



Dr. Blosa Science

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The Science Foundation College
Uganda East Africa
Senior one to senior six
+256 778 633 682, 753 802709
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UACE P515/1 Principles and practices of agriculture

SECTION A (30 MARKS)

Write the letter corresponding to the correct answer in the box provided at the end of each question.

- Couch grass can be effectively controlled by
 - Hand hoeing
 - Burning to kill the shoots
 - Spraying with translocated herbicides
 - Spraying with contact herbicides
- A practical illustration of stage 1 of production function is
 - Overstocking in a paddock
 - Insufficient use of fertilizers
 - Heavy feeding of a dairy cow
 - Use of a big tractor on small pieces of land
- Water that is absorbed during seed germination is used to
 - Activate hydrolytic enzymes in the seed
 - Dissolve nutrients for the embryo
 - Transport food within the seed
 - Hydrate starch molecules
- Bees perform the circular dance as a means of communication to indicate
 - the success of a foraging trip
 - the presence of food nearby
 - that they are contented with their food
 - that conditionals around the hive are favorable
- the main disadvantage of broadcasting fertilizers during seed bed preparation is that
 - there is wastage of fertilizers where seeds will not land
 - the spread of fertilizers is not uniform throughout the field
 - some of the fertilizers is leached before crop emerge
 - weeds are also stimulated to grow with crops at the same time
- Which one of the following would be the most appropriate measure to take when birds in a poultry house are observed coughing, sneezing, breathing with difficulty and eventually dying?
 - Treating them with antibiotics

- B. Adding Sulphur drugs to their drinking water
 - C. Culling all the birds and disinfecting the poultry house
 - D. Fumigating the poultry house
7. Anti-hill soil is suitable for making bricks mainly because
- A. Its red color adds to the beauty of the building
 - B. Its clay content makes bricks strong
 - C. It is easy to work and mould into bricks
 - D. Bricks freshly made from it maintain their shape
8. Which one of the following is a reason for practicing back crossing in crops hybridisation? To
- A. Recover the genotype of the recurrent parents
 - B. Combine genes scattered in different varieties
 - C. Permit increased homozygosity
 - D. Achieve a maximum degree of hybrid vigour
9. Which one of the following is a problem associated with feeding silage to cows during milking?
- A. Attract flies
 - B. Introducing germs to milk
 - C. Tainting milk with bad odor
 - D. Disruption of milk let down
10. When a super phosphate fertilizer is applied to a clay soil, crops may not show a positive response because
- A. phosphate uptake by crops is suppressed by other minerals in clay
 - B. the acidity of clay soil reduces the solubility of phosphates
 - C. phosphates get fixed into insoluble mineral, once in clay
 - D. clay soils are usually water logged and dissolve the phosphates which are leached
11. The reaction below represent a process of weathering
- $$2\text{Fe}_2\text{O}_3(\text{s}) \rightarrow 4\text{FeO}(\text{s}) + \text{O}_2(\text{g})$$
- Which of the processes in the rock weathering is represented by the equation?
- A. reduction
 - B. hydrolysis
 - C. oxidation
 - D. hydration
12. The best solution for fluctuation in the prices of agricultural products is to
- A. provide good transport and communication
 - B. fix prices irrespective of the quality of products
 - C. provide market information
 - D. emphasize production of high quality products.
13. Which one of the following represents the ratios of materials mixed to produce mortar for binding bricks?
- A. 3:4 mixture of sand to cement
 - B. 1:1 mixture of sand to cement
 - C. 3:1 mixture of sand to cement
 - D. 1:4 mixture of sand to cement

14. During construction of an earthen fish pond, the walls are made to slant at an angle of about 45° to the bottom surface in order to
- plan the location of the water inlet and outlet points
 - remove soil from the pond excavation site easily
 - easily pile dug-out soil and compact it
 - avoid the collapse of the walls due to pond water action
15. One advantage of specialization in agricultural production is that it
- requires few production skills
 - reduces production costs
 - is easier to market products
 - uses less labor
16. Which one of the following factors does not directly contribute to the efficiency of draught animals?
- castrating them
 - training the animals
 - dipping them
 - providing supplementary feeds
17. What happens during rock weathering by the process of hydrolysis?
- metallic cations in the rock are replaced by hydrogen ions
 - hydroxyl ions in the rock are replaced by metallic ions
 - metallic cations in the rock are replaced by hydroxyl ions
 - hydrogen ions in the rock are replaced by metallic ions
18. Interveinal chlorosis of leaves in a crop is a symptom of
- Magnesium deficiency
 - Calcium deficiency
 - Phosphorus deficiency
 - Sulphur deficiency
19. Trees may die after ring barking because of
- interrupted flow of water from roots
 - interrupted flow of assimilates
 - reduced water absorption from soil
 - increased transpiration
20. How can rickets in livestock be controlled? By providing
- Mineral and vitamins
 - Vitamins and carbohydrates
 - Lipids and vitamins
 - Proteins and minerals
21. Which one of the following describes a complex community in an ecosystem? A community
- with pioneer species that are still progressing to another level of succession
 - with many species of organisms living together
 - with only biotic components in a habitat
 - which is relatively stable and in equilibrium with its environment
22. Painting of wood on farm structures is done in order to

