

**MSCE AGRICULTURE**

**QUESTIONS**

**&**

**MODEL**

**ANSWER**

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# Topics covered

## **1. Agricultural and the environment**

- Soil degradation
- Agricultural and climate change
- Land drainage

## **2. Agricultural research and technology**

- Farm mechanization
- Farm power
- Gender and agricultural technology
- Improved farming technology

## **3. Agricultural economics and farm business management**

- Agricultural marketing and trading
- Price elasticity of demand and supply

## **4. Crop production**

- Crop improvement
- Crop processing
- Pasture
- Mango production

## **5. Livestock production**

- Cattle production
- Reproductive system of poultry and cattle
- Livestock improvement

1. State two forms of soil degradation
  - Physical degradation
  - Chemical degradation
2. Differentiate between physical and chemical degradation
  - In physical degradation, the physical characteristics of soil are interfered with while in chemical degradation, the chemical composition of soil is altered
3. Outline the major causes of soil degradation
  - Soil erosion
  - Salinization
  - Soil acidification
  - Leaching
  - Compaction of soil
4.
  - a. What is salinization of soil
    - Salinization is the accumulation of water soluble minerals in the soil
  - b. In which way does salinization cause soil degradation
    - Makes it difficult for crops to absorb soil moisture
    - Impairs availability of some minerals for crop use
    - May cause the soil pH to be less than plant can withstand
5. State two causes of physical land degradation
  - Soil erosion
  - Soil compaction
6. Suggest two causes of soil acidification
  - Continuous use of acidifying fertilizers
  - Accumulation of acidic salts in the soil
7.
  - a. Outline four effects of flooding on agriculture
    - Damage of crops in the field
    - Death of livestock
    - Destruction of farm structures
    - Outbreak of water-borne diseases and parasites
    - Reducing the arable lands
    - Loss of top fertile soil
  - b. List four other effects of high population on land
    - Clearing of more natural vegetation and planting annual crops that may not be very good in combating land degradation

- Overstocking leading to overgrazing and hence soil erosion
- Encroachment of arid and semi-arid areas that are more prone to land degradation

8. Name three types of terraces

- Bench terraces
- Broad based terraces
- Narrow based terraces
- Graded terraces
- Level terraces

9. What are the control measures of soil degradation

- Mulching
- Afforestation and reafforestation
- Construction of gabions
- Construction of terraces

10. What is soil degradation

- Soil degradation is the process by which soil loses its quality and productivity as a result of human activity

11. List four ways of dealing with climate change in agriculture

**By practicing**

- Conserving agriculture
- Water harvesting
- Agroforestry
- Reafforestation
- Integrated forest, crops, livestock and fish system

12. Describe how each of the following practices help prevent climate change in agriculture

a. Agroforestry

- Trees reduce GHG (greenhouse gases) by absorbing carbon dioxide in the atmosphere
- Trees protect the soil from erosion
- Trees improve water infiltration
- Trees conserve soil moisture by reducing evaporation

b. Conservation agriculture

- Reduce soil erosion hence siltation of water bodies
- Reduce carbon dioxide emission into the atmosphere
- Avails cleaner surface water for domestic and agricultural use

13.

a. What is conservation agriculture

- Conservation agriculture is an approach in farming that aims at attaining high crop yields at the same time conserving the environment

b. Name the three principles of conservation agriculture

- Minimum soil disturbance
- Permanent soil cover
- Diversified crop rotation or plant associations

14.

a. Outline the importance of water harvesting

- Avails clean water for use
- Reduces volumes of surface run-off hence reduce soil erosion
- Reduce flooding

b. State two ways of storing harvested rain water

- Use tanks
- Use dams
- Use of ponds

15. Identify four areas in farm where agroforestry can be practiced

- Along the farm boundary
- Within the homestead
- Along the terrace
- In marshy areas
- In very steep areas

16. What is land drainage

- Land drainage is the practice of removing excess moisture from the soil to make it suitable for growing crops

17. Suggest five benefits of carrying out land drainage

- Improves soil aeration
- Increases microbial activities
- Reduces soil erosion
- A method of land reclamation
- Controls waterborne parasites and diseases

18. What is bio drainage

- Bio drainage is the use of growing plants to drain out water from the field

19. Identify four benefits of bio drainage compared to conventional drainage

- Trees act as wind break
- Trees help moderate the temperature of the surrounding
- Trees increase the forest cover
- Trees drain and discharge the excess water

- Bio drains are cheap to maintain

20. Outline four possible causes of waterlogging

- Very high rainfall in low lying areas
- High amounts of clay particles in the soil
- Presence of an underlying impermeable rock
- A high water table
- Presence of hard pans in the field

21. Give three disadvantages of open ditches as a method of land drainage

- They are expensive to maintain
- They interfere with agricultural mechanization
- If the ditches are not well designed, they may lead to serious erosion
- Use valuable land space that would otherwise be used for growing crops

a. What are cambered beds

- Cambered beds are raised heaps of soil, water flows by gravity into the channels making the soil on the raised bed suitable for growing crops

b. Describe how cambered beds aid in land drainage

- Excess water from the raised heaps of soil flow by gravity into the channels making the soil on the raised bed suitable for growing crops

22. Describe the condition in which water pumping is recommended as method of drainage

- in a situation whereby a large pool of water collects in a low lying area, where other methods of drainage are not applicable

23. What is farm mechanization

- Farm mechanization is the use of power driven machinery to carry out certain farming activities

