THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION, 1993

034 AGRICULTURAL SCIENCE

TIME: 2 ½ Hours.

INSTRUCTIONS

1. This paper consists of 35 questions in two Sections, A and B.
2. Answer ALL questions.
3. Read the Instructions given under each section carefully.
4. All writing must be in blue/black ink or ball point pen.
5. All answers must be written in the answer book provided.
6. You are advised to spend 30 minutes on Section A and 120 minutes on Section B.
7. Write your centre and index numbers on every page of your answer book.

SECTION A

Nature of questions	=	Multiple choice
Marks allocated	=	20 marks (20%)
Time allocated	=	30 minutes.

Answer ALL questions in this section. Under each of the questions below, only one of the four answers provided is the most correct. Write down the letter with the most correct answer in the answer book provided.

1. During soil formation, which factor is most important in influencing the amount of soil particles which are present in the soil profile?
   A. Type of parent material
   B. Time
   C. Topography
   D. Climate

2. Which of the following fertilizers would be suitable for application of nitrogen on a soil that has a pH of 5.0 and is deficient in nitrogen?
   A. Calcium Ammonium Nitrate
   B. Sulphate of Ammonia
   C. Ammonium Sulphate Nitrate
   D. Urea

3. Which of the following mineral elements has an influence on the availability of inorganic phosphorus in the soil?
   A. Available boron
   B. Available copper
   C. Available calcium
   D. Available potassium

4. In a four-stroke internal combustion engine, the compression stroke occurs immediately after:
   A. Ignition stroke
   B. Inlet stroke
   C. Exhaust stroke
   D. Power stroke

5. A method of artificial regeneration of trees which involves the growing of forest trees together with agricultural crops in the early stages is known as:
   A. Coppice system
   B. Shelter system
   C. Taungya system
   D. Silvicultural system

6. At what stage of the following flowering seasons should harvesting of honey be done?
   A. At the end
   B. Just before
   C. At the beginning
   D. At the middle

7. Using the formula $LW = \frac{L \times G^2}{300}$, what is the liveweight of a bull which is 58 inches from the point of shoulder to the pinbone and has a girth of 60 inches?
   A. 720 kg
   B. 672 kg
   C. 696 kg
   D. 420 kg

8. One of the most effective ways of controlling Foot and Mouth Disease is:
   A. Drenching
   B. Quarantine
   C. Dipping
   D. Paddocking

9. The best method adopted for the control of red ball worm cotton pest in Tanzania is:
   A. Spraying insecticides
   B. Crop rotation
   C. Closed season
   D. Quarantine

10. The difference between the value of output and variable costs is known as the:
    A. Gross margin
    B. Gross profit
    C. Net profit
    D. Surplus

11. When planning a rotation of growing vegetable crops in a garden, cabbages may be grouped as:
    A. Medium feeders
    B. Heavy feeders
    C. Light feeders
    D. Very light feeders

12. The measurement of vertical distances on a land area is known as:
    A. Pacing
    B. Taping
    C. Levelling
    D. Traversing

13. The duration taken by an animal from the day of conception to the time of giving birth is known as:
    A. Breeding period
    B. Lactation period
    C. Flushing period
    D. Gestation period

14. If the price of cabbages rises from 2/= per kg to 7/= per kg while supply decreases from 10,000 to 2,000 tonnes per week, what will be the elasticity of supply for cabbages?
    A. 0.32
    B. 0.50
    C. 0.80
    D. 1.00

15. A soil sample analysed in the laboratory was found to weigh 150 gm. Its volume was 100 cm^3; the volume of soil particles was 50 cm^3 and the volume of pore space was 50 cm^3. What was its particle density?
    A. 2 gm/cm^3
    B. 3 gm/cm
    C. 4 gm/cm^3
    D. 5 gm/cm^3

16. What is the approximate percentage base saturation of a soil which contains 2 m.e. Hydrogen ions and 6 m.e. Bases for 100gm of oven dry soil?
    A. 6%
    B. 25%
    C. 33%
    D. 75%

17. A loam soil sample with maximum water retentive capacity of 45% was analysed in the laboratory two days after it had rained. The water content of the sample was found to be 5% at 31 atmospheres, 6% at 15 atmosphere and 33% at ⅓ atmospheres. What is the percentage moisture which could be available to plants growing from where the soil sample was taken?
    A. 27%
    B. 28%
    C. 39%
    D. 40%

18. Plants in the field usually wilt permanently when the soil loses its moisture up to a point at which the moisture remaining in it is held at a force which is:
    A. Between 31 and 100 bars
    B. 31 bars
    C.. Greater than 15 bars
    D. Greater than ⅓ bars

19. In which one of the following methods of agricultural produce can SALTING be classified?
    A. Physical
    B. Chemical
    C. Mechanical
    D. Biological

20. How many revolutions are made by the crankshaft of a four-stroke tractor engine when it turns one complete cycle?
    A. Four
    B. Three
    C. Two
    D. One

SECTION B

INSTRUCTIONS

Nature of questions	=	Short answer type
Marks allocated	=	80 marks (80%)
Time allocated	=	120 minutes.

