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.

1. Poor root respiration in the soil may be a result of
   A. high amount of organic matter in the soil
   B. high water level in the soil
   C. optimal temperature of the soil
   D. low frequency of soil cultivation
2. If a feed consumption in a poultry house is 120g/bird/day, how many 70kg bags of feed should a farmer stock for 625 birds for a week?
   A. 7.5 bags
   B. 75 bags
   C. 153 bags
   D. 7500 bags
3. Which of the following hormones sustains the secretion of progesterone to maintain pregnancy in an animal?
   A. Follicle stimulating hormone
   B. Luteinizing hormone
   C. Oxytocin
   D. estrogen
4. Which one of the following causes a shift along the same demand curve?
   A. Change in income
   B. Increase in population
   C. Change in commodity price
   D. Change in taste and preference.
5. The following are ways of getting the most out of farm labour except
   A. Providing a duty roster for workers
   B. Measuring the work done by each worker
   C. Making worker do specific jobs
   D. Training worker in relevant skill
6. Roughages should be included in animal's feed ration to

A. Increase the amount of feed taken by the animal
B. Improve the texture of the feed making it easy to eat
C. Increase the digestibility of the feed taken by the animal
D. Reduce the cost of feeds

7. If the capacity of a dip tank is 18,000 litres and the recommended mixing ratio of Acaricide to water is 2:500, calculate the amount of Acaricide to be added to the water to fill the dip.
   A. 35 litres
   B. 36 litres
   C. 70 litres
   D. 72 litres
8. Which **one** of the following statements is true about complementary products?
   A. The demand for them is the same
   B. They use the same inputs
   C. An increase in the production of one is accompanied by increase in the production of the other
   D. An increase in the production of one results in a decrease in the production of the other.
9. A farmer would like to mix a feed ration containing 20% crude protein using maize bran containing 16% crude proteins and fish meal containing 38% crude proteins. In what proportion would the maize bran and fish meal be mixed to get 100 kg of feed mash?
   A. 22 kg maize bran and 78kg fish meal
   B. 80kg maize bran and 20kg fish meal
   C. 82 kg maize bran and 18 kg fish meal
   D. 38 kg maize bran and 62 kg fish meal
10. Crops in wet cold soil will not efficiently absorb essential minerals because
    A. Absorption of minerals in an active process
    B. Minerals are excessively diluted
    C. Soil organisms that are important in the process will be less active
    D. The acidity level of the soil increase, prohibiting absorption
11. When a gene masks the effect of another gene situated on a different locus on a chromosome the phenomenon is referred to as
    A. Heterosis
    B. Dominance
    C. Allelopathy
    D. epistasis
12. the following results were obtained from selfing of F1 generation of pure breeding parents for round and wrinkled seeds given that round is dominant over wrinkled seeds. If in F2 the number of offspring were 7,524, what is the actual of F2 generation plants with round seeds?
    A. 1.762
    B. 1,881
    C. 2,008
    D. 5,643
13. The use of plastics on the external parts of farm structure is not recommended because
    A. Are too weak to support the structure

B. Degenerate fast under high temperature
C. Are too costly to farmers
D. Are poor conductor of heat

14. Equilibrium price is described as the
    A. highest price at which a commodity can be bought
    B. price at which a commodity is sold at profit
    C. price obtained at a point where supply and demand curves intersect
    D. price that is acceptable to both buyer and seller
15. The following statements are true about pathogens that infect plants **except**
    A. there should be contact pathogen and susceptible tissue
    B. presence of pathogen in a plant is sufficient to cause disease
    C. the pathogen should be adaptable to the environment of the plant
    D. the path
16. Calculate the number of pineapple sucker required to plant in one hectare of land given that the spacing for pineapple is 90cm by 30cm
    A. 37,077 suckers
    B. 4,037 suckers
    C. 3,710 suckers
    D. 370 suckers
17. *Amaranthus* grow well where waste materials have been burnt because
    A. There is a lot of nitrogen
    B. Zinc is available in the ash
    C. Of absence of soil borne diseases
    D. Potassium is available in the ash
18. A hen maintains humidity around eggs during incubation by
    A. Bathing in dew before sitting on eggs
    B. Laying eggs on damp surfaces.
    C. Sweating on the abdomen while sitting on eggs
    D. Exposing the eggs to absorb moisture from atmosphere