24. Name three animal drawn machineries

- Ox-plough
- Ox –cart
- Ridger
- Seed drills

25. Describe the advantages of farm mechanization

- Increasing crop yields
- Farm operations can be done on time
- Improves production efficiency by reducing cost per unit of product
- It reduces drudgery making work easy and enjoyable
- Farmers benefit from economies of scale of large scale production
- Crop quality is increased especially during harvesting and processing

- Operation are done more efficiently
- Substitutes expensive farm labour
- Compensates for labour peak periods

26. Outline the maintenance of a tractor drawn mouldboard plough

- Clean after use
- Tighten loose nuts and bolts
- Apply old engine oil on the plough for long storage
- Lubricate moving parts
- Repair damaged parts
- Store in a dry place
- Replace lost or worn out parts such as nuts and scrappers
- Sharpen shares by hammering the edges

27. Besides the disc plough, name three other tractor drawn machineries used in primary cultivation

- Mould board plough
- Subsoiler
- Rotator

28. State five maintenance practices carried out on trailers

- Check tyre pressure and adjust accordingly before each day's work
- Avoid overloading the trailer
- Lubricate the wheel bearings regularly
- Clean the trailer regularly
- Keep under a shade for long storage
- Check bolts and nuts. Tighten loose nuts and bolts
- Repair damaged parts

29. Suggest the factors to consider when mechanizing a farm

- Availability of capital
- Size of land
- Availability of technical skills
- Topography
- Accessibility
- Support services
- Employment opportunities

30. State three machineries which are used in harvesting crops

- Combine harvester
- Maize shellers
- Potato lifters
- Forage harvesters



31. Describe the limitations of farm mechanization

- Unskilled farm labour is not required hence many cases of unemployment
- Inadequate capital to purchase machines
- Highly skilled operations require higher wages

32. Describe four daily maintenance practices carried out on an ox-plough

- Lubricate land wheel hub
- Clean after use
- Check and tighten loose nuts and bolts before the day's work
- Replace worn out parts`

33. Name tractor-drawn implements that are mounted on a three point hitch

- Ploughs
- Subsoiler

34. Describe the safety measures when using

a. Carts

- Do not pull carts through buildings
- Grease moving parts of the wheel
- Replace broken parts

b. Sprayers

- Dispose of any chemical left overs and empty containers properly
- Clean spraying equipment thoroughly
- Keep proper records of all chemical applications

35. Outline the limitations of human power

- Slow
- Low work output
- Unreliable since it depends on the health of the worker
- Relies on level of skill of the worker
- Less motivation can reduce productivity

36. Explain how to enhance animal power

- Use mature animals
- Use animals with fairly large body weight
- Indigenous breeds are hardy and better used to generate power
- Harness the animals properly to be comfortable when working
- Use well trained animals

37. Name two farm operations which are powered by wind power

- Pumping water from boreholes
- Generating electricity
- Winnowing crops

38. Identify the main components of biogas

- Methane (60 – 70%)
- Carbon dioxide (29%)
- Nitrogen (1%)
- Carbon monoxide (0.1%)
- Oxygen (0.1%)
- Hydrogen sulphide (traces)

39. State the advantages of biogas

- Environmental friendly
- It is cheap to generate
- It is an excellent source of manure
- It has low maintenance costs

40. Describe the uses of water power

- Drive water mills which are used in grinding of cereal crops
- Transport or ferry logs in navigatable rivers
- Operate a hydro pump to draw water for domestic use

41. State the limitations of mechanical power

- It is very expensive
- Machines need maintenance costs

42. Suggest two uses of solar energy

- Heating
- Cooking
- Lighting

43. Name the equipment required in harnessing solar energy

- Solar panels
- Storage batteries

44. Outline the disadvantages of using solar energy

- It is unreliable
- It is relatively expensive to install
- It requires skills to install and maintenance
- It cannot be directly used on most farm operations

45. List some gender specific operations for women

- Hard threshing
- Digging
- Weeding
- Planting
- Harvesting

- Storage of produce as grains
46. Suggest some male dominated activities in farms
- Driving tractors
  - Working with oxen
  - Mechanical threshing
  - Driving combine harvesters
  - Watering fields
  - Watering fields
  - Spraying crops
47. State two causes of gender bias in agricultural technology
- Socialization
  - Lack of proper education
  - Lack of access to appropriate skills
48. Identify the effects of gender bias in agricultural technology
- Declining crop yields hence shortage of food
  - Labour shortage
  - Increased poverty
  - Environmental degradation
49. Explain how culture contributes to gender bias in agricultural technology
- Traditional cultural values place women at a lower rank in the society
  - Culture socializes people to believe there are male and female jobs
  - Lack of proper education for women makes them unable to operate machines due to lack of relevant skills
50. Explain how gender bias in agricultural technology can be eliminated
- Change the traditional cultural values and norms
  - Increase access to education by women
  - Empower women politically and degradation
  - Empower women economically
51. How does gender bias lead to low agricultural production
- Performing operations manually instead of mechanizing agriculture
  - Inadequate labour to work on the farm hence low production
  - Environmental degradation increases hence loss of important plant nutrients
52. What do you understand by the term improved farming technology
- Improved farming technology is the use of practices and innovations that increases agricultural production and at the same time conserving the environment
53. Outline three characteristics of improved livestock breeds

- Resistance to tropical diseases
- High tolerance to infestation by both internal and external parasites
- High prolificacy

