4.15 Agriculture Paper 1 (443/1)

SECTION A (30 marks)

1. reasons for inter-cropping

- Conserve soil/water (cover cropping);
- Maximise production;
- Maximise utilization of nutrients in the soil;
- Control weeds;
- Control pests/diseases;
- Diversification/spread risks
- Maximise labour utilisation/save costs on labour.
- Improve soil fertility if legumes are included.
- Maximise utilisation of land.

\[4 \times \frac{1}{2} \quad 2\text{ marks}\]

2. Advantages of intensive farming

- Increases production per unit area;
- Farm supervision is easy;
- Maximises utilization of available land;
- Ideal for densely populated areas/small land holdings;
- Utilizes technology to increase production.

\[4 \times \frac{1}{2} \quad 2\text{ marks}\]

3. reasons for early land preparation

- Allow time for weeds to dry and decompose;
- Allow for proper soil aeration;
- Allow timely planting / subsequent operations;
- Allow time for soil clods to disintegrate/soften.

\[4 \times \frac{1}{2} \quad 2\text{ marks}\]

4. reasons for deep ploughing

- Facilitates aeration;
- Facilitates drainage;
- Breaks hard pans/facilitates water infiltration;
- Bring up previously leached nutrients;
- Facilitate development of deep rooted crops;
- Expose lower soil layers to weathering;
- Expose soil borne pests and disease agents.
- Remove deeply rooted weeds.

\[4 \times \frac{1}{2} \quad 2\text{ marks}\]
Conditions for purely competitive market

- Large number of sellers;
- Large number of buyers;
- Homogeneous product;
- Same price for the product;
- Free entry and exit from the market;
- Buyers and sellers have perfect knowledge of market trends.

Mark as a whole: 2 x \(\frac{1}{2}\) = 1 mark

6. Grading - is the sorting of the produce into different lots, each with the same characteristics/market quality while Standardization is the establishment of uniformity in the quality and quantity of the product.

Mark as a whole: 2 marks

7. Benefits of agroforestry to a maize crop.

- Leguminous trees fix nitrogen into the soil;
- Trees act as windbreaks;
- Trees stabilize soil against soil erosion;
- Leaf litter decompose to form humus/recycle nutrients;
- Trees improve and act as water catchment areas/conserve water.

Mark as a whole: 4 x \(\frac{1}{2}\) = 2 marks

8. Intensive hedgerow: trees or shrubs are planted between rows of crops.

Border planting: trees or shrubs are planted on the borders of the farm.

Mark as a whole: 2 marks

9. (a) Mixed cropping: Is the growing of two or more crops on the same field but on different sections.

(b) Monocropping: Is the growing of only one type of crop.

(c) Intercropping: Is the growing of two or more crops in the same field at the same time.

Mark as a whole: 3 x 1 = 3 marks

10. Advantages of timely planting

- Disease and pest control;
- Benefit from nitrogen flash;
- Weed control;
- Maximises rainfall utilization by the crop;
- Crop matures early when market prices are high/high demand.

Mark as a whole: 4 x \(\frac{1}{2}\) = 2 marks
11. Advantages of row planting

• Field operations can be mechanized;
• Easy to establish plant population;
• Low seed rate than broadcasting;
• Facilitates cultural practices/accept specific practices;
• Ensures proper spacing
• Ensures uniform germination of seeds.

4 x ½ = 2 marks

12. Importance of a nursery

• Many seedlings can be produced in a small area;
• Facilitates timely routine management practices;
• Provides best conditions for growth of seedlings;
• Small seeds and delicate seedlings grow into healthy and vigorous seedlings to facilitate transplanting;
• Reduced growth period in the field;
• Excess seedlings can be sold for income;
• Facilitate selection of healthy and vigorous/true to type seedlings for transplanting.

4 x ½ = 2 marks

13. Monopoly:- Market dominated by only one seller;

Monopsony:- Market dominated by only one buyer.

Mark as a whole = 2 marks

14. (a) Cassava: - stem cuttings/stems
(b) Sisal: - Bulbils
- Suckers
(c) Pyrethrum: - Splits
(d) Sweet potatoes: - Vines/stem cuttings

4 x ½ = 2 marks

15. Characteristics of a good vegetable seedling

• Free from disease/pest/healthy;
• Vigorous growing;
• Free from physical deformities;
• High yielding;
• Correct stage of growth/height 10 - 15 tall/4 - 6 true leaves.

