

Name:.....

Identification Number:.....

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination

November 2000

AGRICULTURAL SCIENCE 2

3 hours

Do not open this booklet until you are told to do so. While you are waiting, read the following instructions carefully. Write your Name and Identification Number in the spaces provided at the top right-hand corner of this booklet.

This paper consists of two parts. Answer Part I in your Objective Test answer sheet and Part II in your answer booklet. Part I will last for 1 hour after which the Objective Test answer sheet will be collected. Do not start Part II until you are told to do so. Part II will last for 2 hours.

PART 1
OBJECTIVE TEST
[60 marks]

1 hour

1. Use HB pencil throughout.
2. If you have got a blank answer sheet, complete the top section of it as follows:
 - (a) In the space marked **Name**, write in capital letters your **surname** followed by your **other names**.
 - (b) In the spaces marked **Examination**, **Year**, **Subject** and **Paper**, write 'W.A.S.S.C.E.', '2000 NOVEMBER', 'AGRICULTURAL SCIENCE' and '2', respectively.
 - (c) In the box marked **Identification Number**, write down your **Identification Number** vertically in the spaces on the left-hand side. There are numbered spaces in line with each digit. Shade carefully the space with the same number as each digit.
 - (d) In the box marked **Subject Code**, write down the digits 502213 in the spaces on the left-hand side. Shade the corresponding numbered spaces in the same way as for your identification number.
 - (e) In the box marked **Sex**, shade the space marked **M** if you are male, or **F** if you are female.
3. If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in 2 above. In the boxes marked **Identification Number**, **Subject Code** and **Sex**, reshade each of the shaded spaces.
4. An example is given below. This is for a female candidate, whose **name** is Chidera Nkiruka OBI, whose **Identification Number** is 5251102068, and who is offering Agricultural Science 2.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: OBI CHIDEREA NKIRUKA Examination: WASSCE Year: 2000 NOV.
 Surname Chidera Other Names Nkiruka
 Subject: AGRICULTURAL SCIENCE Paper: 2

IDENTIFICATION NUMBER									
5	0	0	1	1	2	2	3	3	4
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6	0	0	1	1	2	2	3	3	4
8	0	0	1	1	2	2	3	3	4

SUBJECT CODE									
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2	0	0	1	1	2	2	3	3	4
2	0	0	1	1	2	2	3	3	4
1	0	0	1	1	2	2	3	3	4
1	0	0	1	1	2	2	3	3	4
3	0	0	1	1	2	2	3	3	4

SEX									
Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box:									
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							

INSTRUCTIONS TO CANDIDATES

1. Use grade HB pencil throughout.
2. Answer each question by choosing one letter and shading it like this: [A] [B] [C] [D]
3. Erase completely any answers you wish to change.
4. Leave extra spaces blank if the answer spaces provided are more than you need.
5. Do not make any markings across the heavy black marks at the right hand edge of your answer sheet.

For Supervisors only.

If candidate is absent shade this space:

Answer all the questions.

Each question is followed by four options lettered A to D. Find out the correct option for each question and shade in pencil on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only one answer to each question.

An example is given below.

The farm input which will boost the productivity of a depleted soil is

- A. fertilizer.
- B. fungicide.
- C. insecticide.
- D. seed.

The correct answer is fertilizer which is lettered A and therefore answer space A would be shaded.

[A]

[B]

[C]

[D]

Think carefully before you shade the answer spaces; erase completely any answer(s) you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. Which of the following is not a solution to problems of local farmers?
 - A. Rehabilitating bad roads
 - B. Subsidizing crude implements
 - C. Practising improved farming methods
 - D. Providing credit facilities by governments

2. The main motive of the farmer in commercial agriculture is to
 - A. maximize profit.
 - B. produce rare crop varieties.
 - C. produce for family consumption.
 - D. increase risk.

3. The land tenure system which leads to land fragmentation is
 - A. freehold.
 - B. inheritance.
 - C. pledging.
 - D. gift.

4. Subsistence farming is practised in West Africa on land mostly acquired through
 - A. pledge.
 - B. donation.
 - C. inheritance.
 - D. purchase.