54. What environmental conditions can be controlled in green house

- Soil moisture content
- Relative humidity
- Carbon dioxide concentration
- Temperature
- Light duration
- Pest invasion
- Disease attack

55. Describe the role of irrigation in improving food security

- Enables growing of crops in arid and semi-arid areas
- Enables growing of crops even during the dry season
- Allows growing of crops outside their ecological zones
- Enables growing of crops inside special structures such as green house

56. Explain how each of the following increases food supply

a. Crop rotation

- Reduces competition with weeds
- Reduces attack and damage by pests
- Reduces attack by disease hence plant grow vigorously and gives high yields

b. Use of draught animals

- Allows farming in steep areas where tractors cannot work
- Allows farming on irregular pieces of land
- Increases the work output and hence high yield

c. Improved means of communication

- Farmers have access to vital information when they need it
- Farmers are able to monitor market trends and hence appropriate time and market to sell their produce
- Eliminates likelihood of exploitation by middleman

57. Define the following terms

a. Trade

- Trade is the practice of buying commodities and then selling them to consumer at a profit

b. Marketing

- Marketing refers to the processes involved in the transformation and flow of goods from the producer to the consumer

58. Give three differences between marketing and trading

MARKETING	TRADING
Aims at satisfying the consumer	Primarily concerned with the total sales
Very wide with many processes	Narrow; only buying and selling
Proceeded with research to determine what the consumer wants	Uses resources to buy and then sell at a profit
Demand driven to make some profit	Aims at making profit by disposing surplus commodity

59. Explain four benefits of trading agricultural produce at the following levels

a. International level

- A country is able to get agricultural commodities it does not produce
- A country earns foreign exchange
- Improves international relations
- Widens the market for a country's agricultural commodities
- Increases chances of getting humanitarian aid from trade partners in case of calamity
- Improves the living standards of the citizens of a country
- Improves a country's transport and communications facilities
- Encourages specialization in particular agricultural commodities

b. National level

- Ensures availability of a variety of commodities in the market
- A region is able to get commodities that it does not produce
- It creates and promotes understanding amongst various communities in the country
- It promotes specialization
- It enables producers to dispose surplus commodities
- It ensures steady of various agricultural commodities
- It creates urban population to get food
- It promotes agricultural allied industries

60. Suggest two ways by which population distribution affects marketing

- High supply of produce in high density areas
- Low supply of produce in low density areas
- More outlets of produce in high density areas
- Low outlets of produce in low density areas
- Longer marketing channels in high density areas
- Shorter marketing channels in low density areas

61. Describe four ways of improving trading of agricultural produce at

a. Community level

- Ensure roads are all-weather, that is passable in all weather conditions
- Promotes the growth of rural trading centers
- Promote peaceful and harmonious co-existence among the neighboring communities
- Promotes communication facilities such as radios, televisions and telephones

b. National level

- Improve transport infrastructure such as roads, railways and airways
- Improve commination facilities
- Promote adequate market information of major agricultural commodities
- Establish butter stocks to safeguard on price fluctuation
- Harmonise taxation to prevent over taxation

62. List four marketing agencies of agricultural commodities

- Marketing boards/ Government parastatals
- Retailers
- Wholesalers
- Processors
- Brokers
- Itinerant agents

63. State two marketing costs

- Transport costs
- Capital and financing costs
- Cost of production losses

64. What is a marketing channel

- This is the pathway a particular good follows from the producer until it reaches the ultimate consumer

65. Given the following information, calculate the marketing margin for coffee beans after milling to the final product, coffee grounds

- The conversion ratio of coffee beans to coffee ground is 0.6
- 0.3kg of husks are realized for every 1kg of coffee beans valued at 50MK/kg
- The buying price of coffee beans is 200MK/kg and the selling price of ground coffee is 450MK/kg

Solution

$$= (0.6 \times 450) + (0.3 \times 50)$$

$$= 270 + 15$$

$$= 285\text{MK}$$

$$= \frac{285-200}{200} \times 100$$

$$= \frac{85}{200} \times 100$$

$$= 42.5\% \text{ Answer}$$

66. Define the terms

a. Price elasticity of demand

- Is the sensitivity of demand to changes in price
- It measures the quantity of goods demanded when the price changes

b. Price elasticity of supply

- Is the sensitivity of supply to changes in price
- It measures the quantity of goods supplied when the price changes

67. Give two reasons why most agricultural commodities have an inelastic demand

- They have a high perishability
- They are basic commodities

68. What do you understand by the following terms

a. Elastic demand

- Elastic demand is a situation where the quantity demanded changes by a higher percentage than the change in price

b. Inelastic supply

- Inelastic supply is a situation where the quantity supplied changes by a lower percentage than the change in price

69. What is:

a. Supply schedule

- Is a table that shows the quantity of a good the suppliers in a market will supply at every different price

b. Demand schedule

- Is a table that shows the quantity of good the consumers in a market will buy at every different price

70. Use the table below to answer the questions that follow. The table shows the demand and supply schedule for tomatoes in a market

