30.14 AGRICULTURE (443)

30.14.1 Agriculture Paper 1 (443/1)

SECTION A (30 marks)

1.
- Chemical treatment
- Filtration
- Boiling
- Aeration
- Sedimentation/decantation
- Storage for 36 hours

(3 x ½ = 1½ marks)

2.

(a)
- Galvanised iron pipes
- Aluminium pipes

(2 x ½ = 1 mark)

(b)
- Rubber hose pipes
- Plastic hose pipes

(2 x ½ = 1 mark)

3.
- Encourages soil erosion
- Results in overgrazing/overstocking
- Difficult to control breeding
- No individual security on land ownership
- Difficult to acquire loans for agricultural development
- Lacks incentives for permanent/long term development projects
- Difficult to carry out sound farm plan
- Encourages spread of parasites and diseases
- Encourages disputes among community members

(4 x ½ = 2 marks)

4.
- Farm boundaries
- Homestead
- Terraces
- River banks/water catchment areas
- Steep slopes/slopes
- Within pasture land/between crop plots

(4 x ½ = 2 marks)

5.
- Receipt
- Invoice
- Statements
- Purchase order
- Delivery note

(4 x ½ = 2 marks)

6.
- Slow down the speed of run-off to reduce erosive power of water
- Reduce the volume of run-off
- Trap soil sediments

(2 x ½ = 1mark)

7.
- T-budding
- Top budding
- Patch budding/ring budding

(2 x ½ = 1mark)

8.
- Reduce damage to seedlings by strong wind
- Reduce evaporation/transpiration rate due to strong sun and wind *(2 x ½ = 1 mark)*

9.
- Destroys organic matter
- Destroys soil structure
- Kills useful soil organisms
- Exposes soil to agents of soil erosion
- Causes nutrient imbalance/loss of volatile nutrients/accumulation of salts/alters soil pH
- Destroys soil water/loss of soil water *(4 x ½ = 2 marks)*

10.
Nitrate ion/NO_3^-
Ammonium ion/NH_4^+ *(2 x ½ = 1 mark)*

11.
- To avoid prussic acid/hydrocyanic acid poisoning *(1 x 1 = 1 mark)*

12.
- Decomposition of organic matter to release plant nutrients
- Some fix nitrogen/sulphur into the soil
- Some produce toxic substances that help control soil borne diseases *(2 x ½) = 1 mark)*

13.
- **Hybrid** is bred by crossing inbred lines/varieties under controlled pollination
- **Composite** is bred by crossing a number of varieties under uncontrolled/open pollination *(Mark as a whole = 1 mark)*

14.
- Enhances seed germination
- Promotes soil microbial activities
- Improves quality of crop products
- Enhances vigorous growth and development
- Enhances high yields. *(3 x ½ = 1½ marks)*

15.
- Results in soil erosion
- Results in lodging of crops
- High evapotranspiration rates
- Spreads disease/pests/weeds *(2 x ½ = 1)*

16.
- Reduces surface run-offs/increases water infiltration into the soil
- Reduces evaporation rates *(2 x ½ = 1 mark)*

17.
(a)
- Reduces competition for light, space, nutrients, etc.
- Enables the seedlings to grow healthy and strong *(2 x ½ = 1 mark)*

(b)
- Encourages development of short, dense and strong rooting system for faster establishment after transplanting
- To facilitate lifting of seedlings/minimize root damage during transplanting *(2 x ½ = 1 mark)*

18.
- Reduce/remove shade
- Thinning to reduce overcrowding
- Reducing amount and frequency of watering
- Spraying with copper/appropriate fungicides *(2 x ½ = 1 mark)*

19.
- Suck plant sap causing wilting
- Some inject toxic saliva/secretions
- Lower quality of crop products
- Transmit disease agents
- Inflict wounds/openings which provide entry for secondary infections
- Lower crop yields *(4 x ½ = 2 marks)*