5. The roles of government in the development of agriculture in Nigeria include the following except
- A. reorganization of the rural communities.
 - B. provision of extension service.
 - C. provision of credit facilities.
 - D. rehabilitation of feeder roads.
6. The main reason for governments enforcement of efficient quarantine laws is to
- A. check the destruction of unproductive animals.
 - B. attract school leavers into agriculture.
 - C. give grants to researchers for agricultural problems.
 - D. check and control the inflow of animals and crops.
7. The most important objective of the farm settlement scheme is to
- A. supply farm tools to farmers.
 - B. provide subsidy for small scale farmers.
 - C. demonstrate that farming can be a profitable business.
 - D. mechanise agriculture.
8. In which of the following is land used for agricultural purposes?
- A. Forage production
 - B. Recreation
 - C. Mining
 - D. Road construction
9. Which of the following climatic factors is primarily necessary for photosynthesis in crop plants?
- A. Wind
 - B. Light
 - C. Rainfall
 - D. Temperature
10. An example of a biotic factor affecting crop or animal production is
- A. predator.
 - B. soil texture.
 - C. soil structure.
 - D. light.
11. The effect of high temperature on livestock production include the following except
- A. reduction in growth rate.
 - B. reduction in feed intake.
 - C. increase in water intake.
 - D. increase in production.

12. Which of the following is the role of organisms in soil formation?
- A. Deposition of soil particles
 - B. Breaking down of rocks
 - C. Increasing the level of soil minerals
 - D. Transporting soil particles
13. Which of these rocks is formed from sandstone?
- A. Limestone
 - B. Quartzite
 - C. Marble
 - D. Graphite
14. Soils with particle sizes ranging between 0.2 – 0.02 mm are referred to as
- A. gravel.
 - B. fine sand.
 - C. silt.
 - D. clay.
15. Which of the following types of soil is easily water logged?
- A. Sand
 - B. Clay
 - C. Loam
 - D. Silt
16. The most important horizon in a soil profile for crop production is
- A. bed rock.
 - B. weathered parent material.
 - C. sub soil.
 - D. top soil.
17. Which of the following is a micro element?
- A. Calcium
 - B. Sulphur
 - C. Phosphorus
 - D. Manganese
18. Soil fertility can be improved through the following except
- A. planting of cover crops.
 - B. crop rotation.
 - C. fertilizer application.
 - D. continuous cropping.

19. Which of the following farm practices will lead to the pollution of soil water?
- A. Bush burning
 - B. Crop rotation
 - C. Clean clearing
 - D. Zero grazing
20. The most suitable structure for underground drainage in farms is
- A. narrow solid pipe.
 - B. waste pipe.
 - C. perforated concrete pipe.
 - D. clay pipe.
21. The most unreliable source of power on the farm is
- A. heat engine.
 - B. wind.
 - C. electricity.
 - D. animal.
22. The farm machinery used to sow seeds and apply fertilizer at the same time is
- A. seed drill.
 - B. combine drill.
 - C. fertilizer spreader.
 - D. jab planter.
23. The farm operation which require stationary power is
- A. land clearing.
 - B. threshing.
 - C. ploughing.
 - D. harrowing.
24. The following are all secondary tillage implements except the
- A. disc harrow.
 - B. spring tine harrow.
 - C. disc plough.
 - D. disc ridger.
25. An instrument used to determine height or elevation of a point relative to another during survey on the farm is the
- A. arrow.
 - B. ranging pole.
 - C. cross staff.
 - D. Gunter's chain.

26. A variety of oil palm is
- Amelonado.*
 - Acuminata.*
 - Tenera.*
 - Trinitario.*
27. Which of the following crops has not lost its ability to propagate by seeds despite being propagated by vegetative means for many years?
- Yam
 - Cassava
 - Cocoyam
 - Spinach
28. Which of the following statements is **not** a reason for pruning? To
- remove dead and diseased plant parts.
 - reduce the leave area and allow greater light penetration.
 - encourage plant to attain a desirable shape.
 - incorporate plant matter into the soil.
29. Which of the following is **not** an advantage of cover cropping?
- Protecting soil from direct heat of the sun
 - Preventing soil erosion
 - Decreasing the population of earthworms in the soil
 - Functioning as wind breaker
30. If the yield of cowpea is 750 kg per hectare. Calculate the yield of cowpea from a 20 ha farm.
- 7,500 kg
 - 15,000 kg
 - 22,500 kg
 - 30,000 kg
31. The major reason why the moisture content of crops should be reduced before storage is to
- improve storage quality and avoid fungal infection.
 - reduce weight during transportation.
 - maintain chemical composition of the crop.
 - make crop palatable for eating.
32. A creeping perennial grass which forms rhizomes and roots freely at the nodes is
- elephant grass.
 - guinea grass.
 - gamba grass.
 - giant star grass.

