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UACE P515/2 Principles and practices of agriculture2 2010

Instructions

- This paper consists of sections: **A, B, C, D and E**
- Answer **question 1** in section A and four other questions, selecting **one** from each of the sections **C, D and E**.
- Write your answers in the answer booklets provided
- Any additional question(s) answered will not be marked

SECTION A (20MARKS)

Question1 is compulsory

1. The graph in figure 1 illustrates the relationship between light intensity, air temperature and transpiration rate from Lucerne leaves.

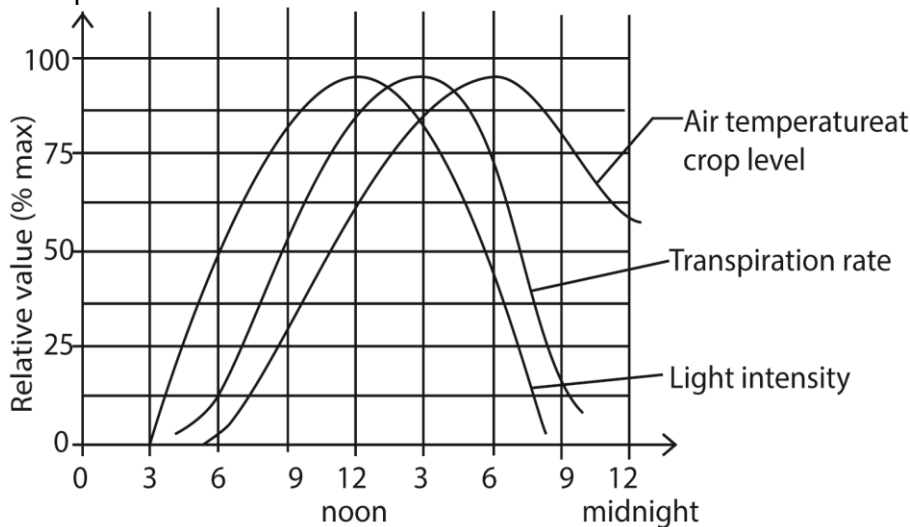


Fig. 1 Time of the day

Study the graph and answer the following questions

- (a) Explain the shape of the curves for light intensity and air temperature (06marks)
- (b) Explain the relationship between transpiration rate and
 - (i) air temperature (04marks)
 - (ii) light intensity (04marks)
- (c) Describe how any four structural factors can influence the rate of transpiration. (04marks)
- (d) State two advantages of transpiration to plants. (02marks)

SECTION B (20MARKS)

CROP PRODUCTION

Answer **one** question from this section

- 2. (a) Explain the factors that should be considered when assessing pest damage for effective management. (12 marks)
- (b) Explain the characteristic of an effective biological pest control agent. (08 marks)
- 3. (a) Explain why vegetative propagation is a popular method of raising crops. (12marks)
- (b) What precautions should be taken in the process of grafting plant? (08 marks)

SECTION C (20MARKS)

ANIMAL PRODUCTION

Answer **one** question from this section

- 4. (a) Outline the common causes of mortality in chicken and describe how each of them can be prevented (20marks)
- 5. (a) Give reasons why farmers in Uganda should be encouraged to take up fish farming. (06marks) (12marks)
- (b) Explain the factors to consider when selecting the site for s fish pond (09marks)
- (c) Describe how a fish pond should be maintained. (05 marks)

SECTION D (20MARKS)

AGRICULTURAL ENGINEERING

Answer **one** question from this section

6. (a) Explain the factors that affect the quality of farm water. (10marks)
(b) Describe the care and maintenance of water storage tank. (10 marks)
7. (a) Explain why diesel engines are more suited for farm work than petrol engines. (06marks)
(b) Describe the care done on a tractor to ensure that it is in a good working condition before being used. (14 marks)

SECTION D (20MARKS)

AGRICULTURAL ECONOMICS

Answer **one** question from this section

8. (a) (i) Distinguish between partial budgeting and complete budgeting. (02marks)
(ii) Describe the steps in making a complete budget. (12marks)
(b) Describe the steps in making a complete budget. (04marks)
(c) Describe the functions of a farm budget. (06marks)
 9. (a) (i) What is land consolidation? (02marks)
(ii) Outline the advantage of land consolidation? (06marks)
(b) Describe the various ways of acquiring land for farming in Uganda. (12marks)
- END

Suggested answers

1. The graph in figure 1 illustrates the relationship between light intensity, air temperature and transpiration rate from Lucerne leaves.

