

20.0 AGRICULTURE (443)



20.1 Agriculture Paper 1 (443/1)

SECTION A (30 marks)

1. (a) Field Management practices  
Thinning  
Gapping  
(2 x ½) (1 mark)
- (b) (i) Thinning: - Removes the excess seedlings from the field.  
(1 x ½) (½ mark)
- (ii) Gapping: - Replaces seedlings/seeds that died/failed to germinate.  
(1 x ½) (½ mark)
2. (a) Variable costs  
Wages for casual labour  
Costs of feeds and water  
Costs of drugs/chemicals and treatment  
Cost of Electricity.  
(2 x ½) (1 mark)
- (b) Fixed costs  
Land rent/house rent/depreciation of building  
Salaries of regular/permanent labour  
Depreciation of machinery  
Interest on borrowed loan  
Cost of equipment.  
(2 x ½) (1 mark)
3. Disadvantages of monocropping  
High risk of total loss incase of crop failure.  
Under utilization of some soil nutrients  
Build up specific of crop pests/diseases/weeds.  
Only specific mineral nutrients are absorbed/exhaustion of certain minerals poison the soil and once exhausted the soil becomes infertile.  
Results in soil erosion in crops with poor ground coverage.  
Faster spread of pests and diseases  
leads to destruction of soil structure  
loss of soil fertility.  
(4 x ½) (2 marks)
4. Reasons for early land preparation.  
Allows time for organic matter to decompose and form humus.  
Facilitates timely subsequent operations.  
Allows time for weeds to die/be dehydrated.  
Allows weathering of soil clods before subsequent operations.  
Minimises competition for labour  
Allows time for pests and diseases causing organisms to starve and die.  
Allows time for soil aeration/gaseous exchange  
Allows time for water infiltration.  
(3 x ½) (1 ½ marks)

5. How crop rotation controls weeds.  
Crops associated with specific weeds are alternated with crops of different families to remove the appropriate host and break the life cycle of weeds.  
Alternating with cover crops smothers the weeds.  
(2 x ) (1 mark)
6. Qualities of a mother plant.  
Disease/pest resistant/tolerant.  
Healthy/free from pests/diseases.  
High yielding.  
Well adapted to the environment/local ecological conditions.  
Fast growth  
Early maturity.  
(4 x ) (2 marks)
7. Factors on choice of labour.  
Availability of the labour.  
Size of the enterprise/amount of work.  
Financial ability of the farmer/cost of the labour.  
Type of enterprise/type of work  
(3 x ) (1  marks)
8. (a) Balance sheet  
Showing the financial position of the farm business at a particular period of the year/  
shows values of assets and liabilities/shows net worthy/net deficit/shows solvency and  
insolvency/shows value.  
(1 x ) ( marks)
- (b) Inventory  
Recording all the assets owned by the farm business.  
(1 x ) ( marks)
- (c) Cash book  
Recording all transactions involving receiving and paying out of cash on the farm  
business.  
(1 x ) ( marks)
9. Functions of A.S.K  
Holding competitive agricultural shows/competitive trade fairs and exhibitions of livestock,  
crop and farm produce  
Encouraging breeding and importation of pure breeds and improvement of indigenous live-  
stock.  
Encouraging and assisting in official milk recording scheme.  
Organising the running of Young Farmers Clubs.  
Organising the National Ploughing Contest.  
Publishing the Kenya Stud Book.  
Publishing the monthly journal; "The Kenya Farmer".  
Awarding bursaries for local and overseas studies/tours for its members.  
(4 x ) (2 marks)
10. Leaching:-  
Washes dissolved mineral nutrients to the lower soil horizons beyond the reach of plant roots.  
(1 x ) ( mark)