33. The insect vector involved in the transmission of cassava mosaic virus is
- grasshopper.
 - termite.
 - whitefly.
 - moth.
34. Mottling and deformation of leaves in crops are symptoms of a
- viral disease.
 - bacterial disease.
 - fungal disease.
 - nematode disease.
35. Downy mildew in maize is caused by a/an
- insect.
 - fungus.
 - nematode.
 - bacterium.
36. Which of the following is best for controlling yellow streak of maize?
- Early planting and spraying with insecticides
 - Early planting and application of fungicides
 - Late planting and application of nematicides
 - Late planting and application of fungicides
37. Which of the following is **not** a method of controlling perennial weeds?
- Hand pulling
 - Use of crop rotation
 - Regular tillage
 - Use of hoes
38. Which of the following weeds is dispersed by animals?
- Crotalaria*
 - Acanthospermum hispidum*
 - Talinum triangulare*
 - Emilia sonchifolia*
39. A weed is a grass
- growing on a lawn.
 - growing on a legume farm.
 - that has been cultivated.
 - that is grazed upon by animals.

40. Which of the following corresponds to the true stomach of a simple stomach animal?
- A. Omasum
 - B. Reticulum
 - C. Abomasum
 - D. Rumen
41. The gestation period of rabbits (in days) is
- A. 15.
 - B. 21.
 - C. 31.
 - D. 42.
42. Parturition in farm animals marks the end of
- A. breeding.
 - B. mating.
 - C. gestation.
 - D. egg laying.
43. N'dama cattle are well adapted to West Africa because the breed
- A. can withstand a long period of drought.
 - B. is resistant to trypanosomiasis.
 - C. can feed well on poor quality forages.
 - D. is gregarious.
44. Livestock feed concentrates are usually those ingredients that are high in
- A. fibre and water.
 - B. protein and energy.
 - C. vitamins and crude fibre.
 - D. fibre and vitamins.
45. Vitamin A is needed in livestock for the prevention of
- A. milk fever.
 - B. rickets.
 - C. night blindness.
 - D. beriberi.
46. Natural rangelands are **not** commonly found in areas with
- A. solar radiation.
 - B. strong wind.
 - C. high relative humidity.
 - D. low atmospheric pressure.
47. Crops grown specifically to feed animals in fresh or preserved forms are referred to as
- A. grass crops.
 - B. fodder crops.
 - C. arable crops.
 - D. cereal crops.

48. Which of the following is **not** a characteristic feature of a well prepared silage?
- Sweet aromatic smell
 - Greenish colouration
 - Very nutritive
 - Mouldy growth
49. Which of the following diseases is caused by a protozoon?
- Trypanosomiasis
 - Milk fever
 - Rinderpest
 - Anthrax
50. Which of the following is **not** involved in the life cycle of the liver fluke?
- Sheep
 - Cattle
 - Snail
 - Tick
51. The main mode of infection of rinderpest disease in cattle is through
- grazing.
 - drinking.
 - contact.
 - inhalation.
52. Which of the following methods of animal selection is based on the performance of the offspring?
- Individual selection
 - Progeny selection
 - Family selection
 - Mass selection

Study the demand schedule for an agricultural commodity below and use it to answer Questions 53 – 55.