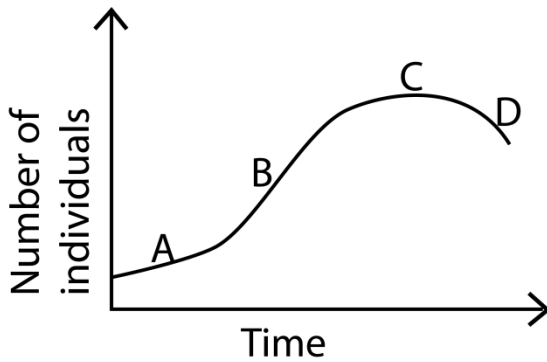
- A. Block entry of air
 - B. Prevent termite attack
 - C. Block penetration of moisture
 - D. Seal off wood defects
23. Which one of the following is a reason for making poultry wooden feed trough with lips? It
- A. allows chicks to stand on a feeder while feeding
 - B. prevents spillage of feeds during feeding
 - C. eases handling of the feed trough
 - D. prevents water from pouring into the feed trough
24. Which one of the following is true about plants that are produced by tissue culture? they
- A. Produce high quality fruits
 - B. Are resistant to diseases
 - C. Mature easily
 - D. Are identical
25. A nose ring fixed in the nose of work animal in order to
- A. identify the animal
 - B. ensure effective control of the animal
 - C. stop the animal from eating while at work
 - D. indicate a proven draught animal
26. The supply of labour for agricultural production is determined by the
- A. Amount of work available on the farm
 - B. Active proportional of the total population
 - C. Type of work available on the farm
 - D. Policy of the government on labor use
27. Calcium demand is highest in cattle during
- A. Fattening
 - B. Early growth
 - C. Gestation
 - D. milking
28. A pulley system was used to lift 100N of poultry feed to a floor 6m high. If the effort of 40N was used move through a distance of 24m, what is the efficiency of the pulley system?
- A. 25%
 - B. 40.0%
 - C. 62.5%
 - D. 80.0%
29. Which one of the following maize pest destroys the soft stem apex resulting into drying up plant tops?
- A. Leafhopper
 - B. Spotted stalk borer
 - C. Maize tassel beetle
 - D. Maize stalk borer

30. In cattle the gene for hornless is dominant over the gene for horned. What will be the percentage of horned cattle if a heterozygous bull is mated with a heterozygous cow?
- A. 100%
 - B. 75%
 - C. 50%
 - D. 25%

SECTION B

Answer all questions

31. The figure below shows variation in the number of organisms in the population with time



- (a) Name each of the stages labeled A, B, C, and D.

- A.
- B.
- C.
- D.

- (b) Explain what is taking place in phases A to D

- A
.....
- B
.....
- C
.....
- D
.....

- (c) Mention four examples of environmental resistance that may limit of the population shown in the figure above
32. (a) Explain the following terms used in simple machines.
- (i) mechanical advantage
 - (ii) Velocity ratio
 - (iii) Efficiency
- (b) A machine lifts a load of 200N through a distance of 1 metre when an effort of 50N is applied to it. If the distance moved by the effort is 6metres, determine the
- (i) Mechanical advantage of the machine
 - (ii) Velocity ratio of the machine
 - (iii)Efficiency of the machine
- (c) Explain four factors that may affect the efficiency of a machine (04marks)
33. (a) State four functions of nitrogen in growth and development of plants (04marks)
- (b) Give three ways in which nitrogen can be added to the soil (03marks)
- (c) Outline three effects of excess nitrogen applications (03 marks)
34. (a) Briefly explain the following market condition (04marks)
- (i) Perfect market
 - (ii) Imperfect market
 - (iii) Monopoly
 - (iv) Oligopoly
- (b) Give six reasons to explain why the supply of an agricultural commodity may be low even when the demand for it is high. (06marks)
35. (a) Explain the following methods used in animal selection (06marks)
- (i) Individual selection
 - (ii) Pedigree selection
 - (iii) Progeny testing
 - (iv) Tandem selection
- (b) State three situations in which progeny testing is used to select animals (03marks)
- (c) Give two limitation using progeny testing to select animals
36. (a) Give **five** characteristics of a pesticides (05mark)
- (b) State **five** factors that limit the use of pesticides by farmers. (05 marks)
37. (a) Give four factors to consider when choosing a draught animals(04marks)
- (b) State four advantages of using animal draught power (04marks)
- (c) outline four factors limiting the use of draught power. (02marks)