19. If a pasture is consumed at a rate of 2.4% of body weight of an animal per day, what would be the amount of pasture consumed for 7 days by an animal whose body weight is 650kg.
    A. 222.86kg
    B. 109.20 kg
    C. 92.86 kg
    D. 38.69kg
20. Which one of the following types of sprayer would be suitable for spraying tree crops?
    A. Bucket hand spray
    B. Motorized mist blower sprayer
    C. Spinning disc sprayer
    D. Knapsack sprayer

21. The price of maize flour in the market rose from 12,000/= to 16,000/= per bag. As a result, the quantity of maize supplied increased from 25000 bags to 30,000 bags. What is price elasticity for the supply for the maize flour?
    A. 1.5
    B. 1.3
    C. 0.7
    D. 0.6
22. In designing a cattle dip, the draining race is made longer than the entrance race to
    A. Allow the animal to rest after dipping
    B. Allow many animals to be dipped at ago
    C. Sort animals after dipping exercise
    D. Allow time for excess for excess Acaricide to drain from animals
23. When loam soil is heated in an oven at 120^0C for one hour, loss in weight will be due to
    A. loss of water from the soil sample
    B. death of microorganisms in the soil sample
    C. destruction of the structure of the soil sample
    D. burning of organic matter in the soil sample
24. The functional similarity between the rumen and gizzard is that both
    A. Ferment food
    B. Break down cellulose in food
    C. Produce enzymes that can act on fiber in food
    D. Breakdown coarse food particles

25. Which one of the following qualities does not apply to a good calf pen?
    A. Rough concrete floor
    B. Vermin proof
    C. Good drainage
    D. Good ventilation
26. A farmer is advised to operate in region 2 of production function because
    A. Exhausts all returns that can get by using extra input
    B. Uses very little input and get a large amount of output
    C. Produces more output every unit input used
    D. Gets constant returns for every unit input used
27. Which one of the following diseases is characterized by muscular spasms uncoordinated movement and paralysis in cattle?
    A. Ketosis
    B. Milk fever
    C. Nitrate poisoning
    D. Anaplasmosis
28. Which one of the following types of damages is caused by piecing and sucking insect pest?
    A. Destruction of plant roots
    B. Boring tunnels in plant stems

C. Introduction of disease causing organisms into the plant
D. Destruction of the growing points of the plant

29. A suitable ratio of sand to cement in making a mortar for brick laying is
    A. 1:4
    B. 3:2
    C. 2:3
    D. 4:1
30. In the food chain green plant → grasshopper → hen → kite, the organism which belongs to the trophic level with the highest energy is
    A. Grasshopper
    B. Hen
    C. Green plants
    D. Kite

Suggested answers to question 1 - 30

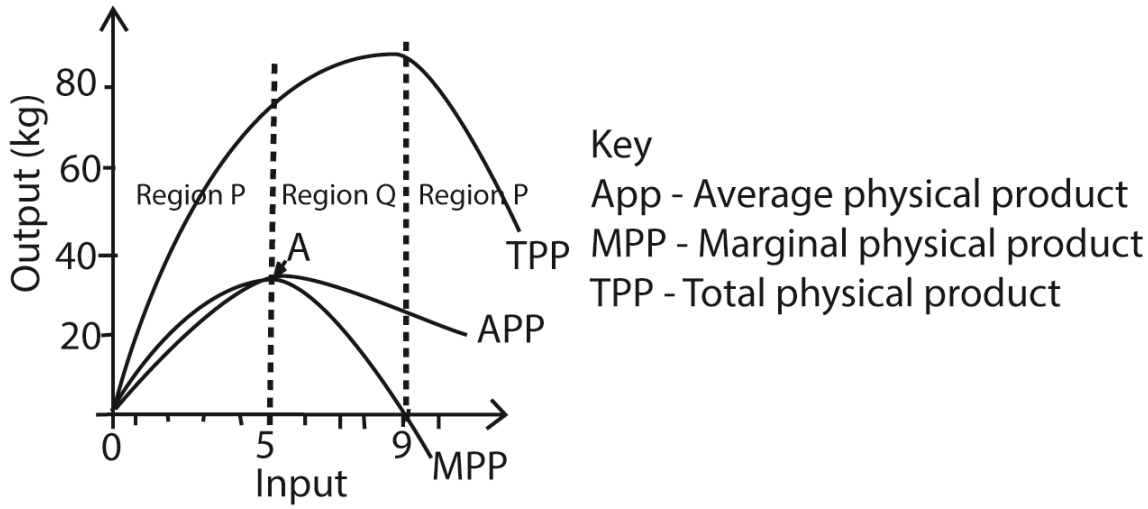
1B	4C	7D	10A	13B	16A	19B	22D	25A	28C
2A	5B	8A	11D	14C	17A	20B	23A	26A	29D
3A	6C	9C	12D	15B	18C	21D	24D	27B	30C