4 x ½ = 2 marks
16. (a) Sprinkler/overhead irrigation.
   • Cleaning after use;
   • Unblocking blocked nozzles;
   • Lubricating rotating parts;
   • Repairing/replacing broken/worn out parts;
   • Proper storage after use;
   • Oiling to prevent rusting;
   • Tighten loose nuts.

17. (a) Drip irrigation does not wet the foliage hence controls fungal diseases

18. (a) Ledger

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<th>Particulars</th>
<th>Folio</th>
<th>Amount</th>
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<td>10/1/11</td>
<td>Sold 100 trays of eggs</td>
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   • Date - \( \frac{1}{2} \)
   • Particulars - \( 2 \times \frac{1}{2} \)
   • Amounts - \( 2 \times \frac{1}{2} \)
   • Folio - \( \frac{1}{2} \)

19. (a) A - Increasing returns production function curve.
   B - Constant returns production function curve.

(b) The Law of diminishing returns.
If successive units of one variable input are added to fixed quantities of other inputs, a point is reached where additional (marginal/extra) product per additional unit of input declines.

(c) (i) B

The Law of diminishing returns.
20. (a) **Macro-nutrients:**
- Calcium;
- Nitrogen;
- Phosphorous;
- Carbon;
- Sulphur;
- Magnesium.

**Mark as a whole** 1 mark

(b) **Micro-nutrients:**
- Copper;
- Molybdenum;
- Zinc;
- Iron.

**Mark as a whole** 1 mark

(c) **Fertilizer elements:** Nitrogen, Phosphorus & Potassium.

**Mark as a whole** 1 mark

(d) **Liming elements:** Calcium; Magnesium and Sulphur.

**Mark as whole** 1 mark

**SECTION C (40 marks)**

21. (a) **Cultural soil and water conservation**

- Grass/Filter strips: reduce speed of flowing water/filter soil;
- Cover cropping: prevents surface flow/reduces impact of rain drops/prevents evaporation/volatilization;
- Contour farming: creates ridges of soil which hold up water/reduce speed of run-off;
- Mulching: reduces impact of rain drops/prevents evaporation/surface run-off;
- Rotational grazing: allows grass to recover for soil and water conservation;
- Crop rotation: maintain soil cover for protection against erosion/improves soil structure thus increasing infiltration;
- Inter cropping: provides adequate cover on the soil;
- Strip cropping: the different strips reduce speed of run-off/filter soil;
- Grassed/vegetated waterways: slow the speed of water/trap eroded soil;
- Afforestation/Re-afforestation: Act as water catchments/stabilizes soil/canopy intercepts raindrops/wind;
- Agroforestry - stabilises soil/canopy intercepts raindrops/act as water catchment/wind;
- Use of manures/fertilizers: Promotes vegetative growth which covers soil against evaporation and erosion;
- Correct spacing of crops: Ensure adequate soil cover.

8 x 1 8 marks

(b) (i) **Shortage of labour;**
Lack of motivation to invest in agriculture


Increased cost of living leading to lack of resources for Agricultural production.

- Government and NGOs are spending a lot of time and resources controlling the disease instead of investment in agriculture.
- Lack of market for agricultural produce.

### (ii)
- Establishment of national food security policy to supply free farm input to farmers to improve production;
- Facilitate soil conservation;
- Imposes laws to regulate quality of agriculture products;
- Imposes laws to regulate production and sale of agricultural produce to ensure sustainability;
- Imposes high taxes on imported agricultural products;
- Providing subsidies on agricultural inputs, e.g. fertilizers;
- Establishment of government agencies to supply inputs and market agricultural products;
- Construction of bulky handling and storage facilities for agricultural products;
- Funding research into new and improved agricultural production technologies;
- Ensures control of parasites/diseases/weeds is done effectively;
- Provision of extension services/education.

### (iii)
- Improper timing of routine practices;
- Lack of agricultural skills
- Low production of low quality;
- Inappropriate decision making e.g. disease observation and control;
- Delayed adoption of new and improved production technologies.
- Lack of knowledge to apply / types and / of inputs;
- Inability to collect market information.