Price in MK/kg	Quantity demanded (kg)	Quantity supplied (kg)
20	600	200
24	500	250
28	400	290
32	300	320
36	200	350
40	100	355

a. Calculate the elasticity of demand when the price:

i. Changes from 20 Mk/kg to 24Mk/kg

$$\begin{aligned} Ed &= \frac{\Delta Q}{\Delta P} \times \frac{P_1}{Q_1} \\ &= \frac{600-500}{20-24} \times \frac{20}{600} \\ &= \frac{100}{4} \times \frac{20}{600} \\ &= \frac{2000}{2400} \\ &= 0.83 \end{aligned}$$

ii. Changes from 40Mk/kg TO 36Mk/kg

$$\begin{aligned} &= \frac{100-200}{40-36} \times \frac{40}{100} \\ &= \frac{100}{4} \times \frac{40}{100} \\ &= \frac{4000}{400} \\ &= 10 \end{aligned}$$

b. Calculate the elasticity of supply when the price changes from

i. 20Mk/kg to 24Mk/kg

$$\begin{aligned} Es &= \frac{\Delta Q}{\Delta P} \times \frac{P_1}{Q_1} \\ &= \frac{200-250}{20-40} \times \frac{20}{200} \\ &= \frac{50}{4} \times \frac{20}{200} \\ &= \frac{100}{1800} \\ &= 0.13 \end{aligned}$$

ii. Changes from 40Mk/kg TO 36Mk/kg

$$\begin{aligned} &= \frac{355-350}{40-36} \times \frac{40}{355} \\ &= \frac{5}{4} \times \frac{40}{355} \\ &= \frac{200}{1420} \\ &= 0.15 \end{aligned}$$



71.Explain the meaning of crop improvement

- Crop improvement refers to plant breeding processes which changes the genetics of plant in order to produce desired characteristics

72.State the aims of crop improvement

- To improve adaptation of plants to different ecological conditions
- To increase the average crop yields
- To improve the nutritional content of edible plant parts
- To increase the market value of crop products
- To increase resistance to pests and diseases
- To develop crops with ease of adaptation to new agricultural areas
- To develop crops well adapted to modern production technologies

73.Explain the meaning of the following terms

a. Base collection

- Refers to seeds conserved for a long term usually 50 -100 years at about -20°C with 5% moisture content. They are used for regeneration

b. Active collection

- Active collections are seeds stored for medium duration usually 10 -15 years at 0°C with 5 -8% moisture content. They are used for multiplication and evaluation

c. Working collection

- Working collections are seeds stored for a short duration usually 3 -5 years at 5 -10°C with 10% moisture content. They are regularly used in crop improvement programs

74.What is hybridization

- Hybridization is the combination of desirable genes found in two or more different varieties to produce pure- breeding progeny which is superior in many aspects to the parental types

75.Name the gene banks used in *ex-situ* conservation of germ plasm

- Seed banks
- Plant bank
- Shoot tip bank

76.Outline the activities in crop improvement

- Collection of germ plasm
- Germ plasm conservation
- Germ plasm evaluation
- Germ plasm cataloguing, data storage and retrieval
- Actual improvement
- Demonstrations to prove success of research objective
- Seed multiplication

- Seed distribution

77. What is germ plasm

- Germ plasm refers to all the alleles of various genes present in a crop species and its wild relatives. Also known as genetic resources or gene pool or genetic stock

78. Outline the characteristics of a gene pool

- Genetic plasm consist of land races, modern cultivars, obsolete cultivars, breeding stocks, wild forms and wild species of cultivated crops
- Genetic pool represents the entire genetic diversity available on crop species
- Germ plasm is collected from centers of diversity, gene banks, gene sanctuaries, farmer's fields, markets and seed companies
- Germ plasm is basic material for launching a crop improvement programme.
- Germ plasm may be indigenous or exotic

79. Give the aims of germ plasm evaluation

- To identify gene sources for resistance to biotic and abiotic stresses, earliness, dwarfness, productivity and quality traits

80. Distinguish *in-situ* and *ex-situ* conservation of germ

- In- situ conservation involves preserving germ plasm under natural conditions such as national parks while Ex-situ conservation involves preserving germ plasm in gene banks

81. Define the term processing

- is the changing of raw forms of produce into a finished product of higher value which can be preserved for future use

82. State the importance of crop processing

- Improves the shelf-life of the products
- Improves taste of the produce
- Adds value to crops
- Provides employment opportunities
- If exported, it earns the country foreign currency

83. Define blanching in crop processing

- Blanching is the act of immersing a crop briefly in boiling water

84. Why would blanching be done in crop processing

- To retain original characteristics like colour and texture of the product

85. Suggest reasons why maize grains should be dried properly before storage

- To minimize incidents of moulds developing on the testa which causes the deadly aflatoxin
- To make the testa hard to resist insect attack
- To reduce transpiration rate in grains hence preserve for long periods
- To prevent germination of seed when they are in the store

86. Outline six operations carried out in canning mushrooms

- Grading
- Cleaning
- Blanching
- Can filling in brine solutions
- Sterilization of the cans
- Labeling of the cans

87. Describe the preservation of a leafy vegetable through drying

- Blanch the leaves
- Place blanched leaves on baking or metal screen trays
- Set oven temperatures at 60°C and leave the door open 2 to 4 inches for ventilation

88. Name the products obtained from processing the groundnut

- Peanut oil
- Groundnut butter
- Groundnut cake (animal feed)

89. Explain radiation preservation of mushrooms

- Mushrooms are exposed to a radiation of gamma rays to stop the post-harvest growth and deterioration