Price (₦)	Quantity Demanded (kg)
30	200
20	240

53. Calculate the percentage change in quantity of commodity demanded.

- 10%
- 20%
- 30%
- 40%

54. Calculate the percentage change in price for the commodity.
- A. 50.0%
 - B. 40.0%
 - C. 33.3%
 - D. 23.3%
55. Find the elasticity of demand for the commodity.
- A. 0.9
 - B. 0.8
 - C. 0.6
 - D. 0.3
56. A repayable loan obtained from the bank for farm operations is known as
- A. subsidy.
 - B. credit.
 - C. subvention.
 - D. capital.
57. Which of the following is **not** true about record keeping in agricultural production?
- A. It shows the performance of the farm at a given time.
 - B. It assists in the modification of farm strategies.
 - C. It enables the farmers to purchase heavy farm machinery.
 - D. It is useful for tax purposes.
58. The process of spreading new farming techniques to farmers is commonly referred to as
- A. diffusion.
 - B. learning.
 - C. distribution.
 - D. assimilation.
59. Which of the following agricultural specialist serves as an intermediary between research organisations and the farmers?
- A. Plant pathologist
 - B. Project planning officer
 - C. Entomologist
 - D. Extension officer
60. The most popular method used by the Agricultural Development Projects in their extension service is
- A. training and visits.
 - B. individual contact.
 - C. demonstration.
 - D. farmers' festivals.

**DO NOT TURN OVER THIS PAGE
UNTIL YOU ARE TOLD TO DO SO.**

**YOU WILL BE PENALIZED SEVERELY IF YOU ARE
FOUND LOOKING AT THE NEXT PAGE BEFORE
YOU ARE TOLD TO DO SO.**

PART II

ESSAY

[80 marks]

*Answer five questions in all, including one question from each section.**Write your answers in ink, in your answer booklet.**All questions carry equal marks.*

SECTION A

Answer one question from this section.

1. (a) Explain briefly how each of the following factors can be used to differentiate a subsistence farmer from a commercial farmer. [3 marks]
 (i) Land use [3 marks]
 (ii) Finance [3 marks]
 (iii) Illiteracy [3 marks]
 (iv) Labour [3 marks]
- (b) State four reasons why farming is generally not an attractive business to the youths. [4 marks]
2. (a) List five tillage implements. [5 marks]
 (b) Describe two tillage operations in a mechanized farm. [6 marks]
 (c) State five ways of maintaining farm machinery. [5 marks]

SECTION B

Answer one question from this section.

3. (a) Mention four components of a fertile soil. [2 marks]
 (b) In a tabular form, compare the
 (i) physical; [10 marks]
 (ii) chemical; [4 marks]
 properties of sand and clay.

4. (a) State four factors which influence nutrients availability to crops. [4 marks]
- (b) Explain briefly the effects of three of the factors listed in (a) on the availability of nutrients to plants. [9 marks]
- (c) List three methods of replacing lost nutrients in the soil. [3 marks]

SECTION C

Answer one question from this section.

5. Describe the cultivation of maize under the following headings: [2 marks]
- (a) Land preparation; [1 mark]
- (b) Propagation; [2 marks]
- (c) Planting date; [1 mark]
- (d) Seed rate; [1 mark]
- (e) Spacing; [2 marks]
- (f) Fertilizer requirement; [1 mark]
- (g) Weeding; [3 marks]
- (h) Harvesting; [3 marks]
- (i) Storage. [3 marks]
6. State the causal organism, mode of transmission and control measures of any four of the following diseases. [4 marks]
- (a) Tikka [4 marks]
- (b) Groundnut rosette [4 marks]
- (c) Cocoa blackpod [4 marks]
- (d) Cassava mosaic [4 marks]
- (e) Angular leaf spot [4 marks]

Name:.....

Identification Number:.....

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination

June 2001

AGRICULTURAL SCIENCE 2

3 hours

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PART I
OBJECTIVE TEST
[60 marks]

1 hour

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 - (b) In the spaces marked *Examination, Year, Subject and Paper*; write 'W.A.S.S.C.E.', '2001 JUNE', '**AGRICULTURAL SCIENCE**' and '2', respectively.
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 - (e) In the box marked *Sex*, shade the space marked **M** if you are male, or **F** if you are female.
3. If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in 2 above. In the boxes marked *Identification Number, Subject Code and Sex*, reshade each of the shaded spaces.
4. An example is given below. This is for a **male** candidate, whose **name** is **Chukwuma Adekunle CIROMA**, whose **Identification Number** is **4251102068**, and who is offering **Agricultural Science 2**.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: **CIROMA CHUKWUMA ADEKUNLE** Examination: **W.A.S.S.C.E.** Year: **2001 JUNE**
 Surname Other Names

Subject: **AGRICULTURAL SCIENCE** Paper: **2**

IDENTIFICATION NUMBER	
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2	0 1 2 3 4 5 6 7 8 9
0	0 1 2 3 4 5 6 7 8 9
6	0 1 2 3 4 5 6 7 8 9
8	0 1 2 3 4 5 6 7 8 9

For Supervisors only.

