4.15 AGRICULTURE (443)

4.15.1 Agriculture Paper 1 (443/1)

Section A (30 marks)

1.
- Less soluble;
- Promote root development;
- Lack/slight scotching effect;
- Have long residual effects;
- Not easily leached. $4 \times \frac{1}{2}$ (2 marks)

2.
- Mode of feeding/biting/chewing/piercing;
- Stage of growth of the crop;
- Crop attacked;
- Where they are found/field/storage;
- Stage of pest development;
- Scientific classification/biological classification;
- Level of damage/major or minor;
- Crop part attacked. $4 \times \frac{1}{2}$ (2 marks)

3.
- Landless can rent land;
- Idle land is put to agricultural production;
- Reduces disputes over land ownership and use;
- Ensures equitable distribution of land as a resource;
- Landlords can earn income from tenants;
- Tenants can vary land size depending on production. $4 \times \frac{1}{2}$ (2 marks)

4.
- Apiculture - rearing of bees;
- Aquaculture - rearing of fish in fish ponds. (1 mark)

5.
- Type of animal used
- Type of feed eaten
- Type of litter used
- Age of farmyard manure;
- Method of storage;
- Species of animal. $4 \times \frac{1}{2}$ (2 marks)

6.
- Encourages variation hence hybrid vigour;
- Easy to store and handle /less bulky;
- Easy to control pests and diseases;
- Planting can easily be mechanized;
- Can be stored for long without loosing viability. $4 \times \frac{1}{2}$ (2 marks)

7.
- Small size of the land;
- Lack of adequate capital;
- Lack of skilled labour to handle machinery/use of a jembe requires less skills;
- Steep terrain/landscape that cannot be mechanised.
- High soil moisture content. $4 \times \frac{1}{2}$ (2 marks)

8.
- Stage of harvesting/leaf stem ratio;
- Forage species;
- Storage structure;
- Weather condition during drying/length of drying period;
- Presence of foreigh materials. $4 \times \frac{1}{2}$ (2 marks)

9.
- Name/number of the sire/dam;
- Date of service;
- Expected date of calving;
- Actual date of calving;
- Sex of the calf;
- Weight of the calf;
- Breed;
- Service number;
- Date of pregnancy diagnosis;
- Remarks column. $5 \times \frac{1}{2}$ $(2\frac{1}{2}$ marks)

10.
- Determine soil PH/determine type of fertilizer to use/type to grow;
- Determine nutrient content/amount of fertilizer to apply. $2 \times \frac{1}{2}$ (1 mark)

11.
- Floriculture;
- Pomoculture;
- Olericulture. $3 \times \frac{1}{2}$ $(1\frac{1}{2}$ marks)

12.
- Protection against strong sun/regulate temperatures;
- Intercept rain drops/hail stones/control soil erosion;
- Protection against wind;
- Reduces moisture loss. $2 \times \frac{1}{2}$ (1 mark)

13.
- Boundaries;
- Terraces;
- River banks;
- Steep slopes;
- Homestead. $4 \times \frac{1}{2}$ (2 mark)

14.
- Follow manufacturer's guidelines;
- Wear protective clothing;
- Spray in a cool and calm weather;
- Should not spray against the wind direction/avoid inhaling;
- Proper storage of herbicides;
- Proper disposal of empty herbicide containers;
- Proper cleaning after handling;
- Should not suck blocked nozzles;
- Should not smoke or eat when spraying. $4 \times \frac{1}{2}$ (2 marks)

15. • When it is not required in the cabbage field;
• When its disadvantages outweigh the advantages in the cabbage field.
$2 \times \frac{1}{2}$ (1 mark)

16. • Broad leaved weeds;
• Narrow leaved weeds;
• Perennial weeds;
• Annual weeds;
• Biennial weeds;
• Monocotyledonous;
• Dicotyledonous weeds. $4 \times \frac{1}{2}$ (2 marks)

17. • Application of herbicides/pesticides/chemicals;
• Poor cultivation practices (overcultivation, cultivation along river banks, cultivation down slope, clean weeding;
• Use of inorganic fertilizers;
• Over grazing;
• Watering animals directly in water sources;
• Washing agricultural machines in water sources. $4 \times \frac{1}{2}$ (2 marks)

Section B (20 marks)

18. (a)

Method I

Nitrogen - 10%;
Quantity of fertilizer applied;

10 kg N is in 100 kg of the fertilizer;
180 kg N - $\frac{180 \times 100}{10}$ = 1800 KgN
= 1800 kg x 3 hectares;
= 5400 kg of fertilizer.