90. What is steeping preservation

- Steeping refers to soaking mushrooms in a solution having 10 – 12 % salt

91. Define the following terms

a. Pasture

- Pastures are grasses and legumes found naturally growing in fields or cultivated on pieces of land for feeding livestock

b. Grass ley

- Grass ley are artificial pastures established by man

92. Describe the advantages of mixed stand pasture over pure stand pasture

- Grass- legume pastures have higher nutritive value than pure pastures
- Less use of nitrogen fertilizers for top-dressing or higher soil fertility due to nitrogen fixation
- The yield of forage per unit area is higher compared to pure stand
- Grass –legume mixture is more palatable
- There are fewer cases of bloat in animals which graze on mixed pastured than on pure stands
- There is maximum soil exploitation as different crops have different nutrient requirements
- There is guaranteed yield in case of failure if one crop

93.Suggest the importance of weed control in forage crops

- Weeds compete with pastures for nutrients, moisture, space and sunlight which ultimately affect the overall performance of the pastures
- Weeds interfere with proper pasture establishment thereby prolonging the establishment and maturity period
- Presence of weeds reduce the quality and overall herbage yields
- Some weeds such as Datura stramonium may result in livestock poisoning if accidentally fed on
- Weeds shorten the life of pasture stand
- Some weeds taint the colour and flavour of milk for example wild onions

94.Explain the different methods of pasture establishment

a. Direct sowing

- Seeds or vegetative materials are planted directly into a well prepared seedbed. It involves the following methods

i. Vegetative propagation

- Vegetative materials such as cuttings and rooted splits are established directly in the field. The field is prepared and holes dug as per the spacing of the pasture

ii. Broadcasting

- The field is prepared to a fine tilth and land leveled. The pasture seeds are scattered randomly over the seedbed and then covered with a thin layer of soil

iii. Drilling

- The planting materials are placed in drills at predetermined spacing in manual drilling, a planting line can be used while in mechanized drilling, planters are used

b. Under sowing

- This is establishment of pasture under an already growing crop usually referred to as nurse crop

c. Over sowing

- This is the establishment of a pasture legume in an existing grass pasture

95.State six benefits of rotational grazing

- Reduces build-up of parasites and disease
- Allows pasture to re-grow
- Manure is evenly distributed in the field
- Excess forage can be conserved
- Allows management practices on unglazed portions

- Pastures have increased resistance to drought
- Ensures maximum utilization of pastures
- Allows certain species of plants to fruits and from seeds

96.

a. Why is it importance to conserve forage

- For better and full utilization of available land
- It ensues availability of livestock feed throughout the year even during dry seasons
- It is a source of income
- Provides feed for the dry season when forage re-growth is low

b. State three methods of forage conservation

- Hay making
- Silage making
- Standby hay/foggage

97. Briefly describe the process of making hay

- Cut the forage crop when 50% of the plant have flowered
- Dry the cut crop to about 16 -20% moisture content or for 2 -3 days
- Gather the hay and store in a shade
- Bale the dry material if possible

98. State the factors that affect pasture seed rate

- Seed size
- Soil tilth
- Growth habit of pasture
- Method of sowing
- Seed purity
- Germination percentage

99. Name the methods of achieving rotational grazing

- Paddock grazing
- Strip grazing
- Herding
- Tethering

100. Describe three characteristics of the mango cultivar Tommy Atkins

- The tree is large with dense rounded canopy
- The fruits are medium to large, oval to oblong in shape
- The flesh is yellow to deep yellow in colour
- The fruit skin is orange yellow with a heavy red blush

101. Outline the nutritional importance of mangoes

- Source of Vitamins A and C

- Source of minerals such as potassium
  - Has anti-oxidants which prevents growth of cancerous cells
  - Source of stomach soothing enzyme papain
102. Describe the procedure for transplanting mango seedlings
- Transplant when seedlings are 6 – 8cm long
  - Water seedlings before transplanting
  - Plant at the beginning of the rainy season
  - Take care when handling seedlings not to damage them
  - Using a sharp knife, cut and remove the polythene sleeve
  - Prune back circular roots
  - Plant the seedling at the center of the hole
  - Plant to the level existing nursery soil
  - Press the soil firm around the root zone
  - Place mulching material at the base of the seedlings
  - Water after transplanting
- 103.
- a. Identify two signs of fruit fly attack in mangoes
    - Present of small flies
    - Small sport on the skin of fruits
    - Rotting of fruits
  - b. Give three control measures of fruits fly
    - Collect fallen fruits twice a week and destroy them
    - Eradicate all non-economic host plants
    - Remove fruits with dimples and those that ooze clear sap
    - Use fruit traps to reduce their population
    - Regular use of poison baits
- 104.
- a. Outline two signs of a mango tree attacked by anthracnose disease
    - Infected flowers wither and die before fruits form
    - Spots grow into irregular patches on leaves
    - Brown or black sunken spots develop on young fruits
  - b. Describe two control measures of anthracnose disease in mango orchard
    - use tolerant varieties
    - remove dead branches, twigs and dead leaves and destroy them
    - spray appropriate fungicides
105. State two disadvantages of dodo (*maboloma*) cultivars of mangoes
- Fruits have high fibre content