### 22. (a) Physical Pest Control
- Use of lethal temperature to kill the pests;
- Proper drying of produce to make it hard for pest to penetrate;
- Flooding drowns and kills pests;
- Suffocation to kill the pests in air tight containers;
- Physical killing of the pests /trapping and killing;
- Use of scarecrows /scaring away the pests;
- Use of physical barriers to prevent infestation by the pests;
- Use of electromagnetic radiation to kill the pests.

### (b) Factors for competitive ability of weeds
- Some produce large seed quantities to enhance survival chances;
- Some remain viable in the soil for a long time to await favourable conditions to germinate;
- Some are easily and successfully dispersed to enhance chances of survival;
Some have ability to propagate vegetatively into new plants;
- Some have extensive root system to enhance survival in drought conditions;
- Some have adaptations to survive where water/nutrients are limited through water and food storage modifications;
- Some have a short life cycle which is completed early before adverse climatic conditions set in;
- Some irritate animals as a protective measure against grazing, trampling/some are tolerant to pests and diseases;
- Some are heavy feeders they make food faster than crop establishes.
- Some weeds have allelopathic effects which suppresses growth of other plants enhancing their survival.

8 x 1 8 marks

(b) Harvesting of Coffee

- Pick red ripe berries/cherries;
- Spread the berries on sisal mats and sort them out into Grades 1, 2 and 3 (Mbuni);
- Deliver grades 1 and 2 to the factory for pulping same day;
- Dry grade 3;
- Deliver grade 3 to factory at the end of harvesting season;
- Picking interval of 7 - 14 days.

5 x 1 5 marks

23. (a) Stem cuttings for Napier grass

- Select cuttings from a desirable variety;
- Select cuttings from healthy and high yielding mother plants;
- Make cuttings with 2 - 3 nodes;
- Place cuttings in planting holes in a slanting manner;
- Cover two nodes underground and one node above the ground.

5 x 1 5 marks

(b) Production of onions

(i) Clear the land;
- Prepare the land early;
- Plough/dig deeply and eradicate all weeds;
- Harrow to a moderate tilth/fine tilth/appropriate tilth. 3 x 1 3 marks

(ii) Thinning in directly planted crops to reduce competition;
Weeding should be done carefully so as not to damage shallow roots.
- Remove excess soil from root region.
- Do not compact the soil around the bulb;
- Top dress with nitrogenous fertilizer/CAN at a rate of 250 Kg per ha three months after planting;
- Spray with appropriate pesticide/chemical to control pests especially thrips;
- Spray with fungicides or practice crop rotation to control fungal diseases;
- Watering during dry spell/season.

4 x 1 4 marks
(iii) Harvest after 5 months:
- Harvest when leaves start drying;
- Break or bend the tops at the neck to hasten withering;
- Dig up the bulb and leave them to dry under shade;
- Turn daily to ensure uniform drying;
- Store in slatted boxes;
- Leave bulb to dry under shade.

(c) reasons for land Consolidation

- Proper supervision
  Saves time and travel costs between plots;
- Easy to offer extension services on the actual and on-spot inspection of land;
  Encourages sound farm planning and adoption of crop rotation programmes;
- Encourages soil conservation and land improvement;
  Encourages mechanization due to enlarged holdings;
- Encourages construction of permanent structures/undertake long term project investments;
- Enhances weed, pest and disease control.
SECTION A: (30 MARKS)

1. • Dusting the birds with insecticide - sodium floride.
• Observing good hygiene.
• Fumigation/smearing the affected perches with volatile insectides.
• Picking and killing.

   \[4 \times \frac{1}{2} = 2 \text{ marks}\]

2. • The doe throws herself on its side.
• Frequent urination.
• Vulva turns red and swells.
• Doe becomes restless.
• Doe rubs her body against the wall.
• Peeping/contacting other rabbits in adjacent hutches.

   \[3 \times \frac{1}{2} = 1 \frac{1}{2}\]

3. • Crushing and straining /squeezing method.
• Heating method.
• Use of centrifugal extractor.

   \[3 \times \frac{1}{2} = 1 \frac{1}{2}\]