Method II

1 ha = 180 KgN ∴ 3 ha = 180 kg x3 = 540 kg

10 kgN are contained in 100 kg of the fertilizer.

540 KgN is contained in

$\frac{540}{10} \times 100 = 5400$ kg fertilizer

(3 marks)

(b) 10 Nitrogen percentage; 10% N
20 Phosphorous percentage; 20% P_2O_5 2 x 1 (2 marks)

19. (a) Aerial layering/marcotting. (1 mark)

(b) - Select a healthy woody branch;
- Remove the bark and cambial layer from a section of the branch/ring back the branch;
- Heap moist rooting medium around the section;
- Wrap the rooting medium with a polythene sheet;
$4 \times \frac{1}{2}$ (2 mark)

(c) - Gives a large planting material;
- Obtain planting materials from branches that cannot easily bend bend/woody stems/ branches high up the stem. 2 x 1 (2 marks)

20. (a) A - Row planting. (1 mark)

(b)
- Operations can be mechanized;
- Easy to establish plant population;
- Uses less planting materials;
- Easy to carry out cultural practices.

2 x 1 (2 marks)

(c)
- Soil type - light soils require greater depth;
- Soil moisture content - wet soils require shallow depth;
- Size of the seed - large seeds require greater depth;
- Type of germination - epigeal germination requires shallow depth.

2 x 1 (2 marks)

21. (a) Maize smut/smuts; (1 mark)

(b)
- Ensure field hygiene;
- Use of resistant varieties;
- Rogueing;
- Crop rotation;
- Use of certified seeds. 3 x 1 (3 marks)

(c) Fungal disease (1 mark)

Section C (40 marks)

22. (a) (i)
- Rainfall reliability - determine the timing of land preparation and planting;
- Amount of rainfall - determines the type of crop to grow;
- Rainfall distribution - influences the type and variety of crops to grow in an area;
- Rainfall intensity - high rainfall intensity damages crops and causes soil erosion.

4 x 2 (8 marks)

(ii)
- Light intensity - The rate of photosynthesis increases with increase in light intensity;
- Light duration - determines flowering, hence the type of crops to grow i.e. short-day, long-day or day-neutral plants;
- Light wavelength - Plants absorb light of specific wavelength making natural light more suitable for crop production.

2 x 2 (4 marks)

(b) (i) Land preparation
- Level the field;
- Construct/repair bunds around the levelled field;
- Flood the field;
- Using tractor drawn rota/rotavator work the field in preparation for transplanting.

2 x 1 (2 marks)

(ii) Water control
- Flood the field to a depth of 7.5 - 10 cm for 4 days;
- Drain to leave water to a depth of 5 cm at transplanting;
- Gradually manage the depth of water to 15 cm when the seedlings are fully grown/maintain water level to $\frac{1}{3}$ the height of the crop;
- Allow water to flow slowly through the field/change the water every 2 - 3 weeks.
- Drain the water completely 2 - 3 weeks before the start of harvesting.

2 x 1 (2 marks)

(iii) Fertilizer application
- Sulphate of ammonia at 25 kg for each nursery unit of 18.5 m x 18.5 m;
- DSP broadcasted in the field at 120 kg per ha;
- SA at 125 kg/ha just before transplanting;
- SA at 125 kg/ha 40 days after transplanting.

2 x 1 (2 marks)

(iv) Weed control
- Flooding;
- Uprooting;
- Use of herbicide (propanyl/Daconyl/Butachlor)/chemicals.