20.
- Amount of rainfall/rainfall intensity
- Slope/topography
- Type of soil
- Size of water shade/catchment
- Length of the slope
- Vegetation cover
- Wind velocity/strength of wind *(4 x ½ = 2 mark)*

21.
- When there are no alternatives/choices in enterprises
- When production resources are not limited/are abundant *(2 x ½ = 1 mark)*

SECTION B (20 marks)

22. (a) smut/maize smut/ear smut *(1 x 1 = 1 mark)*
(b) sugarcane/wheat/sorghum/barley/oats/millets/pasture grass *(1 x 1 = 1 mark)*

(c)
- Plant certified seed
- Crop rotation/close season
- Field hygiene/destroy crop residues
- Rogueing
- Hot water treatment
- Use of resistant varieties

(2x1 = 2 marks)

23. (a) to compare porosity/drainage/infiltration and water holding capacity of different soils *(1 x 1 = 1 mark)*

(b) A – Sandy soil
B – Loamy soil *(2 x ½ = 1 mark)*

(c)
- Adding organic matter
- Liming
- Sub soiling/proper tillage
- Draining away excess water *(2 x 1 = 2 marks)*

24. (a) Ridging *(1 x ½ = ½ mark)*

(b) Soil is dug in a continuous line; and heaped on the side(s); to form a bund/ridge
(3 x ½ = 1½ mark)

(c)
- Promotes tuber/root expansion/development
- Facilitates harvesting of root crops
- Conserves soil and water
- Facilitates drainage in water logged soils

(2 x 1 = 2 mark)

25. (a)
- Improves level of phosphorus and potassium in the manure
- Modifies soil pH to enhance microbial activities

(1 x 1 = 1 mark)

(b)
- Introduces micro-organisms required for decomposition of organic matter

(1 x 1 = 1 mark)

26.
(a) Calcium
(b) Nitrogen
(c) Potassium
(d) Phosphorus

(4 x ½ = 2 marks)

27.
(a) (i) Helps to maintain a uniform/level plucking table
(1 x 1 = 1 mark)

(ii) Facilitates air circulation/aeration to prevent fermentation of tea
(1 x 1 = 1 mark)

(b) (i) Staking
(1 x ½ = ½ mark)

(ii)
- enhances production of clean fruits/improves quality of fruits
- Helps in controlling diseases
- Facilitates spraying/weeding/harvesting of the crop
- Prevents infection by soil borne pests

(3 x ½ = 1½ marks)

SECTION C (40 marks)

28
(a) (i)
- Rose coco/GLP2
- Mwezi moja/GLP1004
- Canadian Wonder/GLP24
- K74
- Wairimu/Red haricot
- Mexican142
- Mwitemania

(2 x 1 = 2 marks)

(ii)
- Select varieties suited to the local ecological conditions
- Select dry and mature seeds
- Select sound seeds that are free from physical damage and wrinkles
- Dress seeds against soil borne pests and diseases
- Obtain seeds from a reputable source/certified seeds
- Inoculate seeds with the right strain of bacteria

(3 x 1 = 3 marks)

(iii)
- Plant at the beginning of rains/timely planting
- Make shallow farrows/holes at a depth of 3-5 cm using appropriate tool.
- Apply phosphatic fertilizer/DSP/SSP/DAP/MAP/manure during planting.

- Place 2-4 seeds per hole and cover it up with the soil/seed rate 50-60kg/ha.
- Spacing is 30-50cm by 10-15cm depending on variety.
- Shallow weeding is done to avoid root damage.
- Avoid weeding during flowering to prevent knocking off the flowers.
- Weed when the field is dry to avoid spread of diseases.
- Keep the field weed free in the early stages of growth. ***(5 x 1 = 5 marks)***

(b)

- Wear protective clothing
- Avoid inhaling the herbicide/spray along the direction of wind
- Read and follow the manufacturer's manual
- Avoid sucking or blowing blocked nozzles
- Was thoroughly after handling the chemical
- Store herbicides in a safe place away from children
- Equipment used should not be washed in water sources to prevent pollution
- Empty containers and left overs should be properly disposed to avoid danger to humans, livestock and environment
- Avoid chemical spillage to unintended places/where it may cause danger to human and livestock
- Thoroughly wash the equipment to avoid damage to crops/livestock in subsequent operations.
- Avoid eating or handling food before washing to prevent contamination/poisoning.