11. Reasons for imposing quarantine  
 To test them for purity to prevent entry of noxious/foreign weeds into the country.  
 To test them for purity to prevent entry/spread of pests and diseases into the country.  
 Quality control  
 (2 x ) (1 mark)
12. Methods of controlling bean anthracnose disease.  
 Use of certified seeds  
 Use of appropriate fungicides/chemicals eg. dithiocarbonate  
 Crop rotation  
 Use of resistant varieties eg. Banja 2, Mexican 142, K74, Wairimu  
 Field hygiene/destruction of infected crop residues.  
 Rogueing.  
 (4 x ) (2 marks)
13. Post harvest practices  
 Threshing/shelling  
 Drying  
 Cleaning/Winning  
 Sorting/grading  
 Dusting  
 Package/bagging/packing  
 Processing  
 (4 x ) (2 marks)
14. Non-competitive markets  
 Monopoly/monopolistic markets  
 Oligopoly/Oligopolistic markets  
 Monopsony/monopsonistic markets.  
 (2 x ) (1 mark)
15. Settlement schemes  
 Jet schemes  
 Haraka schemes  
 Shirika schemes  
 Lari settlement scheme  
 The squatter's settlement scheme  
 Harambee schemes  
 Ol-kalaou salient schemes. (2 marks)
16. (a) Poisonous  
 Thorn apple/Datura stramonium  
 Sodom apple/Solanum incanum  
 (1 x ) ( mark)
- (b) Taints milk when eaten  
 Onions  
 Mexican marigold/(Tagetes minuta)  
 (1 x ) ( mark)

17. Agricultural support services  
 Credit services  
 Marketing services  
 Agricultural machinery services/tractor hire services  
 Agricultural research services  
 Farm input supplies services.  
 (4 x ) (2 marks)
18. Methods of harvesting trees  
 Coppicing/cutting back  
 Lopping/side pruning  
 Pollarding  
 Thinning  
 Felling trees.  
 (3 x ) (1  marks)
19. Maintenance practices for trees  
 Protection when young/seedlings  
 Pruning  
 Training  
 Grafting/top working  
 Watering  
 Weed control  
 Pest/disease control  
 Shading/mulching  
 Manuring  
 Gapping  
 (3 x ) (1  marks)

SECTION B (20 marks)

20. (a) Chitting/Sprouting  
 (1 x 1) (1 mark)
- (b) Procedure of chitting  
 Arrange the setts/tubers in a store/chitting box with the rose-end facing upwards.  
 Tubers are arranged 2-3 layers deep.  
 Allow diffuse light through the store.  
 Dust (spray)the setts/tubers with an appropriate insecticide/fungicides to control pests/aphids/  
 tubermoths/fungal infection.  
 Sprinkle some water on tubers if the conditions are dry.  
 (3 x 1) (3 marks)
- 21 (a) To demonstrate the presence of living organisms in the soil.  
 (1 x 1) (1 mark)
- (b) Observation  
 Flask C  
 Lime water turns white/milky/white precipitate.  
 (1 x ) ( mark)
- Flask D  
 No observable change/lime water remains clear. ( mark)
- (c) Reasons for the answers in (b) above

Flask C

Lime water turns white because living organisms exhaled carbon (IV) oxide which reacted with calcium hydroxide to form a white precipitate (calcium carbonate)

(1 x 1)

(1 mark)

Flask D

The heating of the soil killed the soil living organisms and no respiration occurred to produce carbon (IV) oxide.

(1 mark)

22.

(a) The law illustrated

Law of diminishing returns.

(1 x )

( mark)

(b) Phase II

Each additional unit of fertilizer input leads to a lower increase in total output of maize than the previous unit of fertilizer input.

(1 x 1)

(1 mark)

Phase III

Each additional unit of fertilizer input leads to a decrease in total output of maize.

(1 x 1)

(1 mark)

(c) Importance of the law

Helps the farmer to identify the level of optimum fertilizer application in the production of maize/to determine the highest level of maize output.

(1 x 1)

(1 mark)

23.

Profit and Loss account of Makueni Farm for the year ending 30th June 2008

Purchase and Expenses      Sales and Receipts

Ksh.   Cts

Ksh.   Cts

Opening Valuation      80,000 00

Rent received      10,000 00

Tractor repairs      30,000 00

Egg Sales      60,000 00

Tax paid      40,000 00

Maize sales      55,000 00

Interest on loan      20,000 00

Debts receivable      100,000 00

Purchase of inputs      90,000 00

Closing Valuation      90,000 00

Total      260,000 00

Net Profit      55,000 00

Total      315,000 00      Total      315,000 00

Award of marks

Title - Profit and loss account for the year ending -

mark

Purchase & expenses column      (1 x )

mark

Sales & receipts column      (1 x )

mark

Correct entries in each column      (2 x )

1 mark

Correct profit/Balance      (1 x )

mark



24. (a) Paddock/rotational grazing  
(1 x ½) (½ mark)

(b) Advantages

Reduces build up of parasites and diseases/prevent spread of parasite and diseases.