2 x 1 (2 marks)

23. (a) Factors that increase demand for tea on the market:
- Population increase leads to increased consumption of tea;
- Increase in income of tea consumers;
- Increase in preference and taste for tea;
- Increase in the price of related goods/substitutes;
- Advertisement promotes the sale of tea;
- Future expectations or uncertainty e.g. shortage makes consumers to buy and stock;
- Improved quality of tea;
- Price expectation i.e future increase in the price increases the demand for tea;
- Reduced taxation makes it affordable to more consumers.

Factor 5 x 1; Explanation 5 x 1 (10 marks)

(b) Ways of improving labour productivity on the farm:
- Training;
- Giving incentives/improving terms and conditions of service;
- Farm mechanization;
- Labour supervision;
- Proper remuneration;
- Assigning tasks according to skills.

4 x 1 (4 marks)

UPENDO FARM					
Liabilities	**Sh**	**Cts**	**Assets**	**Sh**	**Cts**
Wages payable	5,000	00	Cash in hand	15,000	00
			Cash in bank	52,000	00
Debts payable	26,000	00	Debts receivable	18,000	00
			Beans in store	40,000	00
Interest payable	8,000	00	Layers	80,000	00
			Calves	75,000	00
Taxes payable	3,000	00	Beef cattle	240,000	00
			Machinery	250,000	00
Bank loan	725,000	00	Buildings	310,000	00
			Land	550,000	00
Total liabilities	767,000	00			
NET WORTH	863,000	00			
TOTAL	**1,630,000**	**00**	**TOTAL**	**1,630,000**	**00**

24. (a)
- Watering early in the morning and late in the evening during dry weather conditions;
- Gapping to ensure optimum plant population;
- Weed control to reduce competition;
- Staking to support the plants off the ground to prevent fungal diseases;
- Mulching to conserve moisture and smother weeds;
- Top dressing with CAN or SA at rate of 20 kg N per ha;
- Pruning to control upward growth and encourage development of large fruits;
- Pest control using appropriate pesticides to prevent destruction of plants, flowers and fruits;
- Disease control - spray with appropriate fungicides to control tomato blight;
- Rogueing of plants infected by bacterial wilt;
- Regular watering and appropriate fertilizer application to control blossom-end rot;
- Harvesting by picking ripe fruits for canning or as a reddish colour starts to appear for the fresh market;
- Earthing up to facilitate drainage, support the plants and prevent soil erosion.

12 x 1 (12 marks)

(b)
(i) Splash erosion/rain drop erosion - rain drops hit the soil surfaces, detach and transfer soil particles;

(ii) Sheet erosion - Surface flow of water removes thin layers of soil from flat or gently sloping land;

(iii) Rill erosion - The concentration of water flowing down the slope removes soil in small channels or streamlets;

(iv) Gulley erosion - Develops from rill erosion. The small channels gradually becomes deeper and wider to form deep and wide ditches (gullies) due to the effect of running water.

(v) River bank erosion - Occurs when there is heavy down pour upstream in the immediate catchment area and damages the banks depending on the volume, speed and load of water.

Type of erosion 4 x 1; Description 4 x 1 (8 marks)

4.15.2 Agriculture Paper 2 (443/2)

SECTION A (30 marks)

1.
- Newzealand white/Kenya white
- California white
- flemish giant
- chinchilla
- rex
- angora
- earlops

(4 x $\frac{1}{2}$ = 2 marks)

2.
- large/heavy
- brown
- clean
- smooth shelled
- oral/normal shaped
- fresh
- handling quality

(4 x $\frac{1}{2}$ = 2 marks)

3.
- succulent roughages
- dry roughages

(2 x $\frac{1}{2}$ = 1 mark)

4.
- loss of hybrid vigour/performance
- decline in fertility
- reduced production
- high rate of pre-natal mortality
- weak inferior animals

(4 x $\frac{1}{2}$ = 2 marks)

5.
(a) calcium
(b) lignin/fibre/cellulose

(2 x $\frac{1}{2}$ = 1 mark)

6.
- Even fat distribution in the body
- Facilitate mating
- Avoid incidences of blowfly infestation

(2 x $\frac{1}{2}$ = 1 mark)

7.
- Depression
- Respiratory distress
- Dullness
- Drooping wings
- Sleepy eyes
- Pale and shrunken combs and wattles
- Greenish-yellow diarrhoea
- Death within a few days

(4 x $\frac{1}{2}$ = 2 marks)

8.
- Drift lambing is where all the pregnant ewes are put together in one paddock and are separated as they lamb down.
- Pen lambing is where pregnant ewes are only separated from others after showing signs of lambing.