- Susceptible to powdery mildew
  - The tree is huge hence difficult to harvest
106. Describe two control measures of mango stone weevils
- Collect all fallen fruits and destroy them
  - Spray regularly with bio- pesticides *Bacillus thuringiensis*
  - Spray long acting contact insecticides
107. Outline two weed control methods in mango orchard
- Mechanical methods especially by digging them up
  - Mulching
  - Use of herbicides
  - Intercropping
108. Identify the cause of anthracnose disease of mangoes
- Fungus ; *Colletotrichum gloeosporioides*
109. Outline the signs of mango scales in a mango crop
- Presence of small immobile insects on leaves
  - Leaves turn yellow
  - Leaves fall off prematurely
  - Trees have poor growth
  - Die back of branches
  - Fruits drop off
110. Give factors considered in selection of meat goats
- Should be healthy
  - Should have high prolificacy
  - Should be highly adaptable to prevailing weather conditions
  - Should be fast growing
  - Should have a compact, well fleshed body
111. Define inbreeding ‘
- Inbreeding refers to mating between related animals
112. Give one disadvantage of inbreeding in livestock
- Reduction of vitality
  - Leads to loss of hybrid vigour
  - Leads to low fertility of offsprings
  - Increase pre-natal mortality rate
113. Give one advantage of inbreeding in livestock
- Promotes uniformity in herd
  - Used to test males for undesirable characteristics
  - Concentrate desirable genes together

- It exposes undesirable characteristics so that they can be improved
- 114. What is outbreeding
  - This involves mating totally unrelated animals but from the same breed
- 115. State one advantage of outbreeding in livestock
  - Increases hybrid vigour
  - Introduces desirable characteristics that overshadow present
- 116. State one disadvantage of outbreeding in livestock
  - Expensive to import semen by individual farmers
- 117. List three breeds of cattle for
  - a. Dairy production
    - Friesian
    - Jersey
    - Guernsey
    - Ayrshire
  - b. Beef production
    - Hereford
    - Boran
    - Malawi Zebu
    - Charolais
    - Sussex
- 118. Describe four observable characteristics of cattle breeds kept for
  - a. Dairy
    - Body is less fleshy
    - Wedged shaped
    - Large abdomen
    - Well-developed udder
  - b. Beef
    - Well fleshed body
    - Blocky shaped
    - Small under
    - Short thick neck
- 119. Outline five management practices carried on beef and dairy cattle
  - Proper feeding
  - Proper housing
  - Parasite control
  - Disease control
  - Selection and breeding



- Hoof trimming
120. Name four common
- a. Parasites of cattle
    - Ticks
    - Tsetse fly
    - Tapeworms
    - Live flukes
    - Roundworms
  - b. Disease of cattle
    - Mastitis
    - Anthrax
    - East Coast Fever (ECF)
    - Gall sickness
    - Milk fever
    - Black quarter
    - Bloat
121. Outline four methods of controlling ticks in cattle
- Use of acaricides
  - Practice rotational grazing
  - Fencing of livestock
  - Hand picking
  - Burning heavily infested pastured
  - Ploughing heavily infested pasture
122. Describe the suitable feeds for cattle
- Roughages such as hay and silage
  - Concentrates such as cotton seeds cake, groundnut seed cake and bran
123. Describe signs of two viral disease
- a. Signs of rinderpest
    - Rapid rise in body temperature
    - Dry and cracked muzzle
  - b. Signs of foot and mouth disease
    - Great reduction in milk production
    - Inflammation of tongue, lips and gums
124. Explain the control for the viral diseases in 123 above
- a.
    - Disinfect animal houses
    - Vaccination of all animals that are more than one year old

- Imposition of quarantine in case of outbreak
- b.
- Vaccinate animals every six months
  - Disinfect animal hooves
  - Slaughter, burn and bury infected animal
125. List four distinguishing characteristics of a jersey breed of cattle
- Have sharp withers
  - The colour of milk is yellow
  - They are resistant to high temperatures
  - Bulls are aggressive
- 126.
- a. Outline the pre-disposing factors of mastitis
- Poor hygiene
  - Overstocking
- b. What measures should a farmer carry out to control mastitis in his dairy herd
- Vaccinate animals once a year
  - Cull animals which do not respond to treatment
  - Apply milking jelly on teats to prevent cracking and drying
127. What is the function of the following parts in cattle reproduction
- a. Scrotum
- Protects the testes from mechanical injury
  - Holds the testes in position
  - Regulates the temperature of the testes
- b. Prostate gland
- Prostate gland produces a saline- glucose rich fluid that activates the spermatozoa
- 128.
- a. What does the term oestrus cycle mean
- Oestrous cycle is the period in the sexual cycle of female mammals during which they are on heat, ready to accept a male
- b. If a dairy cow is noticed to be showing signs of heat at 6 a.m., what time should it be inseminated
- Should be served 12 hours later. That is 6pm in the evening
129. Outline the phases of oestrous cycle in cattle and in goat
- Occurs in four phases**
- Proestrous
  - Oestrous
  - Metoestrous
  - Dioestrous

130. Give two Give the signs of heat
- Restlessness
  - Mounting others and when mounted, stands still
  - Loss of appetite
  - Constant vocalizations
  - Seeks out for bucks
  - Reddening and swelling of the vulva
  - Discharges a thin clear mucus from the vulva
131. Give two functions of the testes in a bull
- Secretes male sex hormones
  - They produce sperms
132. Name the part of the hen's reproductive system where
- a. Fertilization takes place
    - Infundibulum or funnel of oviduct
  - b. The shell is added to the egg
    - Shell gland or uterus
133. Describe four signs of parturition in a cow
- Restlessness
  - Loss of appetite
  - Discharged of a clear slimy mucus from the vulva
  - Swelling and reddening of the vulva
  - Cow isolates herself from the other
  - Relaxation of the ligaments and muscles on either side of the pelvic bones
  - Enlargement of the udder and feels firm to the touch
134. What is the gestation period of a cow
- 275 – 285 days
135. Outline four factors that influence the onset of puberty in cattle
- Origin exotic breeds reach puberty earlier than indigenous
  - Exposure to the opposite sex stimulates onset of puberty
  - Warm temperature stimulates the onset of puberty but extreme temperature either hot or cold delays the onset
  - Well-fed animals reach puberty earlier than pure breeds due to heterosis (hybrid vigour)
136. Give the role of each of the following in cattle
- a. Sigmoid flexure in a bull
    - Enables the penis to retract after mating
  - b. Ovary

