PROPOSED MARKING GUIDE 2020

Uganda Advanced Certificate Of Education

PRINCIPLES AND PRACTICES OF AGRICULTURE

1. (a) W = String/rope
X = load
Y = Single fixed pulley
Z = Effort

Award ½ marks for any 4
½ × 4 = 02marks

(b) place mortar in bucket/ Tin and this will be the load
- ✓ tie the load at one end of the rope i.e. below print **W**.
- ✓ apply effort through pulling at other end of the rope i.e. point Z until the load (mortar) is raised at point J
- ✓ Remove the mortar from the bucket/Tin

Award 1marks for any 4points logically presented
1 × 4 = 04marks

(c) (i) Mechanical advantage = $\frac{Load}{Effort} = \frac{200}{50} = 4$

(ii) Velocity ratio = $\frac{\text{Distance moved by Effort}}{\text{Distance moved by load}} = \frac{20}{4} = 5$

(iii) Work input = Effort × Distance through which effort moves
= 50 × 20
= 1000J

(iv) Work output = Load × Distance through which load moves
= 200 × 4
= 800J

(d) **Factors that affect efficiency of a machine**

- Heavy weight of the load than the effort to raise it. heavy load when placed on a machine, lowers the efficiency
- ✓ Friction forces between the rope and the pulley
- ✓ Large distance between the load and effort lowers efficiency due to increased friction
- ✓ Weak strength of the rope that can get set before the load is raised to the required level
- ✓ Friction
- ✓ Load. Too much load on the machine reduce the efficiency of the machine
- ✓ skills of the operator
- ✓ type of machine

Award 1 ½ marks for any 4point
1 ½ × 4 = 06marks

2. (a) **Seed dormancy**: Is a condition when a viable seed fails to germinate even when provided with suitable conditions for germination

Award 2marks for 1point
1 × 2 = 02marks

(b) Causes of seed dormancy

- ✓ presence of hard seed coat which interferes with the absorption of oxygen e.g Barley
- ✓ immature embryo which has not reached full development at harvest time
- ✓ having dead embryo; this may mature but has to undergo certain changes before they germinate
- ✓ high temperatures during seed maturity which may induce dormancy
- ✓ presence of germination inhibitors
- ✓ presence of seed coat hairs

Award 2marks for 4points
1 × 4 = 04marks

(c) Various methods of breaking seed dormancy.

- ✓ Soaking seeds in water over night before planting so as to soften the testa and allow water and oxygen intake
- ✓ Treating same seeds with hard testa to slight concentration of sulphuric acid to soften the testa
- ✓ Allowing seeds of small grain varieties a short dry period after harvest in order to ripen.
- ✓ Practicing heat treatment e.g by burning seeds for a short period of time to allow the seed coat open.
- ✓ cutting off the hair covering the seed coat to allow oxygen intake to induce germination
- ✓ soaking seeds in growth hormone

- ✓ scarification

Award 1marks for 4point
1 × 4 = 4marks

(d) Experiment to determine seed viability using tetrozolium salt method.

- ✓ Get a sample of seeds
- ✓ pick a number of seed from the seed lot at random
- ✓ count the picked seeds
- ✓ soak the counted seeds in 0.1% of tetrozolium salt overnight
- ✓ provide all the necessary conditions for germination
- ✓ open the testas of the soaked seeds to expose the embryos
- ✓ count the seeds that have pink embryo
- ✓ express the proportion of the seeds that have pink embryo as a percentage of the total number of seeds soaked in the salt.

$$\text{viability \%} = \frac{\text{No. of seeds with pink embryos}}{\text{no. of seeds tested}} \times 100\%$$

- ✓ If the proportion of seeds with pink embryo is above 80%, the seeds are suitable for planting.

Award 1marks for 10points logically presented
1 × 10 = 10marks

3. (a) Effects of disease on crop production

- ✓ lowers the quality of products
- ✓ leads to stunted growth of crops
- ✓ causes death of plants hence total loss
- ✓ causes reduction in crop yields
- ✓ products are condemned in the market/market closed
- ✓ suspension of growing of particular crops e.g in closed season
- ✓ increase the cost of production through buying chemicals for disease control
- ✓ leads to abnormalities in crop growth thus lowering quality and quantity of products
- ✓ leads to delayed crop maturity.