(Mark as a whole) (2 marks)

9
- Sex
- Colour
- Age
- Physiological condition eg pregnancy, lactation;
- Physical injuries

(4 x $\frac{1}{2}$ = 2 marks)

10.
- Stage of lactation
- Age of the animal
- Breed
- Nutrition
- Health
- Completeness of milking
- Season of the year
- Physiological condition eg. emaciation, pregnancy, sickness.

(4 x $\frac{1}{2}$ = 2 marks)

11.
- Shearing of infested sheep
- Routine dipping/spraying with appropriate pesticide/insecticide/acaricide
- Proper hygiene

(2 x $\frac{1}{2}$ = 1 mark)

12.
- Repair worn out parts eg. pipes
- Clean dirty covers
- Tighten loose nuts and bolts
- Replace wornout/lost parts eg nuts and bolts

(2 x $\frac{1}{2}$ = 1 mark)

13. (a) Toggenburg ($\frac{1}{2}$ mark)

(b)
- Drenching/treatment
- Detailing
- Castration
- Tooth clipping
- Identification
- External parasite control
- Weighing

(4 x $\frac{1}{2}$ = 2 marks)

14.
- Vaccination
- Proper feeding
- Quarantine imposition
- Use of prophylactic drugs
- Proper hygiene eg. use of disinfectants and antiseptics
- Treatment of sick animals
- Isolation of sick animals
- Proper selection and breeding
- Control of vectors

(4 x $\frac{1}{2}$ = 2 marks)

15. (a) Addition of chalazae/fertilization
(b) Addition of thick albumen
(c) Addition of shell membranes/water/mineral salts and vitamins/thin albumen.

(3 x $\frac{1}{2}$ = 1 $\frac{1}{2}$ marks)

16. (a)
- Ancona
- White Isghorn

(2 x $\frac{1}{2}$ = 1 mark)

(b)
- Rhode Island Red
- Light Sussex

(2 x $\frac{1}{2}$ = 1 mark)

17.
- Lay fertile eggs
- Production of pheromones to keep the colony together

(2 x $\frac{1}{2}$ = 1 mark)

18.
- Clearing the bush/undesirable vegetation around the pond
- Desilting
- Planting grass on the dyke where necessary
- Cleaning
- Repairing worn out parts
- Fertilize the pond
- Maintain water level

(4 x $\frac{1}{2}$ = 2 marks)

SECTION B (20 marks)

19. (a) N - coping saw
P - stir up pump/bucket pump

(2 x 1 = 2 marks)

(b) M - drilling holes in both wood/ metal
Q - administering solid drugs/tablets orally

(2 x 1 = 2 marks)

(c)
- Cleaning to remove dirt/chemical residues
- Unblocking nozzles to remove solid particles/to facilitate flow of chemical solution
- Oiling the piston to reduce friction
- Replacing worn out parts to ensure efficiency of use

(1 x 1 = 1 mark)

20. (a) A - Purlin
B - Rafter

(2 x 1 = 2 marks)

(b)
- Timber/wood
- Metal/metal bars
- Plastic

(2 x 1 = 2 marks)

(c)
- Fire risk
- Prone to insect damage

(1 x 1 = 1 mark)

21. (a) Round worm/*Ascaris spp*

(1 x 1 = 1 mark)

(b) *A. lumbricoides* - catthle, sheep
A. suum - pigs
A. galli - poultry

(2 x 1 = 2 marks)

(c)
- Blood stained dung
- Presense of eggs
- Diarrhoea
- Adults - presence of adults (2 x 1 = 2 marks)

22. (a) Artificial vagina (1 x 1 = 1 mark)

(b) Collection of semen from bulls. (1 x 1 = 1 mark)

(c) Between 12-18 hours/at standing heat. (1 x 1 = 1 mark)

(d)
- Natural mating
- Embryo transplant (2 x 1 = 2 marks)