- Secretes female sex hormones
137. Define the term selection
- Selection is the practice of choosing male and female animals to become the parent of the future generation
138. How would you select a good dairy cow using physical appearance
- Wedge shaped
  - Less fleshy or have a lean body
  - Large hindquarters
  - Long lean neck
  - Large well developed udder
  - Prominent milk veins
  - Well placed four teats
  - Large barrel
139. Give three main importances of livestock improvement
- To increase production potential of the animal
  - To obtain high quality produce
  - To increase disease resistance in the animals
  - To increase heat tolerance
- 140.
- a. State two factors that indicate the fertility level of sow
- Number of teats
  - Prolificacy, that is number of offspring it gives rise to at one farrowing
- b. Outline five other characteristics of a sow suitable for selection for breeding purposes
- Should have a high growth rate
  - Should be able to produce adequate milk for her litter
  - Should be free from diseases and any other deformity
  - Should slow mild temperament
  - Should have high carcass quality
  - Should be an early mature
141. Describe the conformation of beef cattle
- Should have a rectangular or blocky or cylindrical shape
  - The body is well set and compact and with large hindquarters
  - They have a deep body
  - They should be well fleshed with no protruding bones
  - The legs should be short and strong so as to support the large body
  - They should have a wide brisket that protrudes forward.

# **SAMPLE EXAMINATION PAPER**

## **PAPER 1**

### **Section A (50 marks)**

- This paper has two sections A and B section A has ten questions and section B and four questions

1.

a. State any two four possible causes of soil degradation

- soil erosion
- salinization
- soil acidification
- leaching
- compaction of soil

b. Explain any four effects of soil degradation on crop production

- Soil erosion carries away the top soil which is rich in plant nutrients and the beneficial soil microorganisms
- Soil erosion leaves the land crusty and less useful for crop production. Most farmers abandon such land
- Flooding water may carry weed seeds from one farm to another. Weeds reduce the crop yield by competing with crops for nutrients
- Soil degradation contributes towards siltation of water resources reducing their capacity for agricultural activities such as irrigation

2.

a. Outline four methods of dealing with effect of climate change

- Practicing conservation agriculture
- Practicing water harvesting
- Practicing agroforestry
- Practicing integrated forest, crops, livestock and fishing farming

b. Describe two benefits of trees planted on the farm

- Trees are source of fodder for livestock
- Trees provide timber for construction

3.

a. Define land drainage

- Land drainage is the practice of removing excess water from the soil to make it suitable for crop production

b. Identify three methods of land drainage

- Surface drainage
- Subsurface drainage
- Biodrainage

4.

a. Describe three advantages of farm mechanization

- There is improved production efficiency by reducing cost per unit of production
- It substitutes expensive farm labour

- Crop quality is increased especially during harvesting and processing
- b. Describe three factors to consider when mechanizing farm
  - Availability of capital. High initial costs are required to mechanise a farm, this may be too expensive for some farmers
  - Topography. Mechanisation can easily be applied on fairly gentle slopes to relatively flat land. It may be impossible to operate on steep slope
  - Size of land. Mechanization can easily be carried out on large tracts of land. It is uneconomical to mechanise the farm operations

5.

- a. Name four breeds of dairy cattle reared in Malawi
  - Fresian
  - Guernsey
  - Jersey
  - Ayrshire
- b. Outline four characteristics of a suitable house for cattle
  - It should be easy to clean to prevent accumulation of dust
  - It should be well ventilated to prevent spread of infection
  - It should be well drained
  - It should be spacious

6.

- a. Name four mango varieties common in Malawi
  - Dodo
  - Tommy Atkins
  - Keitt
  - Sensation
- b. List pest and diseases of mangoes
 

Pests of mango include:

  - Fruit flies
  - Mango scales
  - Mango stone weevils

Diseases of mangoes include:

  - Mango anthracnose
  - Powdery mildew

7.

- a. Differentiate between elastic and inelastic demand of commodity
  - Elastic demand is a condition in marketing whereby a small (slight) change in price of a commodity gives rise to a big change in the quantity of the commodity demanded
  - Inelastic demand is a condition in marketing whereby a big change in price of commodity gives rise to a small change in the quantity of commodity demanded
- b. Which type of demand from question 7 (a) above applies to most agriculture goods
  - Inelastic demand of most agricultural goods
- c. Give a reason for your answer in question 7(b) above

- There is usually a limit as to how much one can consume and store agricultural commodities. Some go bad very quickly and hence one demands just enough and not beyond what one can consume or keep leading to inelastic demand

8.

- What is conservation agriculture
  - Conservation agriculture is an approach in farming that strives to attain high and sustained crop production levels while at the same time minimizing the disruption of the soil structures, composition and natural biodiversity
- State three key principles of conservation agriculture
  - Minimum soil disturbance. Carry out tillage that is required to have an effective crop stand
  - Crop rotation. Introduce legumes to increase the amount of nitrogen in the soil and rotate crops to break pests and disease cycle
  - Soil organic cover. Leave some crop residue to cover the soil to reduce the amount of moisture loss

9.