If candidate is absent shade this space:

SUBJECT CODE	
5	0 1 2 3 4 5 6 7 8 9
0	0 1 2 3 4 5 6 7 8 9
2	0 1 2 3 4 5 6 7 8 9
2	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
3	0 1 2 3 4 5 6 7 8 9

INSTRUCTIONS TO CANDIDATES	
1. Use grade HB pencil throughout.	
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3. Erase completely any answers you wish to change.	
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SEX	
Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box: M <input type="checkbox"/> F <input type="checkbox"/>	



Answer all the questions.

Each question is followed by four options lettered A to D. Find out the correct option for each question and shade in pencil on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only one answer to each question.

An example is given below.

The practice of growing exclusively one type of crop and harvesting it before planting another on the same piece of land is

- A. monocropping.
- B. interplanting.
- C. intercropping.
- D. mixed cropping.

The correct answer is monocropping which is lettered A and therefore answer space A would be shaded.

[A]

[B]

[C]

[D]

Think carefully before you shade the answer spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. Which of the following occupations is **not** associated with agriculture?
 - A. Production of polythene
 - B. Production of honey
 - C. Fertilizer production
 - D. Saw-milling

2. Which of the following factors **most** influences the standard of living of individuals in a community?
 - A. Food crop production
 - B. Availability of machinery
 - C. Production of raw materials
 - D. Foreign exchange earnings

3. Subsistence farming is **not** characterised by
 - A. the use of crude farm tools.
 - B. the use of extended family holdings.
 - C. low application of fertilizers.
 - D. low yields.

4. The factors hindering the development of agriculture in West Africa include the following except
- land tenure system.
 - inadequate rural infrastructure.
 - lack of rural markets.
 - poor transportation facilities.
5. Government agricultural regulations are made to control the following except the
- spread of diseases.
 - exploitation of natural resources.
 - control of crops and animals quality.
 - use of exotic breeds.
6. The primary role of government in agricultural development is to
- provide improved homesteads for farmers.
 - formulate good agricultural policies.
 - provide extension services.
 - sell farmers' produce through export.
7. Which of the following statements about land is **not** correct?
- It is a basic requirement for production.
 - Its supply is limited.
 - Indiscriminate use can cause it to deteriorate.
 - It can be relocated.
8. Poaching is prohibited in game reserves in order to
- preserve wildlife.
 - starve hunters.
 - reduce wildlife population.
 - protect hunters from wild animals.
9. In crop plants, high temperatures may cause
- premature dropping of fruits.
 - delayed ripening of fruits.
 - formation of woody stems.
 - prolonged drying of seeds.
10. A physical factor affecting crop production is
- man.
 - temperature.
 - micro organisms.
 - vegetation.

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THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination

November 2002

AGRICULTURAL SCIENCE 2

3 hours

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THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: CIROMA CHUKWUMA ADEKUNLE Examination: W.A.S.S.C.E. Year: 2002 NOV.

Surname

Other Names

Subject: AGRICULTURAL SCIENCE

Paper: 2

IDENTIFICATION NUMBER	
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SEX	
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<input checked="" type="checkbox"/> M	<input type="checkbox"/> F

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An example is given below.

The practice of growing exclusively one type of crop and harvesting it before planting another on the same piece of land is

- A. monocropping.
- B. interplanting.
- C. intercropping.
- D. mixed cropping.

The correct answer is monocropping which is lettered A and therefore answer space A would be shaded.

[A]

[B]

[C]

[D]

Think carefully before you shade the answer spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. Agriculture is most important to the economy of West African countries because it provides
 - A. raw materials for steel industries.
 - B. game reserves for wildlife conservation.
 - C. foreign exchange.
 - D. feeds for livestock.

2. One major factor which constrains farmers to subsistence agriculture is land
 - A. availability.
 - B. immobility.
 - C. scarcity.
 - D. fertility.

3. Commercial agriculture is preferred to subsistence agriculture because it
 - A. provides more food for the populace.
 - B. requires less capital.
 - C. does not require the involvement of skilled persons.
 - D. is centred on cash crop production.