(10 x 1 = 10 marks)

29 (a)

- Modifies/regulates soil temperature through insulation effect
- Prevents water evaporation/retains water in the soil
- Prevents soil erosion/intercepts rain drops/reduces speed of run off/increases water infiltration
- Organic mulch decomposes into humus to release plant nutrients
- Organic mulches decompose to form humus which improves soil structure/water holding capacity/drainage/aeration
- Organic mulches buffer soil pH/improve cation exchange capacity

(5 x 1 = 5 marks)

(b)

- Mulching
- Application of organic manure/organic fertilizers
- Crop rotation
- Use of medicinal plant products to control diseases, pests and parasites
- Rearing of livestock on natural feedstuffs without use of chemical additives
- Physical/cultural/biological pest/weed/parasite/disease control

(5 x 1 = 5 marks)

(c)

- Development of early maturing crop
- Development of high yielding crop
- Makes the plant to assume the desired shape and size
- Can obtain two or more orange varieties on the same root stock
- Ensures uniformity of genetic/clonal characteristics
- Development of drought resistant crop
- Propagation of seedless orange varieties
- Development of tree plant that is less thorny
- Fast multiplication of desired crop/variety of oranges
- Development of disease resistant orange crop
- Repair/treatment of damaged parts of orange trees. ***(10 x 1 = 10 marks)***

30 (a)

- Short-term planning for quick decision to avoid losses when there is a crisis.
- Long-term planning based on studies and makes decisions on future plans and operations on the farm
- Collecting information relevant to the farm enterprises.
- Budgeting for future income and expenses as proposed in the farm plan
- Comparing standards of the farm/enterprises with the set standards and making appropriate adjustments
- Detects weaknesses and constraints and finds ways of overcoming them
- Keeps up to date records and uses them in daily running of the farm
- Implements farm decisions
- Guides and supervises the implementation of the farm plan
- Compares performance of the farm with that of other similar farms
- Makes predictions of the farm business
- Is the accounting officer on all financial transactions of the farm
- Takes responsibility for decisions made/bearing risks (10 x 1 = 10 marks)

(b)

- Loaning members to finance their farming activities
- Enlighten members on improved/improved/modern farming techniques/emerging issues
- Establish income generating activities for members
- Assist in marketing agricultural produce for members
- Buy farm inputs in bulk and sell to members at a low price
- Collectively assist members in their farm operations.
- Guarantees members for loans
- Gathering information on intended projects/activities
- Act as agents of change in the community

(5 x 1 = 5 marks)

(c)

- Clearing the bus using appropriate tool
- Primary cultivation using appropriate tool
- Secondary cultivation/harrowing to a fine tilth
- Plant at onset of long rains/when soil has adequate moisture
- Make drills 30cm apart and 1cm deep
- Apply phosphatic fertilizer/ASP/DAP/MAP during planting
- Sow seeds along the drills
- Cover and firm the seeds with soil ***(5 x 1 = 5 marks)***

30.14.2 Agriculture Paper 2 (443/2)

SECTION A: (30 marks)

1.

	Cattle	Pigs	Poultry
Young from birth/hatching to weaning	Calf	Piglet	
Young female before first parturition/laying	Heifer		Pullet
Mature male for breeding		Boar	Cock

(6 x ½ = 3 marks)

2. (a)

- Rinderpest/Cattle plague
- Foot and Mouth Disease
- Lumpy Skin disease

- Rift Valley fever
- Mad Cow disease

(2 x ½ = 1 mark)

(b)

- Newcastle
- Fowl pox
- Gumboro
- Bird flu/Avian flu
- Mareks disease

(2 x ½ = 1 mark)

3. (a) Liver fluke (Fasciola spp) - fresh water snail/*Limnea sp*
   (b) Tapeworm (Taenia spp) - pig/cattle

(2 x ½ = 1 mark)

4.