Allows pasture to regrow before being grazed again.

Manure is evenly distributed in the field

Excess pasture can be conserved

Allows management practices on ungrazed portions e.g. reseeding, fertilizer application/weed control/irrigation/pests and disease control topping/cutting back .

Ensures maximum utilization of pastures.

(5 x ½)

(2 ½ marks)

25. (a) The weed

Wild oat/Avena fatua/Avena sterilis/Athena

(1 x ½)

(½ mark)

(b) Harmful effects

Competes with crops for nutrients/light/space/water

Acts as an alternate host for pests/diseases

Lowers quality of produce/gets mixed up with the produce

Increase cost of production

Lower yields/quality

Increase cost of production

Lower yields/quantity

(2 x 1)

(2 marks)

#### SECTION C (40 marks)

26. (a) Water treatment to remove solid impurities.

At intake, water is passed through a series of sieves with different sizes of holes to trap large solid parties e.g. leaves, grass, sticks, polythene, stones.

Aluminium sulphate (alum) is added to water in the mixing chamber to coagulate solid particles suspended in water.

Water is passed to a large circular coagulation tank where coagulated solid particles settle.

Water is then passed through a filtration tank where all the remaining solid particles are removed.

The layers of sand and gravel in the filtration tank allow water to seep through very slowly and leave all the solid particles behind.

(5 x 1)

(5 marks)

(b) Farm records that should be kept by a dairy farmer

Feed records:- They show the type of feeds and quantities given to animals at a given time.

Breeding records:- Show details of breeding patterns for various animals on the farm/date of service/ pregnancy diagnosis/expected calving date/ sex of the calf/ the sire used.

Labour records:- Show details of human resources/efforts on the farm/the number of workers/their grades/salaries/responsibilities/performance on the farm.

Health records:- Show incidences of disease/animals attacked/treatment given/  
response to treatment/control measures taken/cost of treatment.

Milk production records:- Show the total milk yield from the heard and individual  
cows.

The quality of milk in terms of butter fat content is also shown for each cow on  
the farm.

Milk marketing records:- Show the quantity of milk sold/the price per litre/kilogram.

Also show the revenue earned from milk per given period of time/day/month/year.

Inventory records:- Show all the assets/buildings/ machinery/land/ livestock any  
consumable good owned by the farmer on the farm.

(5 x 1)

(5 marks)

(c) Cabbage Production

(i) Seedbed preparation

Land should be prepared early when dry.

Primary cultivation should be done.

Secondary cultivation should be done.

Land is prepared to medium tilth

Holes are dug at a depth of 10 cm

Spacing of 0.9 m x 0.6 m for large varieties or

0.6 m x 0.6 m/60 cm x 60 cm for smaller varieties should be done.

(3 x 1)

(3 marks)

(ii) Transplanting of seedlings

Transplant at beginning of the long rains/when soil has enough moisture.

Nursery is first watered so that seedlings can be lifted with ease.

Only healthy and vigorous seedlings should be selected.

Lift the seedlings with a lump of soil attached to the roots/lift seedlings with  
garden trowel.

Add about 15 gm/1 teaspoonful of phosphatic fertilizer to the planting hole/well  
rotten manure.

Place and mix well with the soil.

Place seedlings in planting holes at the same depth it was in the nursery.

mix with soil.

Firm the soil around the base of seedlings

Water the seedlings as appropriate/if necessary

Apply mulch around seedling/erect shade if necessary.

Transplant the seedlings carefully.

Transplanting should be done on a cloudy day or late in the evening when it is  
not too hot.

Place and firm the soil around the base of the seedling.

Seedlings are transplanted at 4-6 weeks of age/at 4-6 leaves stage/at height of 10-20 cm.

(7 x 1)

(7 marks)

27. (a) Effects of pests on maize in the field.

Some pests transmit crop diseases e.g. leaf hoppers.