Award 1marks for 6point
1 × 6 = 06marks

(b) Ways in which crop diseases are spread

- ✓ through wind, wind blows disease germs from one plant to another
- ✓ planting infected materials and the emerging plant is also infected
- ✓ through farm equipments used in weeding, transplanting, harvesting spread germs
- ✓ sucking pests spread most of the viral diseases
- ✓ irrigation water contains germs/ spores which can infect crops
- ✓ contact with man, animals; they carry germs from one crop land to another
- ✓ organic manure contains diseases causing germs

- ✓ crop residues one not burnt act as source of infection to crops
- ✓ soil erosion carries diseases germs in the surface run off
- ✓ direct contact between plant to plant or weeds
- ✓ bacterial and fungal diseases spread through water splash when it rains

Award 1marks for any 5point
1 × 5 = 05marks

(c) How crop diseases are controlled?

- ✓ Crop rotation: This prevents buildup of diseases in crop land by breaking life cycles
- ✓ Planting disease resistant varieties which can withstand disease attack
- ✓ Weeding; removes plants that would be alternative hosts for disease organisms.
- ✓ Closed season/dead season; in order to starve the organisms to death
- ✓ rogueing/selective removal of affected plants and burning them
- ✓ ensuring field sanitation by burning crop remains which labour germs
- ✓ early planting as crops escape periods of disease attack
- ✓ pruning to remove the micro-climate that favour growth of micro-organisms
- ✓ sterilization of the soil to kill germs by burning dry grass on top of soil surface/pouring hot water
- ✓ close spacing to create a micro-climate which minimize multiplication of vectors that transmit rosette viruses in ground nuts
- ✓ draining land to overcome water borne diseases
- ✓ use of clean planting materials/diseases free materials to prevent spread of diseases

Award 1 ½ marks for any 6points
½ mark for mention 1markn for explanation
1 ½ × 6 = 9marks

4. (a) Qualities of good meat for human consumption

- ✓ leanness; should have more proportion of muscle and tissues rather than fats
- ✓ flavour; should have a sweet a roma free from parasites like liverfluke and diseases like anthrax
- ✓ tender; it is the softness of meat when eating and is determined by age of the animal
- ✓ hygienic; should be free from contaminants such dust, blood, soil etc
- ✓ juiciness; it should have a naturally sweet taste with a lot of fluids
- ✓ colour with pale yellow fats while mutton should have brown/pink colour with white fats

Award 2marks for any 5points
2 × 5 = 05marks

(b) **Factors to be considered when culling farm animals**

- ✓ fertility: cows which fail to conceive after service are considered infertile and should be culled
- ✓ age; productivity of animals reduce with age therefore old animals should be culled

unhealthy animals/sickly animals; These are expensive to keep on the farm since veterinary bills eat into the profits
- ✓ slow growth; slow growing animals should be culled
- ✓ inability to raise offsprings; some livestock produce offsprings which die before reaching maturity, such livestock should culled
- ✓ weak offsprings; Animals which produce weak offsprings are undesirable since they have low chances of survival
- ✓ poor mothering ability; livestock which does not take acre of its offsprings well by sucking should be culled
- ✓ poor physical conformation good; Good conformation traits are directly linked to high productivity

Award 2marks for any 5point
$2 \times 5 = 10$marks

5. (a) Reasons for conserving fodder on the farm

- ✓ To avoid necessary wastage of forage during time of plenty
- ✓ to ensure sustained supply of feeds for livestock throughout the year
- ✓ to increase the number of livestock that can be kept per unit area
- ✓ to increase nutritional value of forage e.g. silage provides lactic acid important in lactating animals and hay provide more fibre for proper rumen functioning.
- ✓ to bridge the nutrient gap during periods of scarcity
- ✓ To allow animals to eat plant materials that would be dangerous to eat in fresh form e.g. most succulent plant materials may cause bloat in ruminants so such plant materials would require conservation in dry farm before being given to animals
- ✓ to provide more efficient animal production by making use of wasted pasture surpluses in the growing season
- ✓ on some farms, conserved forage can be solid to earn income e.eg baled hay