- It is highly digestible hence suitable for the digestive system which is not fully developed
- It is highly nutritious
- It contains antibodies enabling the young stock to resist early infections
- It has a laxative effect
- It is highly palatable

(4 x ½ = 2 marks)

5.

- Farmer is able to keep accurate records of milk yield
- Easy to regulate the amount of milk taken by the calf
- Cows produce milk even in the absence of the calves
- Allows for maintenance of high standard of hygiene during milking
- There is a possibility of the farmer selling more milk thereby maximizing profits

(4 x ½ = 2 marks)

6.

- Transmit the disease trypanosomiasis
- Suck blood thereby causing anaemia
- Their bites cause damage to skins
- Bites cause wounds which may act as routes for secondary infections by pathogens
- Cause irritation to the animal

(4 x ½ = 2 marks)

7.

- To help identify rams which have mated with ewes/those incapable of mating. OWTTE
- To identify ewes that have been served/fertile/those that are infertile/not served

(1 x 1 x 1 mark)

8.

- Ensures birth of a healthy calf
- Provides nutrients for maximum foetal growth
- Build up energy for parturition
- Increases and maintains high milk yield after birth/stimulates development of alveoli
- Promotes good health of the cow/mother
- Accustoms the cow to concentrate feeding

(4 x ½ = 2 marks)

9.

- Very high initial capital required for installation
- If the market is not large, it becomes uneconomical to install
- Water supply can become unreliable in case of prolonged drought e.g. seasonal rivers
- The river may change its course leading to wasted investment
- Not all farmers can afford the use of electric appliances
- Lack of skilled personnel
- Lack of rivers in some farms

(4 x ½ = 2 marks)

10.
- To reduce cost of repair/replacement
- To improve efficiency
- To prolong life of the wheelbarrow
- To reduce injury/accident incidences *(2 x ½ = 1 mark)*

11. (a) Bastard file is used for smoothing metal while rasp is used for smoothing wood
1 mark (mark as a whole) *(1 mark)*

(b) Coping saw is used for cutting curves in wood while hacksaw is used for cutting metal.
1 mark (mark as a whole) *(1 mark)*

12.
- East Cost Fever (E.C.F.) (Theileriosis)
- Anaplasmosis/gall sickness
- Coccidiosis
- Trypanosomiasis (Nagana)
- Trichomoniasis
- Corridor disease
- Heart water
- Red water (Babesiosis)
- Nairobi sheep disease
- Sweating sickness *(2 x ½ = 1 mark)*

13.
- Use of ropes/halters/casting
- Use of lead stick and bull ring
- Use of crush
- Use of head-yoke
- Use of holdings/isolation pen/yard

(4 x ½ = 2 marks)

14. (a) Incubation Period: - Is the duration between the time a disease causing organism infects/enters an animal and the time the first disease symptoms show.
(1 x 1 = 1 mark)

(b) Mortality rate: - Is the likelihood of death occurring in case of a disease outbreak which is expressed as a percentage of the affected animals that die.
(1 x 1 = 1 mark)

15.
- Change of milking routine
- Strange surroundings/strangers/sudden noise/storm
- Poor milking techniques
- Sickness
- Pain
- Long duration of milking *(2 x ½ = 1 mark)*

16.
- Have fairly high tolerance to high temperature
- Have considerable tolerance to tropical diseases
- Can walk for long distances in search of pastures and water
- Have ability to survive on low quality pasture/forage
- Are able to survive on less amount of food/water without seriously affecting performance

(4 x ½ = 2 marks)

17. (a)

- For air/oxygen circulation for embryonic gaseous exchange
- For air circulation to control humidity

(1 x 1 = 1 mark)

(a)

- Low humidity causes embryonic mortality due to loss of moisture
- High humidity lowers hatchability and produces abnormally bigger chicks which look marshy