Section B

31. (a) Explain four ways in which water logging of soil affects crop growth (04marks)
    (b) State three disadvantages of surface drainage. (03marks)
    (c) Mention three ways in which the construction of ridges improves crop production in water logged soils. (03 marks)

32. (a) Give four reasons why poorly drained areas should be avoided when choosing sites for farm buildings. (04 marks)
    (b) Explain the six qualities of a good poultry house
33. (a) Distinguish between stocking rate and carrying capacity (02marks)
    (b) Explain **four** factors that influence the carrying capacity of a pasture (04marks)
    (c) Describe four conditions which indicate that the nature pasture requires improvement (04marks)

34. The figure below is a production function. Study it carefully and answer the question that follow



(a) Briefly explain what is occurring in the following regions of production function
   (i) Region P
   (ii) Region R

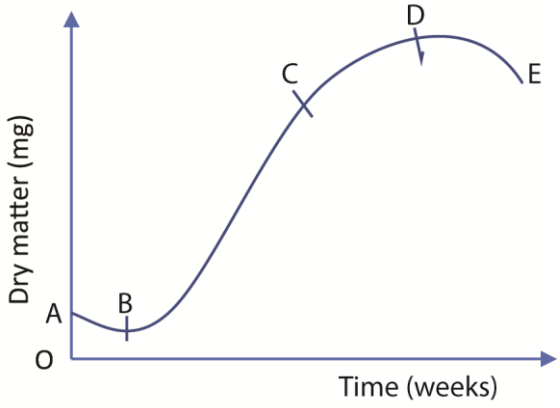
(b) Identify the best region of production function within which a farmer should operate. Give two reasons for your answer.(02marks)

(c) Briefly explain what is occurring at point A of the production function (02)

(d) Describe the relation between APP and MPP in region Q of the production function (02marks)

35. (a) List five factors that affect symbiotic nitrogen fixation in the soil (05marks)
   (b) Give five uses of nitrogen in plants (05marks)

36. The figure below shows the accumulation of dry matter of bean plant measured at different stages of growth from plating up to harvesting time. Study the figure and answer the questions that follow.



(a) Name the different stages
   (i) A – B
   (ii) B – C

(iii) C – D

(iv) D – E

(b) State four physiological events that occur between A and B (04marks)

(c) Account for rapid increase in dry matter yield between B and C (02marks)

(d) Suggest two causes of the decline in dry matter yield between A and E

37. (a) Name five characteristics of roughages in animal feeds (05marks)

(b) Explain how the quality of silage can be improved. (05 marks)

38.

OA

Slow growth due very dividing cells

AB

Exponential growth due to presence of big number of dividing cell

31. (a) Explain four ways in which water logging of soil affects crop growth (04marks)

- Reduced oxygen levels near the rhizosphere: Oxygen is essential for root respiration and nutrient uptake.
- Altered soil physicochemical properties
- Reduced nitrogen uptake: Elements like nitrogen, phosphorus, and potassium may not be efficiently absorbed by waterlogged plants.
- Aerenchyma development: some plants respond by developing aerenchyma to facilitate oxygen transportation.
- Lead to development of aerial roots.
- Anaerobic conditions prevail, leading to crop death
- Plant roots fail to respire due to excess water

(b) State three disadvantages of surface drainage. (03marks)

- Limited infiltration, leading to increased runoff and erosion.
- Limited effectiveness in heavy rain, resulting in flooding or water damage.
- Susceptibility to clogging by debris and vegetation, requiring regular maintenance.
- Alteration of landscape aesthetics with visible channels and drains.
- Can contaminate water bodies.