- Outline three signs of trypanosomiasis disease in cattle
  - Animal is exhausted and very weak
  - Loss of hair at tail switch
  - The animal loses appetite
- Explain three effects of parasites in cattle
  - Anaemia due to sucking of blood by parasites such as ticks
  - Death of host under heavy infestation
  - Some parasites spread disease such as trypanosomiasis

10. Describe the signs of parturition in cows

- Loss of appetite
- Slimy mucous discharge from the vulva
- The cow isolates itself from the rest of the herd
- The vulva swells and become red
- Enlargement of the udder
- Colostrum may drop out of the teats in high lactating cows

### SECTION B (50 MARKS)

- *Answer all the four questions in this section. Your answer should be in essay form*

11. Describe two livestock breeding systems

- Inbreeding is the mating of individuals who are closely related. The level of inbreeding depends on the closeness of the relationship between the parents. This system should be used by breeders and not ordinary or inexperienced farmers due to the undesirable characteristics which arise in the inbred off springs

Example of inbreeding cases include; a mother and a son, a brother and a sister, half-brother and half-sister and father and daughter. Inbreeding is advantageous because it promotes uniformity in a population. Inbreeding is also useful in testing

male animals for abnormalities, that is, testing whether they are carriers of hereditary defects. Inbreeding is disadvantageous since there is reduced performance in the animal and reduced vitality. It leads to weak inferior animals by concentrating too many recessive gene pairs in the progeny.

Cross-breeding is the mating of the two animals belonging to different breeds. Examples include Fresian bull and Malawi Zebu. Cross-breeding is advantageous since the offspring exhibits hybrid vigour, therefore, it can adapt well to harsh environments. The disadvantage of cross-breeding is that it is expensive for most farmers to obtain semen from pure breeds.

12. Describe the different types of harvesting machines, their maintenance and safety measures to consider while using it

- Harvesting machines are used to harvest crops such as maize and wheat. Such machines include combine harvesters, maize shellers, potato lifters and forage harvesters. Combine harvesters are used for cutting the crop and ramming the grains, threshing grains, cleaning or winnowing the grains and packing the grains. Maize shellers are used to remove grains from maize cobs. Potato lifters are used in harvesting crops such as Irish potatoes and sweet potatoes. Forage harvesters harvest forage crops such as maize, sorghum and Napier grass.

Harvesting machines can be maintained by tightening loose nuts and bolts, lubricating moving parts, sharpening cutting edges and applying oil for long storage. While using harvesting machines, the farmer should not wear loose clothing such as neckties. All cutting blades should be sharp and in proper working condition.

13. Explain the processes of reproduction in cattle

- Reproductive in cattle involves the following processes; mating, fertilization, embryo development, foetus development and parturition. Mating can be natural or done through artificial insemination. In natural mating, a bull directly mounts a female on heat and introduces semen into the reproductive tract of the cow. In artificial insemination, semen collected from a superior male is introduced into the female reproductive tract by use of pistolette or syringe

Fertilization is a process through which the nucleus of a male gamete fuses with the nucleus of a female gamete to form a zygote. Fertilization occurs in the upper part of the oviduct. The zygote moves down the oviduct to the uterus, as it moves, it undergoes several cell divisions to form a hollow mass of cell called embryo.

During embryo development, the embryo develops finger-like projections called villi with which it attaches itself on the wall of the uterus in a process called implantation. Villi together with the wall of uterus develop into special organ



known as the placenta which forms the sites of material exchange between the embryo and maternal blood vessel in the uterine wall.

Parturition is the process of giving birth. It is also referred to as calving in cattle. Gestation period in cattle last between 275 – 285 days. A cow will show different signs of parturition such as restlessness, loss of appetite, isolation among others

#### 14. Describe the methods of livestock improvement

■

Livestock improvement is the science of changing the genetic constitution of animals to obtain desirable characteristics. They are two main methods of livestock improvement; breeding and introduction of exotic breeds

Breeding is the process of mating selected animals for the purpose of producing animals with desired traits. The quality of an animal depends on the genetic characteristics inherited from the parent stock. The farmer must therefore be concerned with the parent stock from which the young are to be produced.

Introduction of exotic breeds refers to the process of importing exotic, pure bred animals with superior qualities from another country. Exotic breeds can be introduced by importing superior semen, importing bulls or importing embryos. Males imported or semen harvested can be used to mate the local female animals

#### 15. Explain five factors that affect the quality of hay.

■

Hay refers to forage crops which have been cut and dried to about 15 – 20% moisture content so that they can safely be stored without undergoing fermentation and becoming mouldy and there are several factors that can affect the quality of hay.

Pastures species used. This is the first factor that can affect the quality of hay. Legumes usually have high crude protein content hence are of higher quality than grasses

Age of pasture at cutting. Forage has maximum nutrients if harvested when 50% of the plants have flowered. Delay in harvesting leads to a lower nutrient content since the nutrients would have been used in seed setting.

Moisture content. Hay should be dried to the appropriate moisture content to prevent fermentation which will lower its quality

Leafiness of pastures. The higher the leaf; stem ratio, the higher the quality.

Method of storage. The mode of storage should protect the hay from rain water which may result into formation of moulds