Some pests eat the growing points causing retarded growth e.g. livestock, stalk  
borers/wild animals,cutworms.

Some pests attack the fruits lowering their quality/quantity e.g. birds, bollworms

Some pests eat the foliage/leaves reducing the surface area for photosynthesis.

Some pests damage crop roots/stems causing wilting and death to the plants e.g. termites, rodents/wild pigs/stalk borer.

Some pests pierce and suck sap from the plant depriving the plant of food e.g. aphids.

Some pests injure and cause wounds on the plant exposing it to secondary infections.

Some pests unearth germinating seeds reducing plant population hence lowering quantity eg. monkeys, rodents, chicken.

(6 x 1)

(6 marks)

(b) (i) Procedure of harvesting pyrethrum

Pick flowers selectively.

Pick flowers with horizontal petals (ray florets) with 2-3 rows of disc florets open.

Use forefingers and the thumb.

Pick by twisting the heads so that no stem is left attached.

Put the picked flowers in woven basket.

(4 x 1)

(4 marks)

(ii) Precautions observed during harvesting of pyrethrum.

Picking starts 3-4 months after planting to maintain quality.

Picked flowers are put in woven baskets to allow ventilation and avoid fermentation of flowers.

Wet flowers should not be picked because they heat up and ferment

Picked flowers should not be compacted to avoid heating up and fermenting.

A suitable picking interval 14 - 21 days is maintained to avoid harvesting over blown flowers.

Break the flower stalks to maintain quality.

(3 x 1)

(3 marks)

(c) Cultural Methods

Contour farming; Cultivation and planting done across the slope helps in holding water thereby increasing infiltration and reducing runoff

Mulching covers the soil thereby reducing splash erosion/reduce speed of runoff.

Strip cropping: alternating strips of crops that give good soil cover with those that give little soil cover controls movement of soil particles thereby helping in control of erosion.

Vegetated waterways; vegetation in waterways slows down run off/traps eroded soil particles thereby preventing further erosion.

Afforestation/reafforestation; trees protect soil from splash erosion by atomising raindrops/encourage water infiltration/protect soil from winds which could detach and remove soil particles.

Inter cropping crops which do not cover soil with crops that have good ground cover should be planted together to prevent splash erosion/surface runoff.

Minimum tillage so as to maintain good soil structure/have a seed bed with rough surface such that soil particles are not easily detached/encourage water percolation.

Cover cropping; establishing a crop that spreads over the surface of soil thereby protecting soil from effects of raindrops.

Grass strips/filter strips are left between cultivated/cropped strips of land to reduced speed of water and filter out eroded soil.

(7 x 1)

(7 marks)



28. (a) Biotic factors that influences crop production.  
Nitrogen fixing bacteria: - convert atmospheric nitrogen to nitrates for plant uptake.  
Pollinators:- transfer pollen grains from the anther of a flower to the stigma of the same flower or different flower.  
Decomposers:- organisms which breakdown organic plant and animal remains to release nutrients for plants/aerate soil.  
Pests:- attack crops by eating plant parts, piercing and sacking sap and introduce/spread disease causing micro-organisms.  
Pathogens:- they cause crop diseases.  
Predators:- reduce pest population.  
Weeds:- compete for nutrients, space, light, moisture/suppress growth/spread vests and diseases.

(5 x 1)

(5 marks)

- (b) Preparation of stem cutting

Select shoots from mother plants that are high yielding/healthy  
Select healthy and vigorously growing shoots;  
That have grown unchecked for 6 months.  
Obtain cuttings from the middle part of the shoots.  
Using a sharp knife make cutting 2.5 - 4 cm long; with a single leaf.  
Make the a cut close to the axial bud/leaf.  
The cut/slant should face away from the bud.  
Put the cuttings in water before planting to prevent dehydration.  
The cutting should have a single leaf/bud.  
Make a slauting out  
Cutting should be 2.5 - 4 cm long.

(9 x 1)

(9 marks)

- (c) Properties of N Fertilizers.