4. • Hens stop laying eggs.
• Hens sit on eggs for long periods /continuously.
• Hen plucks off feathers to make a nest.
• Hens are aggressive when approached/walks with wings open.
• Characteristics cracking sound.

   \[3 \times \frac{1}{2} = 1 \frac{1}{2}\]

5. (a) Oxytocin effects last for five to seven minutes;
   (b) Milk let-down is initiated when the milking time is reached;
   (c) Prevent drying off/prevents reducing in yield/prevents mastitis infection.

   \[3 \times \frac{1}{2} = 1 \frac{1}{2}\]

6. • Sight of calf
• Washing/massaging the udder.
• Feeding
• Sounds associated with milking.
• Sticking to a regular milking routine.
• Sight of milkman

   \[4 \times \frac{1}{2} = 2 \text{ marks}\]

7. • Presence of sores/wounds on the skin.
• Irritation/scratching by the animal
• Loss of hair/alopoeia.
• Anaemia
• Presence of various developmental stages of the parasite on the animal.

   \[4 \times \frac{1}{2} = 2 \text{ marks}\]
8. • Reduction of vigour in animals/loss of hybrid vigour/heterosis.
• Quality of products is lowered.
• Reduction in disease resistance ability.
• Appearance of undesirable hereditary defects.
• Increase in abortion/embryonic mortality.
• Decline in fertility
• Reduced production.

9. • Cheap source of protein for the family.
• Require little land and is possible where land is limiting.
• Quick source of income for the farmer.
• Makes fish to be available within the locality.

10. • Allow for even distribution of fat in the body.
• Control breeding.
• Increasing growth rate.
• To make them docile.
• Control breeding diseases.

11. • Checking for abnormalities/candling.
• Selecting eggs of the right size/weight.
• Cleaning/wiping off dirt.
• Sorting and grading.

12. • Do not make half-cuts/make complete cuts.
• Shear sheep during the dry warm season.
• Do the operation on a clean dry floor/use clean shearing equipment.
• Do not cut body parts.
• Use clean shearing equipment

13. • Foundation of the building.
• The floor slab/floor.
• The Lintel.
• Pillars.
• Walls.

14. • Ratio of energy to protein in the feedstuff
• Form in which the feed is fed to the animal/method of feed preparation.
• Chemical composition of the feedstuff.
• Species of the animal.
• Amount of feed already present in the digestive system of the animal.
• Rate of feeding/frequency of feeding.

15. • Lack of calcium in the feed
• Disease attack such as Newcastle

4 x 1 = 2 marks

2 x 1 = 1 mark

2 x 1 = 1 mark

1 x 2 = 1 mark

4 x 1 = 2 marks

4 x 1 = 2 marks

2 x 1 = 1 mark
16. Topography/slope of land should be gently sloping.
   • Reliable water source.
   • Area with cracks/anthills should be avoided.
   • Soil type/site should be free of gravel/stone/sand/preferably clay soil.
   • Secure from predators and thieves.
   • The site should be accessible.

17. Disadvantages of fold system:
   • Few birds per unit area.
   • Laborious in moving the folds.
   • Difficult to keep individual bird production records.
   • Produces dirty eggs.
   • Fold breaks easily due to constant movement.

18. Dehorning methods:
   • Use of sharp knife.
   • Burdizzo and knife.
   • Rubber ring and elastrator.
   • Use of hot iron.

SECTION B: (20 marks)

19. (a) A - Reticulum/Honey comb.
    B - Rumen/pauch.

   (b) A: - Separating fine and course food materials.
       - Retaining indigestible food materials.

   C: - Absorption of water.
       - Grinding and sieving food particles
       - Temporary food storage

   (c) Pepsin/Renin

20. (a) K - Urethra
    L - Testes/testis

   (b) Epididymis - stores sperms
       Seminal Vesicles - Secrete seminal fluid in which sperms move.
21. (a) Check egg abnormalities
   - Monitor chick development during incubation
   - Check whether the egg is fertile

   (b) • A large dark section of developing chick.
        • A small clear section of air space.

22. (a) F - Toe
     G - Blade

   (b) • Sharpening of teeth regularly to improve efficiency.
        • Regular cleaning after use to remove dirt.
        • Setting the teeth to maintain cutting angles.
        • Apply oil before storage to prevent rusting.