Suggested answers

1. C 4B 7C 10B 13D 16C 19B 22B 25B 28C
2. B 5D 8C 11A 14D 17A 20.A 23B 26B 29C
3. B 6C 9A 12C 15B 18A 21B 24D 27C or D

Comments

1. **Translocated herbicides** move to the site of action via the transport mechanisms within the plant; the xylem and phloem. The xylem transports water and nutrients from the soil to growth sites and the phloem transports products of photosynthesis (for instance, sugars) to growth and storage sites. It may take up to two weeks for symptoms to develop on the target weeds depending on herbicide rate, conditions and species.

Contact herbicides have limited movement within the plant, so complete coverage of the target is critical. Compared to translocated herbicides (for example, glyphosate), contact herbicides (for example, paraquat, oxyfluorfen, diquat and bromoxynil) tend to show symptoms rapidly, usually within 24 hours.

2. In the first stage of production function each additional variable produces more products, signifying and increasing marginal returns.

18. Symptoms of calcium deficiency in plants

- Yellowing of upper, younger leaves
- Tips of leaves turning brown to black and dying off
- Misshapen new leaves at the top of the plant
- Distorted, irregular, and odd-looking growth
- Stunted growth

Symptoms of magnesium deficiency in plant

- Yellow areas between the leaf veins, known as chlorosis. Older leaves may show yellowing between the veins while the veins themselves remain green.
- Necrosis or death of plant tissue
- Defoliation of lower leaves
- Reduced fruit yields
- Purpling areas on tomato plants

Symptoms of phosphorus deficiency in plants

- Stunted growth
- Purplish or reddish leaves
- Poor root development
- Thin/weak stems

Symptoms of phosphorus deficiency in plants

- Yellowing of Leaves (Chlorosis): Unlike nitrogen deficiency, sulphur deficiency symptoms appear first on the younger leaves. The leaves may turn pale-yellow or light green

- Stunted growth
- Delayed maturity
- Poor nodulation in legumes

19. Ring barking interrupt with phloem

20. Rickets are due to deficiency of calcium and vitamin D.

25. The nose ring assists the handler to control a potentially dangerous animal with minimal risk of injury or disruption by exerting stress on one of the most sensitive parts of the animal, the nose.

27. Critical times to ensure that diets contain adequate calcium are during pregnancy (for proper bone growth of the fetus) and during lactation (to prevent excessive calcium mobilization from the bones of the lactating cow).

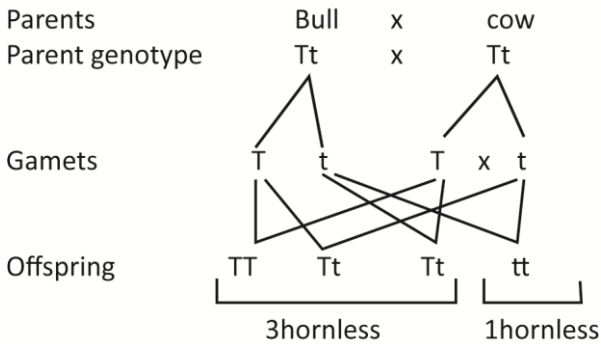
28. $M.A = \frac{Load (L)}{Effort (E)} = \frac{100}{40} = 2.5$

Velocity ratio (V.R) = $\frac{distance\ moved\ by\ effort}{distance\ moved\ by\ load} = \frac{24}{6} = 4$

Efficiency = $\frac{M.A}{V.R} \times 100\% = \frac{2.5}{4} \times 100\% = 60\%$

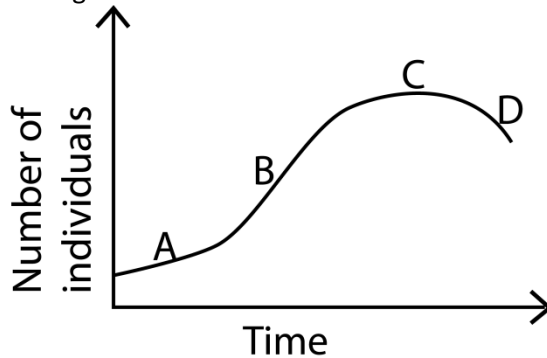
30. Genetic crosses are shown below

T for hornless
t for horned



Section B

31. The figure below shows variation in the number of organisms in the population with time



(d) Name each of the stages labeled A, B, C, and D.