(c) Mention three ways in which the construction of ridges improves crop production in water logged soils. (03 marks)

- Water management: ridges manage excess water by elevating the crop rows promoting aeration of the soil, promoting root growth and nutrient uptake
- Improved soil structure: ridges prevent soil compaction and enhance soil structure.
- Nutrient availability: ridges improve availability of nutrient availability to plants.
- There is improved aeration and better root development

32. (a) Give four reasons why poorly drained areas should be avoided when choosing sites for farm buildings. (04 marks)
    - **Foundation Stability**: Buildings constructed on poorly drained sites may experience unstable foundations due to shifting soil caused by water saturation. This instability can lead to structural damage over time.
    - **Dampness and Mold**: Moisture from poor drainage can seep into building foundations, walls, and floors. Damp conditions promote mold growth, compromising indoor air quality and potentially damaging building materials.

- **Wood Rot**: Wooden components (such as beams, posts, and siding) are susceptible to rot in damp environments. Poor drainage increases the risk of wood decay, weakening the building's structural integrity.
- **Corrosion**: Metal components (such as nails, screws, and fasteners) can corrode more rapidly in wet conditions. This affects the durability of farm buildings, especially those with metal roofing or siding.
- **Access Challenges**: Poor drainage makes it difficult to access farm buildings during rainy seasons. Muddy pathways and flooded areas hinder movement of equipment, livestock, and personnel.
- **Livestock Health**: If farm buildings house livestock, waterlogged areas can lead to unsanitary conditions. Wet bedding, muddy floors, and stagnant water increase the risk of diseases and discomfort for animals.

(b) Explain the six qualities of a good poultry house

33. (a) Distinguish between stocking rate and carrying capacity (02marks)

Stocking rate is defined as the number of animals on a given amount of land over a certain period of time **while carrying capacity** is the maximum number of organism that an ecosystem can sustainably support.

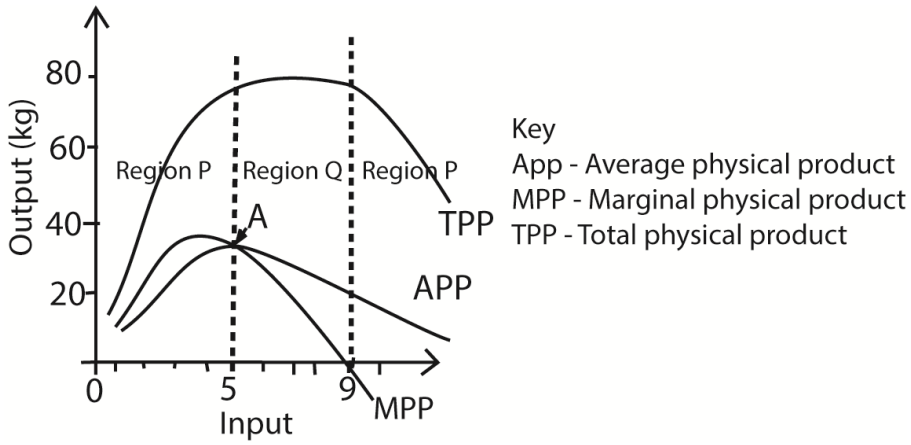
(b) Explain **four** factors that influence the carrying capacity of a pasture (04marks)

- **Size of pasture land:** the bigger the size of pasture land, the higher the carrying capacity
- **Absence of pests and diseases** lead to high carrying capacity
- **Forage production:** The amount of forage available in the pasture.
- **Forage quality:** The nutritional value of the forage.
- **Grazing system:** The type of grazing system employed on the pasture.
- Soil fertility: The nutrient content in the soil.
- **Climate and weather conditions:** The environmental factors affecting pasture growth.

(c) Describe four conditions which indicate that the nature pasture requires improvement (04marks)

- **Patchy or bare spots**: reduce the amount of pasture harvested
- **Weeds taking over:** reduce the quality of pasture
- **Reduced forage production:** reduce the amount of pasture harvested
- **Change in pasture density:** reduce the amount of pasture harvested
- **Reduced ground cover:** reduce the amount of pasture harvested

34. The figure below is a production function. Study it carefully and answer the question that follow



(a) Briefly explain what is occurring in the following regions of production function

(i) Region P

Generally TPP, MPP and APP increase. The ratio of the fixed factor to the variable factor is high, that is, the fixed factor is underutilized by the variable factor. MPP is greater than APP.

(ii) Region R

Generally, TPP, APP and MPP are declining and MP is negative. This implies, employment of an extra unit of a variable factor leads to a decline in the total output due to over utilization of the fixed factor by the variable factor.

