non-ruminants as the)' do not have a developed rumen reticulum complex.
- Final protein digestion takes place in small intestines in both cases.
- Water absorption takes place in the colon in both ruminants and non-ruminants

45. Why cattle benefit more than pigs when fed on roughage

- Cattle are able to digest cellulose by use of micro-organisms in their rumen. They also have on elaborate digestive system (are poly gastric). Pigs on the other hand, are monogastric and are not able to digest cellulose effectively.

46. Reasons for feeding livestock

- To enhance productivity for instance milk, eggs and meat.
- To ensure the animals are healthy and hardy.

47. a) What leads to chicken laying soft-shelled eggs or eggs without shells.

- Lack of calcium in their bodies
- An attack by Newcastle disease

b) Providing the chicken with ground limestone and oyster shells.

48. Reasons why feed evaluation in livestock nutrition is important to a dairy fanner

- It enables the farmer to compare different feedstuffs in order to know their relative nutritive value
- It helps in preparation of livestock feeds that meet nutritional requirements of the livestock.

Address any queries to:
HoW tp Pass
P.O Box 333-00600 Nairobi[7]
Sms: +254722441379
E-mail: motivating2000@yahoo.com

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

HOW TO PASS

Motivating
Educational
Enterprises

ISBN978-9966-1541-9-4