Highly soluble in soil water therefore should be applied in an already established crop.  
Have short residual effect thus should be applied frequently.  
They have a scorching effect/burning effect therefore should not come into contact with the plants.  
The fertilizers are hygroscopic/absorb moisture from atmosphere therefore it should be stored under dry conditions.  
The fertilizers are corrosive therefore they should not be handled with bare hands/stored in easily corroded containers.  
They are easily leached therefore they should be applied to a vigorously growing crop/already established crop.  
The fertilizers are volatile therefore they should be applied on moist soils.

(6 x 1)

(6 marks)

## 20.2 Agriculture Paper 2 (443/2)

### SECTION A (30 marks)

1. Maintenance practices for a disc plough.
  - cleaning after use
  - painting the frame
  - greasing the moving parts.
  - repair/replace broken/worn out parts.
  - oiling the metal parts on long storage.
  - proper storage.(4 x ½ = 2 marks)
  
2. Selection of breeding stock.
  - Progeny testing.
  - Mass selection.
  - Contemporary comparison.(3 x ½ = 1 ½ marks)
  
3. Advantages of using animal power.
  - Animals are cheap to acquire.
  - Require less skilled labour.
  - Can be used on small holdings.
  - Are appropriate in very steep areas.(4 x ½ = 2 marks)
  
4. (a) Blue ticks - Anaplasmosis.  
(b) Brown ear ticks - E.C.F  
(c) Tsetse flies - Trypanosomiasis (nagana)  
(3 x ½ = 1½ marks)
  
5. Control methods for roundworms.
  - Use of antihelmintics/drenching
  - Rotational grazing
  - Proper disposal of faeces/hygiene
  - Ploughing/burning of pasture.(4 x ½ = 2 marks)
  
6. (a) Disease: Any deviation or alteration in the state of animal body or its organs which interferes with proper performance of its functions.  
  
(b) Vaccination: Is the administration of a weakened or killed disease causing agent into the animal to induce production antibodies for immunity against the disease.  
(2 x 1 = 2 marks)
  
7. Maintenance practices for a battery.
  - Topping with distilled water to maintain correct level of electrolyte.
  - Cleaning the terminals and smearing them with grease to prevent corrosion.
  - Tightly fix the battery in a box to prevent spillage and damages.
  - Regular charging.
  - Empty contents and turn it upside down on long storage.
  - Should be fitted correctly on the tractor.(3 x □ = 1 □ marks)

8. Breed Type  
 (a) Aberdeen Angus Beef  
 (b) Guernsey Dairy  
 (c) Sahiwal Dual purpose  
 (d) Red poll Dual purpose (4 x = 2 marks)
9. Proper nutrition  
 • Prevents nutrient deficiency diseases.  
 • Ensures resistance against disease infection. (2 x = 1 mark)
10. Categories of livestock diseases  
 • Bacterial  
 • Protozoan  
 • Viral  
 • Nutritional (4 x = 2 marks)
11. • Upgrading.  
 • Cross breeding. (2 x = 1 mark)
12. Bloodless castration methods.  
 • Use of rubber ring and elastrator.  
 • Use of burdizzo. (2 x = 1 mark)
13. (a) recessive gene: An allele whose phenotypic expression is masked by a dominant allele in heterozygous condition.  
 (b) Epistasis: Gene interaction in which the expression of some alleles is blocked (masked). (2 x 1 = 2 marks)
14. Signs of kindling in a doe.  
 • Nest building  
 • Plucking of fur from the belly.  
 • Lose of appetite.  
 • Restlessness. (4 x = 2 marks)
15. Developmental stages of liver flukes in a fresh water snail.  
 • Sporocyst.  
 • Cercaria  
 • Redia. (2 x = 1 marks)
16. Four strokes of a tractor engine.  
 • induction/inlet  
 • compression  
 • power  
 • exhaust/outlet (4 x = 2 marks)

17. Signs of mite attack in poultry.
- Irritation/scratching of the body.
  - Anaemia.
  - Presence of mites below the plumage in patches.
  - Falling off of feathers.
  - Dermatitis due to burrowing effects.
  - Formation of crusts.

(4 x = 2 marks)

18. Advantages of natural feeding in calf rearing.
- Calf takes milk at body temperature.
  - Milk is free from contamination
  - It prevents scouring in calves.
  - Milk is provided ad libitum.

(3 x = 1 marks)