4. In order to eliminate food shortage, farmers should
- cultivate more varieties of crops.
 - practise land tenure by inheritance.
 - shift from crop to animal production.
 - construct farm buildings.
5. Agricultural development in West Africa is mostly affected by
- absence of markets for foodstuffs.
 - inadequate use of improved crops and animal breeds.
 - inadequate transport network.
 - poor storage facilities.
6. *Subsidy* is any assistance given by the government to farmers which could be
- a reduction in the supply of farm inputs.
 - a reduction in the price of farm inputs.
 - an increase in interest rates on loans.
 - an increase in the price of implements.
7. Land quality in agriculture is usually adversely affected by
- trampling.
 - erosion.
 - weeding.
 - irrigation.
8. Rainfall influences agriculture in the following ways except
- supplying soil moisture necessary for the growth of crops.
 - determining types of crops to be grown in an area.
 - hastening drying of grains.
 - determining farming system to be practised.
9. Rocks formed from accumulation and compaction of sand, gravel, plant and animal remains are known as
- metamorphic rocks.
 - igneous rocks.
 - sedimentary rocks.
 - intrusive rocks.
10. The soil fractions that are richest in nutrients are
- sand and silt.
 - loam and sand.
 - clay and silt.
 - clay and loam.

11. The water which is held in the fine pores of soils by surface tension is known as
- gravitational water.
 - soil water.
 - capillary water.
 - hygroscopic water.
12. The advantages of mulching do **not** include
- control of soil temperature.
 - addition of decomposing organic matter.
 - improving soil structure.
 - reducing the soil anion-cation action.
13. Chlorosis observed along the veins of leaves is a characteristic symptom for the deficiency of
- calcium.
 - magnesium.
 - sulphur.
 - sodium.
14. Which of the following farm practices does **not** have a significantly harmful effect on the soil?
- Crop rotation
 - Land clearing
 - Overgrazing
 - Bush burning
15. Which of the following practices will lead to loss of nutrients from the soil?
- Manuring
 - Mulching
 - Crop harvesting
 - Cultivation
16. Sources of irrigation water include the following except
- lakes.
 - rivers.
 - streams.
 - ocean.
17. Which of the following methods of irrigation can be used to apply foliar fertilizers and pesticides?
- Furrow irrigation
 - Basin irrigation
 - Flooding
 - Sprinkler irrigation

18. Land which requires drainage is one
- A. with a high nutrient-holding capacity.
 - B. with a high water table.
 - C. under irrigation.
 - D. under continuous cropping.
19. Wind power is most unsuitable for
- A. milling livestock feed.
 - B. milking dairy animals.
 - C. pumping water.
 - D. generating electricity.
20. The source of farm power that can be affected by pests is
- A. water.
 - B. biogas.
 - C. animal.
 - D. wind.
21. Which of the following groups of equipment requires electric power for its operation?
- A. Refrigerator, incubator, corn mill and dryer
 - B. Dryer, battery cage, grinder and egg candler
 - C. Incubator, mower, rice mill and knapsack sprayer
 - D. Water pump, refrigerator, dryer and plough
22. Which of the following requires daily checking in a tractor?
- A. Spark plug
 - B. Engine oil
 - C. Air cleaner
 - D. Battery
23. Farm surveying is conducted for the following reasons **except**
- A. determining the location of farm structures.
 - B. designing and constructing drainage canals.
 - C. setting out areas of farmland.
 - D. determining the height of farmstead.
24. A disadvantage of mechanization is that it
- A. reduces drudgery during farm work.
 - B. increases scale of operation.
 - C. displaces many workers.
 - D. reduces farm hazards.

25. Which of the following crops does **not** require nursery?
- A. Cocoa
 - B. Mango
 - C. Maize
 - D. Tomato
26. Dura, Tenera and Pisifera are all cultivated varieties of
- A. coconut.
 - B. oil palm.
 - C. rubber.
 - D. banana.
27. If the recommended spacing for planting plantain is $4m \times 4m$, calculate the plant population per hectare of farmland.
- A. 16
 - B. 63
 - C. 625
 - D. 1600
28. The non-oil crop among the following is
- A. coconut.
 - B. beniseed.
 - C. melon.
 - D. cowpea.
29. *Fodder crops* refer to crops
- A. growing in the wild.
 - B. grown specifically for human consumption.
 - C. grown to feed animals in fresh or preserved form.
 - D. used for controlling erosion.
30. The practice of keeping forests in good condition for social and economic uses is
- A. forest regulation.
 - B. forest management.
 - C. taungya system.
 - D. forest regeneration.
31. Damping-off is a disease caused by
- A. fungus.
 - B. virus.
 - C. bacterium.
 - D. nematode.