Award 1marks for any 6points
$1 \times 6 = 06$marks

(b) Procedures of making good quality silage on the farm

- ✓ Select good; palatable forage at flowering stage
- ✓ cut the crop from the field
- ✓ partially wilt the materials to reduce rate of decay
- ✓ chop the crop/materials into small pieces
- ✓ crush the materials with a roller to ease packing
- ✓ pack the materials into the silo
- ✓ add molasses into the materials to increase rate of germination
- ✓ compact the materials into the soils
- ✓ cover/seal the silo immediately with a plastic sheet
- ✓ provide shelter/a layer of soil over the silo to avoid seepage of rain

- ✓ dig a trench around the silo to drain away rain water/control surface runoff into the pit
- ✓ check the temperature; if high, add water and if low, add more materials

Award 1mark for any 10points logically presented
1 × 10 = 10marks

(c) Advantages of silage over Hay

- ✓ silage cannot be burnt by fire as hay
- ✓ provides forage in a green and succulent state
- ✓ losses of nutrients due to ensiling are much lower compared with loss in hay
- ✓ it requires a small space to store as compared to hay
- ✓ silage can be made from many crops and plants
- ✓ it improves appetite and intake of it by the animals

Award 1mark for any 4point
1 × 4 = 04marks

6. **(a) Advantages of using a cattle dip in tick control**

- ✓ many animals can be dipped in a single day/exercise
- ✓ requires less technical skills during use and maintenance
- ✓ dip wash can used several timers
- ✓ has low labour requirement
- ✓ spoilage of a caricides is minimal
- ✓ cheaper to run in the long run

Award 1marks for any 4points
1 × 4 = 04marks

(b) Factors that reduce the effectiveness of dipping animals

- ✓ dipping animals when it is raining
- ✓ failure to follow the recommended dipping routine
- ✓ use of expired a caricides
- ✓ poor mixing of a caricides
- ✓ low level of dip wash in the dip
- ✓ use of diluted dip wash
- ✓ accumulation of foreign materials in the dip wash
- ✓ linking roof leading to dilution of a caricides

Award 1marks for any 4points
1 × 4 = 04marks

Precautions that should be taken before taking animals to the dip

- ✓ Ensure correct level of dip wash in a dip tank
- ✓ Ensure correct concentration of a acaricide in the dip tank
- ✓ ensure that there is enough water in the foot bath
- ✓ ensure that the a caricide is uniformly mixed before dipping animals
- ✓ do not dip animals on a rainy day because the acaricide can be washed away before it sticks properly
- ✓ do not dip sick animals because they may collapse inside the dip
- ✓ pregnant and sick animals should not be dipped as they can be injured
- ✓ give some water to animals before dipping because they can be tempted to drink the a caricides
- ✓ avoid dipping tired animals as they may collapse inside the dip

Award 1 ½ marks for any 8points

1 ½ × 8 = 12marks

(a) Advantages of using animal draught power

- ✓ it can operate in areas unsuitable for tractor use
- ✓ it can plough at uniform depth during tilling
- ✓ the initial cost of acquiring the animal is low
- ✓ the initial cost of buying the implement is lower compared to tractor implement
- ✓ it requires less skills and training to operate animal draught implements
- ✓ animals provide other products on top of providing power like beef from oxen
- ✓ animal draught power is cheaper than engine power
- ✓ animals provide more power than man

Award 1mark for any 4points

1 × 4 = 04marks

(b) Ways of achieving excellent ploughing using animal draught power

- ✓ proper handling of working animals during ploughing to reduce disturbance
- ✓ ensure enough rest of the animals after work
- ✓ using a relatively long chain
- ✓ using a light yoke
- ✓ proper training of the ox and the operator
- ✓ ploughing in light soils can ensure excellent ploughing
- ✓ pairing of animals during ploughing
- ✓ ensure good feeding of work type animals for good strength during ploughing
- ✓ using castrated animals as they are moer powerful
- ✓ working animals during cool hours of the day to increase efficiency

(c) Factors that favour use of animal draught power on the farm
- ✓ availability of plenty of land for gracing working animals before and after work
- ✓ presence of short and high vegetation which is easy to plough
- ✓ presence of light soils which are easy to plough
- ✓ presence of flat land which make movement of oxen during ploughing easy
- ✓ availability of work type animals in the area
- ✓ effective control of animal parasites and diseases in the area
- ✓ presence of farmers with knowledge and skills of animal handling and training
- ✓ availability of oxen plough in the area