SECTION C

23. (a)

The shell:	-	Protects inner parts of the egg
	-	Prevents entry of micro-organisms
	-	Facilitates gaseous exchange
Albumen/Egg white:	-	Surrounds the yolk
	-	food reserve for the embryo
	-	Shock absorber
Chalaza	-	Holds the yolk in central position of the egg
	-	Ensures the germ spot is always facing up
	-	Transmit heat to the embryo during incubation
Yolk	-	Stores nutrients for the embryo
	-	Carries the germinal disc which develops into the embryo
Air space	-	Used for gaseous exchange
Shell membranes	-	Outer and inner membranes separate at the broad end to form the airspace
	-	Protect inner part of the egg
	-	Determine shap e of egg

(5 x 2 = 10 marks)

(b)

Udder clothes/towels	-	washing the udder
	-	drying the udder
Filtering pads	-	straining milk
Milking jelly/salve	-	applied to teats after milking to prevent cracking
Warm water	-	Washing the udder to remove dirt Stimulate milk let down

Milking pails/buckets	-	Used to hold milk during milking.
Milking stool	-	Sit on during milking
Strip cup	-	Necessary for detecting mastitis
Milk can/churn	-	Hold milk during milking/temporary storage/transportation
Chain/Rope	-	Restraining the animal
Concentrate/feeds	-	To stimulate milk let-down
Weighing scale	-	To determine the quantity of milk/weighing

(5 x 2 = 10 marks)

24. (a) (i) Cattle (1 x 1 = 1 mark)

(ii) Vector -Brown ear ticks/*Rhipicephalus appendicutatus*
Protozoa/Theileria parva (2 x 1 = 2 marks)

(iii)
- Swollen lymph nodes
- Profuse salivation
- Fever
- Lachrimation
- Laboured breathing
- Haemorrhages in the vulva and mouth
- Coughing
- Impaired vision
- Reduced appetite (5 x 2 = 10 marks)

(iv)
- Tick control
- Treatment using appropriate drugs eg. chlorotetracycline, oxytetracycline
- Vaccination (2 x 1 = 2 marks)

(b)
- Temporary food shortage
- Food fermentation
- Synthesis of vitamin B complex and K
- Synthesis of amino acids from nitrogen compounds
- Breakdown of proteins to peptides, amino acids and ammonia
- Breakdown of carbohydrates /cellulose into volatile fatty acids

(5 x 1 = 5 marks)

(c)
- Regularly clean and disinfect feeders/waterers/perches
- Replace old and wet litter/turn litter regularly
- Control visitors into the poultry house
- Use a footbath at the entrance
- Avoid dampness in the house
- Isolate/cull sick birds
- Treat sick birds
- Properly dispose dead birds (5 x 1 = 5 marks)

25. (a)

- Damaged skin/wounds/abscesses on skin
- Scaly/starring coat/rough coat
- Irritation/scratching
- Loss of hair/feathers
- Anaemia
- Presence of parasites on the body
- Emaciation

(5 x 1 = 5 marks)

(b)

- Accessibility - should be easily reached from most parts of the farm
- Drainage - well drained to avoid dampness
- Security - should be secure from predators and thieves
- Relationship with other structures - should be close to others with related functions to save on time and labour
- Proximity of amenities- should be near water/electricity supply
- Topography - gentle sloping to save costs on levelling/facilitate drainage

(5 x 1 = 5 marks)

(c) Induction stroke

- Piston moves downwards causing partial vacuum in the cylinder
- Inlet valve opens, exhaust valve remains closed
- Air fuel mixture is sucked into the cylinder

(3 x 1 = 3 marks)

Compression Stroke

- Piston moves upwards to compress air fuel mixture
- Inlet valve closes, exhaust valve remains closed

(2 x 1 = 2 marks)

Power Stroke/Ignition Stroke

- Valves remain closed
- Spark ignites the air fuel mixture
- Ignited mixture forces the piston down

(3 x 1 = 3 marks)

Exhaust Stroke

- Piston moves up mix cylinder and exhaust valve opens
- Exhaust opens while inlet valve remain closed to force exhaust gases out

(2 x 1 = 2 marks)