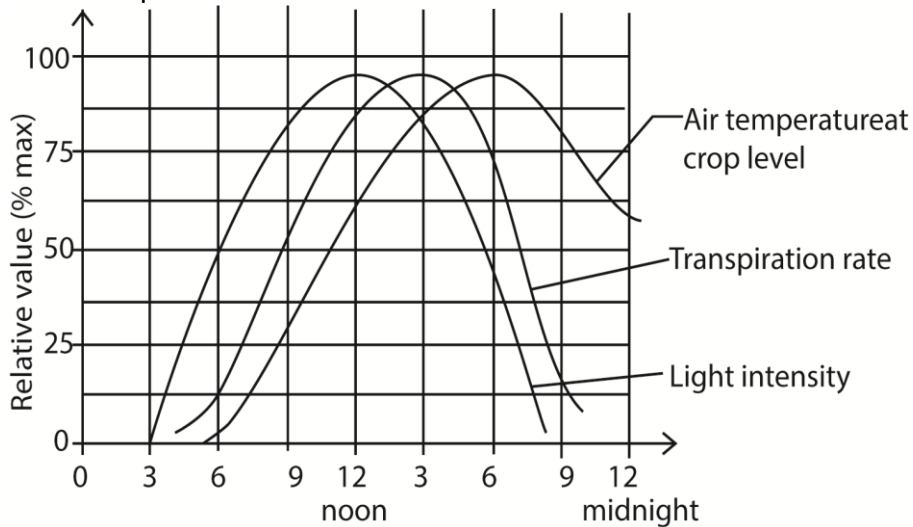


Fig. 1 Time of the day

Study the graph and answer the following questions

- (a) Explain the shape of the curves for light intensity and air temperature (06marks)
- Light intensity increase from about 3am due rising of the sun up to an maximum at noon when the sun is overhead and then decrease up to 9pm due to setting of the sun.
- Temperature increases from about 3am to a maximum at 6pm and then fallow dueto the heat from the sun.
- (b) Explain the relationship between transpiration rate and
- (i) air temperature (04marks)
- Rate of transpiration increases as air temperature increases and then falls as air temperature decreases because heat in air provides latent heat of vaporization
- (ii) light intensity (04marks)
- rate of transpiration increase with light intensity and then decreases as light intensity decreases because light causes the stomata to open promoting escape of moisture from the leaves
- (c) Describe how any four structural factors can influence the rate of transpiration. (04marks)
- Big leaf surface area promotes the rate of transpiration
 - Presence of hairs on the leaf lowers the rate of transpiration because it traps high humidity around the stomata reducing the rate of transpiration

- Sunken stomata reduce the rate of transpiration due to high humidity around the stomata
- Big number of the stomata at upper lamina increase the rate of transpiration due to exposure to the environment
- Thick leaf cuticle reduce the rate of transpiration

(d) State two advantages of transpiration to plants. (02marks)

- Enables absorption of water
- Enables absorption of mineral salts
- Cools the plant

SECTION B (20MARKS)

CROP PRODUCTION

Answer **one** question from this section

2. (a) Explain the factors that should be considered when assessing pest damage for effective management. (12 marks)
- Extent of damage to the buds, flowers, shoot, fruits but grasshoppers, caterpillars and beetles etc.
 - Damage caused by toxins to plants
 - Perforation into fruits and seeds caused by pests, e.g. bean bruchid/weevil, maize weevil etc.
 - Damage caused by sucking pests e.g. aphids, mealybugs and scales
 - Disease transmitted to crops e.g. maize leaf hopper, white flies etc.
 - Damages to crop roots
 - The extent of contamination of produce by pest excreta
 - Reduced crop yield
 - Reduction in seed viability
 - Deterioration of odor of produce
 - Discoloration of produce
 - Contaminate products with their excreta
 - Rotting of produce

(b) Explain the characteristic of an effective biological pest control agent. (08 marks)