(1 x 1 = 1 mark)

SECTION B (20 marks)

18. (a) A/squeezing technique *(1 x 1 = 1 mark)*

(b)

- Teat is grasped at base between the thumb and the index finger
- The other fingers are sequentially tightened starting with index fingers to compress the teat so as to expel the milk into a container
- All fingers are relaxed simultaneously to allow teat to be refilled and a new sequence begins
- Repeat the procedure

(4 x ½ = 2 marks)

(c)

- It is injurious and leads to formation of scar tissue/physical injury on the teat cistern
- The pulling effect leads to tearing of teat tissues making them more prone to bacterial invasion/mastitis
- Chances of milk contamination are high because the application of milking salve/teat dipping becomes necessary for lubrication

(2 x 1 = 2 marks)

19. (a)

B - Inner shell membrane
C - Outer shell membrane
D - Albumen/egg white
F - Chalaza

(4 x ½ = 2 marks)

(b)

- Texture/smoothness of the shell
- Absence of cracks on the shell
- Cleanliness/absence of blood stains
- Oval in shape

(2 x 1 = 2 marks)

(c)

Provides nutrients for the developing embryo/chick *(1 x 1 = 1 mark)*

20. (a)

Hoof trimming *(1 x 1 = 1 mark)*

(b)

- To prevent lameness/difficulty in walking
- To control foot rot
- To ease mating/tupping

(2 x 1 = 2 marks)

21. (a) (i) Fowl/Avian pox
(ii) Virus/Avian pox virus *(2 x ½ = 1 mark)*

(b)

- Watery discharge through eyes and nose
- Difficult breathing and swallowing

- Dullness
- Loss of appetite
- Emaciation *(2 x 1 = 2 marks)*

(c)

- Vaccination
- Removal & Killing of all affected birds
- Observe proper hygiene
- Isolation of affected birds *(2 x 1 = 2 marks)*

22. (a) Elastrator *(1 x 1 = 1 mark)*

(b) Stretching/opening/enlarging *(1 x 1 = 1 mark)*

SECTION C (40 marks)

23. (a)

- Behaviour of the animal – aggressiveness, over excitement produces abnormal sound, isolation
- Animal movement – limping/lameness. strained gait
- General appearance:- restless, dull, less alert or less response to touch/abnormal posture
- Skin/coat:- ruffled/starry coat/loss of hair/dull skin/parts peeling off/cracking/wounds/lesions/swellings
- Mucous membrane:- Dull red/pale/dry/having copious discharge
- Production/performance level:- sudden decline in production/performance/loss of weight and condition
- Pulse rate:- radical departure from the normal range
- Copious salivation
- Lachrymation/shedding tears
- Respiratory rate: abnormal/deviation from the normal range
- Body Temperature: abnormal temperature from the normal range/too high/too low
- Appetite and feeding: - Increased/lack of appetite/abnormal chewing/swallowing/feeding on abnormal food substances.
- urination: - abnormal urine colour/smell/consistency. Difficult urination/less or high frequency
- Defaecation process: - abnormal faecal matter in terms of consistency/smell/colour/ presence of parasites/egg segments/ blood stains/frequent

(Any 10 x 1 = 10 marks)

(b) Process of digestion in a non-ruminant

(i) Mouth

- Food is chewed to break and increase surface area for enzyme action
- Food is mixed with saliva which contains salivary amylase and lubricates the food
- Salivary amylase converts starch to Maltose

(2 x ½ = 1 mark)

(ii) Stomach

- Food is mixed with gastric juice/dilute hydrochloric acid/pepsin/rennin.
- Hydrochloric acid provides optimum pH for enzyme/rennin/pepsin activities and kills a micro-organisms ingested with food. Activates pepsinogen to pepsin
- Pepsin breaks down proteins to proteoses and peptones/peptides
- Rennin coagulates milk to increase the surface area for enzyme/pepsin action

(3 x 1 = (3 marks)

(iii) Small Intestines

- In the duodenum, food is mixed with bile and pancreatic juice (pancreatic amylase, lipase and trypsin)
- Bile emulsifies fats to increase the surface area for enzyme action.