(b) Identify the best region of production function within which a farmer should operate. Give two reasons for your answer.(02marks)

Region Q

Reasons

- There is efficient utilization of the fixed factors by the variable factor
- the producer maximizes profit because MPP is positive

(c) Briefly explain what is occurring at point A of the production function (02 marks)

It is a point beyond which TPP product is increasing at a declining rate.

(d) Describe the relation between APP and MPP in region Q of the production function (02marks)

APP = MPP

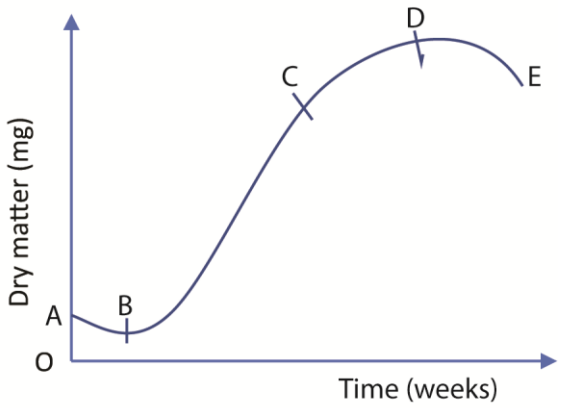
35. (a) List five factors that affect symbiotic nitrogen fixation in the soil (05marks)

- Presence of nitrogen fixing bacteria (**of** the genus **Rhizobium)**
- Presence of root legume roots in whose root nodule bacteria live
- Presence favorable temperature
- Presence of oxygen in the soil for respiration of bacteria
- Presence of nitrogen in the soil to be fixed
- Presence of zinc in the soil: zinc is necessary for nitrogen fixation acting as a secondary signal for nitrogen fixation
- Presence of antimicrobial agents in the soil

(b) Give five uses of nitrogen in plants (05marks)

- used in synthesis of chlorophyll
- used in production structure i.e. constituent of proteins
- used in synthesis of enzymes
- used in synthesis of hormones
- used in synthesis of poisonous substance that protect the plants from predators.
- Controls the use of phosphorus and potassium in the plants
- It improves the quality and quantity of leaf crops such as cabbages, dodo, etc.
- It helps in cell division and therefore responsible for growth
- Controls the use of phosphorus and potassium in the plants

36. The figure below shows the accumulation of dry matter of bean plant measured at different stages of growth from plating up to harvesting time. Study the figure and answer the questions that follow.



(a) Name the different stages

(v) A – B: lag phase/establishment stage

(vi) B – C: logarithmic stage/rapid growth stage

(vii) C – D: steady stage/maturation stage

(viii) D – E : decline stage/senescence

(b) State four physiological events that occur between A and B (04marks)

- Hydrolysis of storage food material
- Synthesis of enzymes, nucleic acids, structural proteins
- Respiration to provide energy for cellular activities
- **Glucose** and amino acids are translocated from the storage centre (endosperm or cotyledon) of the seed to the growing regions of the embryo.
- Cell division, elongation and differentiation leads to immergence of a seedling from a seed.

(c) Account for rapid increase in dry matter yield between B and C (02marks)

- Rapid cell multiplication due to presence of many cells
- Absence of diseases and other environmental resistance.
- Absence of pollutants

(d) Suggest two causes of the decline in dry matter yield between A and E

High rate cell death caused

- Accumulation of waste/toxic materials in plant that inhibit growth
- Diseases
- Predators/parasite
- Lack of water towards dry season

37. (a) Name five characteristics of roughages in animal feeds (05marks)
    - Increase bulkiness of feed;
    - Reduce bulky density of feed
    - Make feeds hard to chew
    - Increase fluidity of feeds
    - Roughages promote the breakdown of complex carbohydrates in rumen.

(b) Explain how the quality of silage can be improved. (05 marks)

- Use the right type of grass and legume species ensiled
- Cut grass at the right stage of growth of the species ensiled
- Ferment for at least three weeks or appropriate
- Use the right type and amount of additive such as urea
- Use appropriate temperature during fermentation.
- Careful harvesting of the material to reduce losses of leaves and contamination by soil.
- Proper sealing of the silos to prevent re-entry of air into the silo.
- Proper fermentation of the material to exclude oxygen and acid fermentation.
- Proper chopping of the material to ensure proper fermentation.
- Wilting of the material before ensiling to reduce the moisture content and reduce the possibility of rotting.
- Addition of additives to increase the energy supply for the bacteria and preservatives.
- Quick use of the material once the silo has been opened to reduce the chances of spoilage due to exposure to the environment.