- E. Lag phase
- F. Log/exponential phase
- G. Constant phase
- H. Decline phase

(e) Explain what is taking place in phases A to D

A – Slow growth due very few dividing cells

B - Exponential growth due to presence of big number of dividing cell

C - Growth slows down and finally stops due rate of cell division equal to rate of cell death or cell division limited by the genotype of the animal and onset of environmental resistance.

D - the rate cell death is higher than the number of cells formed due to environmental resistance

(f) Mention four examples of environmental resistance that may limit of the population shown in the figure above

- Diseases
- Predator
- Shortage of food
- Accumulation of toxic wastes
- Pollution
- Stress caused high population
- Limited space

32. (a) Explain the following terms used in simple machines.

(i) mechanical advantage: is a ratio of load over effort or $M.A = \frac{Load}{Effort}$

(ii) Velocity ratio: is the ratio of the distance moved by the load to the distance moved by the effort or $VR = \frac{distance\ moved\ by\ the\ load}{distance\ moved\ by\ the\ effort}$

(iii) Efficiency: is a percentage of work output to work input or $efficiency = \frac{work\ output}{work\ in\ put} \times 100\%$

(b) A machine lifts a load of 200N through a distance of 1 metre when an effort of 50N is applied to it. If the distance moved by the effort is 6metres, determine the

(i) Mechanical advantage of the machine

$$M.A = \frac{Load}{Effort} = \frac{200}{50} = 4$$

(ii) Velocity ratio of the machine

$$VR = \frac{distance\ moved\ by\ the\ load}{distance\ moved\ by\ the\ effort} = \frac{6}{1} = 6$$

(iii) Efficiency of the machine

$$Efficiency = \frac{MA}{VR} \times 100\% = \frac{4}{6} \times 100\% = 66.7\%$$

(c) Explain four factors that may affect the efficiency of a machine (04marks)

- **Friction:** this is the resistance to movement when two surfaces are moving against each other. Some power is lost as the result of friction. Thus when the friction is high the efficiency of the machine is lowered. Friction may be reduced by lubrication and/or making the surface smooth
- **Amount of load:** too much load on the machine reduces the efficiency of the machine. Machines should be loaded according to manufacturer's recommendation
- **Conditions of the machine:** efficiency is high when a machine is in good mechanical conditions
- **Skills of the operator:** high efficiency is achieved when the machine is operated according to manufacturer's recommendation
- **Type of the machine:** different machine have different inbuilt efficiency
- **Topography:** machine work well on gentle slope than on steep slopes.
- **Level of maintenance and servicing:** well-maintained machine retain high efficiency than faulty machines
- **Nature of vegetation cover:** machine work well with little sparse vegetation than dense thick vegetation
- **Soil type:** machines work efficiently in light soils than in heavy soils.
- **Field conditions such** as presence of heavy stones and trees stamps retard the efficiency of a machine

33. (a) State four functions of nitrogen in growth and development of plants (04marks)

- It's necessary for the formation of chlorophyll
- It improves the quality and quantity of leaf crops such as cabbages, dodo, etc.
- It is a constituent of plant proteins.
- It facilitates in cell division and therefore responsible for growth
- Controls the use of phosphorus and potassium in the plants
- Regulates availability of P and K.

(b) Give three ways in which nitrogen can be added to the soil (03marks)

- Commercial fertilizers e.g. NPK, Urea, CAN, Sulphate of ammonia, Diammonium phosphate (DAP)
- Organic fertilizers like farm yard manure, compost manure and green manure.
- Lightening.
- Nitrogen fixation by nitrogen fixing bacteria

(c) Outline three effects of excess nitrogen applications (03 marks)

- Excessive leaf production
- Delayed maturity
- Leaf and stem logging
- Scotching of leaves
- Poor crop yields

34.) Briefly explain the following market condition (04marks)

- Perfect market: is a market structure where there are many sellers and buyers dealing in homogenous products.
- Imperfect market: is a market structure where there are many sellers and buyers dealing in different products.
- Monopoly: is a market structure where there is one firm selling a good that does not have close substitute but facing many buyers.
- Oligopoly: is a market structure where there are a few big firms dealing either in homogenous or differentiated products facing many buyers e.g. MTN and Airtel or petrol stations