Neutralizes food from stomach

- Pancreatic amylase converts starch to maltose
- Pancreatic lipase coverts fats to glycerol and fatty acids
- Trypsin converts proteins to peptones and peptides.
- In the rest of small intestines, food is mixed with intestinal juice/ erepsin/peptidase, maltase, sucrase/invertase & lactase enzymes)
- Erepsin/peptidase coverts peptones and peptides to amino acids
- Maltase coverts maltose to glucose
- Sucrase (invertase) converts sucrose to glucose and fructose
- Lactose coverts lactose to glucose and galactose
- Digested food materials are absorbed in the ileum
- Undigested and indigestible food materials then move to the large intestines for further digestion *(12 x ½ = 6 marks)*

24. (a) Benefits of using biogas

- Is a cheap source of energy
- Requires low running/maintenance costs
- Is versatile/can be put to many uses such as lighting, cooking, electricity generation, etc.
- Does not pollute the environment/environmental friendly
- Is a sustainable/renewable source of energy
- By products/fermented slurry is used as manure
- Can be income generating
- Raw materials are locally available *(5 x 1 = 5 marks)*

(b) Advantages of using a subsoiler

- It breaks hard pans
- It improves drainage/water infiltration
- It improves soil aeration
- It destroys deep rooted weeds
- It facilitates growth and development of root/deep rooted crops
- It loosens top soil and subsoil without bringing the subsoil to the surface to ensure conservation/minimum tillage/least soil pulverization. *(5 x 1 = 5 marks)*

(c) Factors affecting sitting of a bee hire

- Availability of water:- should be available within 3 km radius to facilitate collection by bees
- Availability of flowers: - should be readily available to facilitate collection of pollen and nectar by bees.
- Shelter:- should be protected from strong sun and wind
- Noise and other disturbances: should be free from noise and other disturbances
- Pests and diseases:- place should be free from pests and diseases
- Dampness and bad odours: - Site should be free from dampness and bad odours.

(Factors 5 x 1) (Explanations 5 x 1) *10 marks*

25. (a) life Cycle of beef/pork tape worm

- Mature segments/proglottids full of eggs are dropped with human faeces
- Eggs are then released from the segments
- Cattle/pigs ingest the eggs during grazing/feeding
- In the intestines, the eggs hatch into embryos
- The embryos penetrate the intestinal wall and enter the blood stream
- The embryos first localize in the liver
- From the liver, the embryos are distributed into the muscles in the body

- In the muscles, they become cysts/bladder worms/*crysticercus cellulosae*
- Human beings get infected when they eat raw/under cooked beef/pork with the cysts
- In the human small intestines, the cyst wall dissolves, the bladder worms emerge and attach on the intestinal wall.
- They then develop into adult worms and start laying eggs.
  - (mark until the order is broken)

(10 x 1) ***(10 marks)***

(b) Process of egg formation

Ovary

- Produces the ovum ***(2 x ½ = 1 mark)***

Funnel/Infundibulum

- Receives the ova
- Chalazae are added and the egg moves to the magnum
- Fertilization occurs here
- Funnel stores the sperms ***(5 x½ = 2½ marks)***

Magnum

- Thick Albumen is added and the yolk moves into the isthmus ***(2 x ½ = 1 mark)***

Isthmus

- Addition of albumen is completed/thick albumen is added
- Water mineral salts and vitamins are added
- Shell membranes are also added and the egg moves to the uterus ***(4 x ½ = 2 marks)***

Vagina

- Egg is temporarily stored
- Egg is inverted to be laid with the broad end first
- Egg is lubricated here ***(4 x ½ = 2 marks)***

Uterus/shell gland

- Shell is added around the egg/ it contains calcium deposits
- Shell pigmentation occurs here ***(3 x ½ = 1½ marks)***