Award 1 ½ marks for any 6points
1 ×6 = 09marks

Importance of opportunity cost to a farmer
- ✓ helps in solving the problems of scarcity of resource through making a choice
- ✓ helps the farmer in resource allocation i.e. determining what to produce when to produce etc.
- ✓ it is a basis of planning, budgeting and management of resources on the farm
- ✓ it helps the farmer in pricing products and resources on the farm
- ✓ it is used by labourers on the farm to make decision on whether to work or enjoy leisure
- ✓ it helps the farmer to make consumption decisions ie. a farmer buys only a commodity from which he derives more satisfaction and foregoes others
- ✓ it helps the farmer to make production decision i.e. he allocates resources when they earn more profits

Award 1marks for any 4points
1 × 4 = 04marks

) Factors that determine supply of labour on the farm
- ✓ level of wages
- ✓ size of total population around the farm
- ✓ degree of mobility of labour
- ✓ availability of essential facilities such as housing, transport allowance, free education
- ✓ nature of the work i.e. Heavy and risky jobs will attract fewer labourers
- ✓ level of education; high level of education skills and experience requirements reduce labour supply on the farm and vice versa

- ✓ political stability, i.e if there is peace in the country, people will have the will and morale to work even for long hours then when there is instability
- ✓ level of adverstment, increases awareness of labourers on the number of people willing
- ✓ rural –urban migration,, high level of labour supply on the farm especially and vice versa

Award 1 ½ marks for any 6points
1 ½ × 6 = 09marks

(c) How a farmer can improve the efficiency and productivity of worker on the farm?

- ✓ Employing of skilled and experience workers
- ✓ on-job training of workers in form of seminars, workshops, sending worker for short courses in colleges
- ✓ increasing wages and other benefits as this motivates workers
- ✓ encourage specialization of workers on the farm
- ✓ ensure good suspension of workers to ensure that every worker is during his/her duty and to give immediate help incase of failure of equipment
- ✓ improving technology such as use of machines on the farm to increase speed and accuracy of output
- ✓ giving enough time and appropriate load to workers
- ✓ provision of job security
- ✓ maintaining good health of workers allowances, transport allowances, medical allowances to worker
- ✓ timely payment of workers
- ✓ promotions on job to other ranks such as supervision, managers etc

Award 1mark for any 7points
1 x 7 = 07marks

9. (a) Advantages of individual land tenure

- ✓ avoid land disputes
- ✓ encourage farmers to improve land through soil and water conservation
- ✓ encourages farmers to establish permanent structure
- ✓ make land planning easier
- ✓ it facilitates land consolidation
- ✓ it can be used as a mortgage for loans

- it easy to transfer ownership of land
- it is easy to sell or rent out land

Award 1mark for any 5points
1 × 5 = 05marks

(b) The land reform policies in Uganda necessary for increasing agricultural production
- encourage lease hold system where individuals can utilize land for a specific period of time
- abolition of customally and communal land tenure to increase land utilization
- co-operative ownership to increase production and productivity of land
- land consolidation to enable use of machines
- land redistribution to enable effective use of land
- land tax to enable profitable use of land in Uganda
- land tribunals to settle land disputes at various levels
- land reclamation e.g. swampy and semi arid areas.
- land registration so that land owners can have legal tittles and freedom to give it as security to acquire loans
- resettlement schemes to avoid congestion, unemployment
- state ownership to encourage large scale production
- putting in place an efficient land market to enable the landless to purchase and acquire land

Award 1mark for any 9points
1 × 9 = 09marks

(c) Problems associated with land fragmentation
- farm planning becomes difficult
- supervision of farm work is difficult
- there is wastage of time while moving from one holding to another
- difficult to control pests and diseases
- difficult to carry out soil and water conversation measures
- difficult to offer agricultural extension services to farmers
- fencing of land becomes expensive
- accessibility to the farm is different
- mechanization is difficult
- usually expensive to transport produce to main store
- difficult to control weeds

Award 1mark for any 6points
1 × 6 = 06marks