- toxic to the target organism
- specific to the target organism
- biodegradable not to accumulate in the environment
- harmless to the plants and animals
- cheap and readily available
- easy to store and transport
- readily soluble in water
- not accumulate in ecosystem

3. (a) Explain why vegetative propagation is a popular method of raising crops. (12marks)

- The offspring is similar to the parent in all ways hence preserve good mother characters.
- Offspring grows faster and mature early.
- Offspring are strong and hardly compare with seedling obtain from seeds.
- Vegetative propagation is the best way for propagating plants with no viable seeds.
- Daughter plants obtain food from their parents until they are sufficiently strong hence increasing chances of survival.
- Multiplication of the plant population is faster
- Over comes the problem of prolonged dormancy in some seeds
- Less risk of seedling disease
- Doesn't require much care
- Does not require pollinating agents

(b) What precautions should be taken in the process of grafting plant? (08 marks)

- Compatibility – The scion and stock must be related or close to facilitate sexual hybridization.
- The scion and the stock should be disease free.
- Use suitable equipment or tool for grafting
- Scion should have a bud
- Both scion and stock should be woody
- Both scion and stock should be from quality plant
- Graft quickly
- Cambial alignment – The cambium of the scion and root stock should be aligned for the union form.
- Timing of the grafting operation – Grafting must be done at a time when the root stock is in a proper physiological state.
- Avoiding desiccation – After grafting operation make sure that all the surface is sealed off using wax or grafting tape around the joining

- Pressure – Apply a pressure after aligning the cambium of the root stock and scion such that the xylem stays in contact.

SECTION C (20MARKS)

ANIMAL PRODUCTION

Answer **one** question from this section

4. (a) Outline the common causes of mortality in chicken and describe how each of them can be prevented (20marks)

Cause of chicken mortality	Prevention measure
High brooding temperature	provide optimal brooding temperature
Low brooding temperature	Protect flock from cold weather
Poor ventilation	Ensure proper ventilation containing right nutrients
Starvation	Provide adequate quality feeds
Inadequate water	Provide adequate clean water
Poor quality chick	Buy chicks from reliable sources
Poisoning from pesticide, herbicides and food	Ensure proper handling of chemical at the farm
Contaminated food	Use food from reliable sources
Litter contamination	Use appropriate litter
Injuries due improper handling	Ensure proper handling
Predators	Provide security
Diseases	Strictly follow medication and vaccination schedule Proper sanitation to prevent disease spreading Isolation of sick chicken Keep drinkers and feeders clean Regularly clean chicken house
High growth rate broilers that heart can't keep up any more	Control feed rates and amounts
High humidity promoting spread of diseases	Maintain pen humidity

5. (a) Give reasons why farmers in Uganda should be encouraged to take up fish farming. (06marks)
- Source of food i.e. proteins
 - High return
 - Fish take short time to mature
 - Source of employment
 - Source of animal feeds
 - Diversification economic activities.

- Requires less capital
 - Makes use of land which is not suitable for other agricultural enterprises
 - Reduce dangers associated with fishing in rivers.
 - Market for fish largely available
 - Fish farming can easily be integrated with other farm enterprises.
- (b) Explain the factors to consider when selecting the site for s fish pond (09marks)
- The topography of the site should be gently sloping to allow the pond to be filled and drained easily under natural gravity
 - The soil water holding capacity and water table should be high to hold water in the pond for a long time without draining away
 - The water source should be stable/permanent to provide water to the pond
 - It should readily accessible for monitoring
 - There should security
 - Should be free from pollution
 - Should be of adequate size
 - Should be free from human interference.
 - Permanent land tenure system
 - Pest and diseases
- (c) Describe how a fish pond should be maintained. (05 marks)
- Pond stocking
 - Pond cleaning
 - Pond repair
 - Pest and disease control
 - Fish feeding
 - Water refilling
 - Fish sampling
 - Fish harvesting and marketing

SECTION D (20MARKS)

AGRICULTURAL ENGINEERING

Answer **one** question from this section

6. (a) Explain the factors that affect the quality of farm water. (10marks)
- Fecal contamination may introduce bad odor and taste to drinking water.
 - Contamination from pesticide may make water poisonous

