AGRICULTURE PAPPER 1

ANSWERS

KCSE 2011

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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 anthracrose disease.
Use of certified seeds
Use of appropriate fungicides/chemicals eg. dithioearbonate
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/Winnowing
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	Ksh.	Cts	Sales and Receipts	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) Paddocking/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 x½) (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 cm x 0.6 cm 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:- complete 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)