(b) Give six reasons to explain why the supply of an agricultural commodity may be low even when the demand for it is high. (06marks)

- Bulkiness of the products making it difficult to transport to places where they are demanded
- Lack of method of preservation to sell in time of scarcity
- Poor transport system that fails transportation of agricultural products
- Long biological lag makes it difficult to increase supply in short run
- Weather uncertainties may disrupting production
- Use of poor technology leading to low production
- Low production due to few farmers
- Seasonality making them to be in excess in certain part of the year and in short supply in the other part of the year e.g. grasshoppers (ensenene)
- Lack of storage facilities store excess
- Lack of inputs such as land

35. (a) Explain the following methods used in animal selection (06marks)

(i) Individual selection:

It is the selection of animals basing on their performance and appearance. The animals' genetic potential is based on the animals' performance. This aid is used for traits of high heritability where the animals' own performance is an accurate guide how its offspring will be.

- (ii) Pedigree selection
This is the evaluation and selection animals only on the basis of performance of their parents and grandparents/ancestors. The ancestral records are used to predict those animals (descendants) that would transmit good traits to the future generations
- (iii) Progeny testing
It refers to evaluation of bulls on the basis of their daughter's performance. it is commonly used to assess the breeding of the males in relation to milk production, mothering ability, udder conformation and food conversion ability.
- (iv) Tandem selection
The selection in which several traits are improved in succession, such as selection is carried out first for one trait, until a desired genetic level is reached, then selection for the second, third, and following traits are performed.

(b) State three situations in which progeny testing is used to select animals (03marks)

- When the character of the parents can be determined after slaughter
- When selecting animal for weakly inherited traits
- When selecting animals for traits expressed in one sex (e.g. milk production for a bull)
- In case selection of an animal sire will definitely be inaccurate
- In case heritability of a particular character takes a long time

(c) Give two limitation using progeny testing to select animals

- The animal has to grow and produce offspring therefore takes a long time
- The performance of the off spring may be due to other factors other than those which are genetic
- Keeping of progeny groups for a long period is costly.

36. (a) Give **five** characteristics of a pesticides (05mark)

- 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 or harmful to environment

(b) State **five** factors that limit the use of pesticides by farmers. (05 marks)

- they and application equipment are expensive
- application of pesticides requires skill especially in measuring and mixing
- they kill beneficial organism as well for example pollinator.
- They pollute the environment

- They lower the value and/quality of products
- They are poisonous to the farmer and livestock
- Lead to chemical resistant pests on prolonged use of same pesticide
- Accumulate in ecosystem
- Pesticides can be poisonous to farmers and their animals
- Some pesticides are inflammable and may cause fire hazards
- Some pesticides such as DDT accumulate in food chain leading to toxic levels and may eliminate organisms in top trophic levels.

38. (a) Give four factors to consider when choosing a draught animals(04marks)

- **Power output:** animals with high power output are mostly preferred for use in traction
- Amount of traction: the animal should be able to give fair good traction on soft and slippery ground.
- **Availability of animals:** availability of a given species of draught animals in the area or nearby areas influences its use on the farm
- **Cost of the animal:** to minimize the cost of production, farmers may use animals that cost less.
- **Level of care:** draft animals requiring less specialized and cheaper care are preferred for use on a farm
- **Adaptability to local conditions:** draught animals are should be well adapted to local conditions.
- **Resistance to pest and diseases:** draught animals should be resistant to pests and diseases.
- **Temperament:** cool temperament is highly recommended

(b) State four advantages of using animal draught power (04marks)

- They are economical on small scattered plots
- They are cheap to buy and use, does not require fuel
- Draught powered technology requires little skill
- Draught animals provide manure and meat as well
- They deliver higher power compared to man
- No pollution
- Oxen do not depreciate like tractors.
- Have low maintenance costs.
- Create employment opportunities.

(c) Outline four factors limiting the use of draught power. (02marks)

- Unavailability of draught animals
- Conservativeness of some farmers to adopt to draught technology
- Availability of alternative sources of power like human labor.
- Lack of capital to purchase draught animals

- Pests and disease
- Lack of skills to use draught animals on the farm
- Poor climate leading to lack of feeds to draught animals
- Presence of heavy soils in most parts of the country.
- Presence of poor topography characterized by steep slopes and ragged terrain
- Thick and tall vegetation that interfere with animal's work
- Expensive veterinary services
- Unsupportive government policy such high taxation on ox-drawn equipment

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Thanks

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