- Unhygienic drinkers may contaminate water with disease causing organisms
- Excessive Alga growth depletes water of oxygen causing fish death
- Contamination by fertilizers
- Unreliable sources such as contaminates spring
- High salt concentration may cause reverse osmosis in soil
- High and low water pH affects soil microbial growth when used for irrigation
- High water temperature reduces dissolved oxygen causing fish to suffocate
- Silting reduce water clarity

(b) Describe the care and maintenance of water storage tank. (10 marks)

- Regular cleaning to remove sediments on the bottom and algae from walls
- Regular disinfecting of the tank
- Maintain valves and fittings
- Repair leaks
- Keep away hazardous chemicals such as paints, fertilizers, pesticides and oil
- Protect from sun damage

7. (a) Explain why diesel engines are more suited for farm work than petrol engines. (06marks)

- Diesel is cheaper
- Less maintenance costs
- They are more rugged and reliable
- More durable

(b) Describe the care done on a tractor to ensure that it is in a good working condition before being used. (14 marks)

- Go through the tractor manual to familiarize with the tips of its maintenance
- Obtain all the maintenance tools
- Protect the tractor from rain
- Check and fix tractor leaks
- Lubricate moving parts to reduce friction:
- Ensure right air pressure in the tires
- Ensure that the breaking system works properly, lubricate if necessary
- Ensure that the air filters are dirt and dust free; replace where necessary
- Do not overload the tractor
- Change oil engine regularly
- Top up coolant regularly and ensure cooling system works properly.
- Use original spare parts
- Keep the tractor clean and dry
-

- **Clear the field of** stones, tree stumps and other obstacles before using a machine.
- Sharpen the plough before and after use.
- Tighten loose bolts and nuts.
- Grease metallic parts to prevent rusting
- Remove the soil from blade after use to prevent rusting

SECTION D (20MARKS)

AGRICULTURAL ECONOMICS

Answer **one** question from this section

8. (a) (i) Distinguish between partial budgeting and complete budgeting. (02marks)

Partial budget is a financial statement outlining the anticipated revenue and expenditure for an enterprise or a part of the whole farm in the fourth coming financial period

Complete budgeting is a financial statement outlining the anticipated revenue and expenditure for the whole farm in the fourth financial period

- (ii) Describe the steps in making a complete budget. (12marks)

- State objectives
- List all available resources
- Estimate the size of land to estimate the number of livestock or planting materials required
- Estimate inputs and labor
- Work out estimates for the cost of inputs
- Estimate the value of expected revenue
- Estimate profit for the different enterprises
- Calculate the opportunity cost of any input so as to make the right decision
- Add up the estimates for all the enterprises on the farm,

- (b) Describe the function of budget. (06marks)

- To estimate required production resources in form of labor, capital and inputs.
- To estimate profitability of the farm enterprise.
- To attract funding from money lenders such as banks
- To direct or control expenditure in the business to enable high profitability.
- To provide basis of performance appraisal

- To exploit idle resources
- Motivate the farmer to work hard to achieve the set objectives
- To set goals and provide direction to the managers of the farm.
- Enable a farmer to make effective changes on the farm.

9. (a) (i) What is land consolidation? (02marks)

This is the pooling of small pieces of land to form a large and more productive land when put together.

(ii) Outline the advantage of land consolidation? (06marks)

- Saves time that could have been wasted moving from plot to plot during farm operations.
- Makes supervision of farm operations easy and less costly since they are in one place.
- It encourages mechanization on a farm since the land is big enough which makes the practice economical.
- Agricultural production is increased due to the size of the land.
- It's easier to provide extension services on the consolidated land.
- Theft of farm produce is reduced due to improved supervision.
- Transport costs of the produce from the garden are reduced since all products are in one place.
- It's easier to control pests and diseases on the farm.
- It's easier to carry out soil and water conservation measures.

(b) Describe the various ways of acquiring land for farming in Uganda. (12marks)

- Purchase land
- Rent land for given season(s)
- Use leased land from the owner or local government
- Inherit land
- Use communal land
- Use land owned by cooperative societies
- Grant from government
- Occupation with the consent of land owner

END

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Thanks

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