23. (a) A Ridger/mould board ridger.

   (b) (i) To make ridges/furrows
        (ii) • used to attach the implement to a tractor.
             • Adjusting the depth of operation.

SECTION C: (40 marks)

24. (a) reasons for keeping livestock healthy

   • Good health ensures a long economic and productive life.
   • Healthy animals give maximum production/high performance.
   • Healthy animals grow fast and reach maturity early.
   • Healthy animals produce quality products which fetch good prices.
   • Healthy animals do not spread diseases to other animals/human beings.
   • Healthy animals are economical to keep/reduce production costs.

   Any 5 x 1 = 5 marks

(b) Symptoms of roundworm attack.

   • Anorexia/loss of appetite under heavy infestation.
   • Stiff dry coat or starring coat
   • Dehydration and pale mucosa.
   • Eggs and adults are seen in faeces
   • General emaciation
   • Animal may diarrhoea
   • Anaemic condition when infestation is heavy
   • Pot-bellies especially in young animals.
   • Coughing.

   7 x 1 = 7 marks
Control measure for cannibalism

- Avoid bright light in the house.
- Avoid overcrowding.
- Provide balanced diet.
- Control external parasites.
- Hang vegetables in the house to keep birds busy.
- Debeak birds which peck at others.
- Cull perpetual cannibals/birds with prolapse.
- Provide adequate equipment feeders, waters, perches.
- Avoid introduction of new birds in the stock.

8 x 1 = 8 marks

25. (a) **Body conformation features of a dairy heifer.**

- Straight topline.
- Have large and well developed udder with large teats.
- Have large stomach which makes them heavy feeders.
- Have prominent milk veins.
- Have less flesh on their bodies/lean bodies.
- Have well set hind quarters to allow room for large udders.
- Prominent pin bones.
- Wedge shaped.
- Long thin neck.

Any 5 x 1 = 5 marks

(b) **disadvantages of live fences**

- May take long to establish into an effective fence.
- Not effective in sub-dividing land into paddocks/occupies a large space.
- May harbour pests.
- May create hiding places for thieves, wild animals and vermin.
- May be labour demanding to trim and infill regularly.
- May have shading effects on crops/competition for nutrients, moisture.
- May leave gaps which allow animals and thieves to pass through.
- Some may injure both livestock and the farmer.

(7 marks)

(c) **How a four stroke cycle Engine works**

- Induction stroke/intake
  - Piston moves down the cylinder causing the inlet valve to open drawing in fresh supply of petrol vapour and air into the cylinder.
- Compression stroke
  - The inlet valve closes and the piston moves up the cylinder. This compresses the fresh fuel mixture in the combustion chamber.
- Power Stroke/ignition
  - A spark is produced at the spark plug. This causes the fuel mixture to ignite and expand resulting in pressure that forces the piston to move down the cylinder.
  - Both valve closed.
Exhaust stroke:
- The piston moves up the cylinder to eliminate the burnt fuel mixture through the open exhaust valve.

Any 4 x 2 = 8 marks

26. (a) Management practices on calves

- Culling highly susceptible calves.
- Spraying with appropriate acaricides to control external parasites/ticks.
- Drenching with anthelmintics to control internal parasites.
- Vaccinate as appropriate against diseases.
- Castration of males not required for breeding.
- Identification at the appropriate age to facilitate record keeping.
- Removal of any extra teats if more than four.
- Debulking/Dehorning.
- Proper feeding of the calf.
- Treat the sick.
- Isolate the sick calves.
- Maintenance of hygiene.

Any 7 x 1 = 7 marks

(b) Brucellosis

(i) Causal organism
- Bacterial/Brucella abortus/mellitensis/suis/sp

1 x 1 = 1 mark

(ii) Animals affected
- Cattle
- Sheep
- Goats
- Pigs

2 x 1 = 2 marks

(iii) Symptoms
- Spontaneous abortion/premature births.
- Retained placenta.
- Infertility in females.
- Low libido in males.
- Orchitis/inflamed testis.
- Yellowish/brown slimy discharge.

(iv) Control
- Use of A.I.
- Culling/slaughter and properly dispose the carcass.
- Vaccination.
- Avoid contact with aborted foetus.
- Blood test to detect infected animals.
- Observe proper hygiene.