Answer ALL questions. Credit will be given for answers which are precise, brief and to the point.

21. A farmer wants to mix a pig ration of 100 kg containing 16% protein. He has the following ingredients for use:

    Maize meal containing 11% protein
    Cereal balancer containing 36% protein

    Using the Pearson square method, calculate the amount of maize meal and cereal balancer which he can mix up to make 100 kg of the ration.

22. When a sow was observed to be on heat, a boar was allowed to mate with it on June 30th. Assuming that the sow became pregnant:
    (a) On approximately what date would the sow be expected to farrow (i.e. to give birth)?
    (b) On approximately what date will the piglets be weaned?
    (c) Mention four ways which you could use to provide iron to the piglets as to prevent the occurrence of anemia.

23. (a) Define the term depreciation.
    (b) Mention three methods of calculating the depreciation of a farm asset.
    (c) A dairy building which had been depreciating at 3,000/= per annum was demolished in 1985 after being in use for 20 years. Its remains were sold at 4,000/=. What was the original cost of the house?

24. Before starting a tractor prior to performing farm operations, what servicing operations need to be done on the following tractor components?
    (a) Battery
    (b) Radiator
    (c) Engine oil
    (d) Tyres' pressure

25. Using the following headings, describe how you would raise a crop of cabbage (Prize drumhead variety):
    (a) Land preparation
    (b) Fertilizers
    (c) Propagation
    (d) Spacing
    (e) Pest control

26. Briefly explain any five good management requirements you will need in order to ensure that maximum power output can be obtained from a team of drought animals kept on the farm.

27. What is a crop pest? For each of the following insect pests, mention one crop which it attacks, one prominent symptom of attack on the crop and one method of controlling the insect pest.
    (a) American boll worm
    (b) Stalk borer
    (c) Antestia

28. Explain briefly how the following become affected when the pH of the soil decreases to acidic levels?
        (i) Availability of iron, aluminium and manganese to plants
        (ii) Availability of phosphorus to plants
        (iii) Availability of calcium and magnesium to plants
        (iv) Availability of molybdenum to plants
        (v) Growth and activity of soil bacteria.

29. (a) Define the word parasite as used in animal production
    (b) Parasites can be categorized as Ecto-parasites and Endo-parasites. For each category, name two examples.
    (c) Outline four effects of parasitic animals to livestock production.

30. (a) Define the term vice as used in poultry production
    (b) Mention four vices which might be encountered in a flock of poultry kept in a deep litter house.
    (c) Mention any five ways of preventing such vices.

31. (a) Define the term colostrum as used in dairy production.
    (b) Why is colostrum very important to the newborn calf? Give four reasons.

32. (a) Name four types of hand saws commonly used in wood work. Explain the use of each type of saw.
    (b) Name three types of planes used in woodwork and explain the use of each.

33. (a) What is soldering? Name four basic soldering equipment and explain the use of each.
(b) List and describe four methods of surface irrigation methods used in agriculture.

34. One 31st December 1980 a farmer had 5 bags of feedstuffs each worth shs.250/=, 4 bags of fertilizers each worth shs.120/=, a harrow that is 10 years old and was bought for shs.5000/= with an expectation that it would be used for 15 years when it would be written off with a salvage value of shs.200/=. In addition, there were:

3 milk cows	@	shs 5,000/=
210 broilers	@	shs 150/=
250 layers	@	shs 200/=

Write down an inventory and valuation as at 31st December 1980 for this farmer.

35. A farmer with 10 hectares of maize farm wants to replace hired labour with a team of hired oxen and a plough.

Use the data below to find out whether the change would be economically worthwhile. Set out the calculation in the form of a partial budget.

Alternatives	Output	Selling price
Hired oxen	960 Kg/Ha	Shs.500/= @ Kg.
Hired labour	600 Kg/Ha	Shs. 5/= @ Kg.

Variable costs of growing cotton using oxen
Hired oxen (2) and plough cost shs.200/= @ Ha.
Supplementary feeds for oxen in each farming season cost shs.320/= @ oxen
Picking costs using hired labour costs shs. 4 /= @ 30 Kg.

Costs of growing cotton using hired labour
Land preparation: 30 mandays @ Ha at shs 14/= per manday.
Picking costs using hired labour is shs.4/= @ 30 kg.