32. Cassava mosaic disease is transmitted by
- A. white fly.
 - B. black fly.
 - C. aphids.
 - D. grasshoppers.
33. A whitish gall on a maize cob is a symptom of maize
- A. streak.
 - B. smut.
 - C. blight.
 - D. rust.
34. Aphids are
- A. biting and sucking insects.
 - B. boring insects.
 - C. piercing and sucking insects.
 - D. biting and chewing insects.
35. Which of the following is **not** a biological method of weed control?
- A. Introducing insects to control weeds
 - B. Allowing the crops to compete with the weeds
 - C. Planting leguminous cover crops
 - D. Uprooting the weeds
36. *Character inheritance* is the
- A. transfer of pollen from one plant to another.
 - B. transfer of traits from one plant to another.
 - C. selection of good gametes for fertilization.
 - D. masking of one gene effect by the other.
37. Fertilization in farm animals occurs in the
- A. oviduct.
 - B. cervix.
 - C. vulva.
 - D. infundibulum.
38. The process of giving birth to young ones in pigs is known as
- A. kidding.
 - B. kindling.
 - C. farrowing.
 - D. calving.

39. Which of the following is **not** a part of the reproductive system of a hen?

- A. Funnel
- B. Isthmus
- C. Ovary
- D. Ureter

40. The hormone responsible for maintaining pregnancy in farm animals is

- A. testosterone.
- B. progesterone.
- C. oxytocin.
- D. relaxin.

41. Which of the following is **not** an effect of high temperature on poultry production?

- A. Increased feed intake
- B. Increased water consumption
- C. Decreased egg production
- D. Increased rate of panting

42. A good silage should be free of

- A. moulds.
- B. nutrients.
- C. moisture.
- D. fibre.

43. Which of the following is **not** a breed of rabbits?

- A. Newzealand white
- B. Landrace
- C. Chinchilla
- D. Californian white

44. The economic importance of poultry keeping includes the following **except**

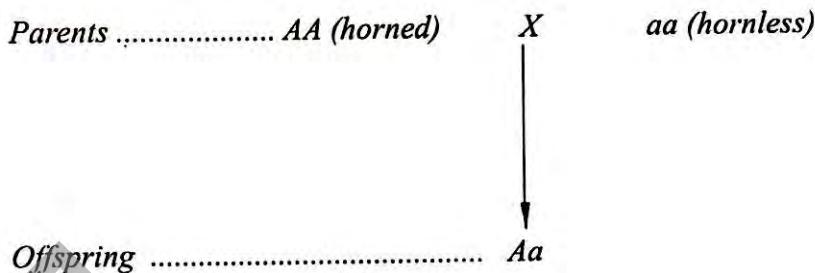
- A. production of ornamental feathers.
- B. provision of food.
- C. provision of employment.
- D. generation of income.

45. Good management practices in pig production include the following **except**

- A. feeding.
- B. candling.
- C. castration.
- D. deworming.

46. Which of the following nutrients do weaned piglets require most?
- A. Minerals
 - B. Fats
 - C. Carbohydrates
 - D. Proteins
47. Which of the following vitamins reduces fertility when deficient?
- A. Vitamin A
 - B. Vitamin E
 - C. Vitamin C
 - D. Vitamin B
48. The causal organism of anthrax is
- A. bacterium.
 - B. virus.
 - C. fungus.
 - D. protozoon.
49. An example of poultry disease caused by protozoa is
- A. aspergillosis.
 - B. coccidiosis.
 - C. red water.
 - D. foot and mouth.
50. Which of the following is **not** an economic importance of ticks in animal production?
- A. Destruction of hides and skin
 - B. Transmission of diseases
 - C. Causing loss of production
 - D. Attaching themselves to hairs of livestock

Study the cross below and use it to answer Questions 51 – 53.



51. The gametes in the above cross are
- A* and *a*.
 - all *A*.
 - all *a*.
 - all *X*.
52. The phenotype of the offspring is
- horned.
 - hornless.
 - dwarf.
 - short-tailed.
53. Which of the following factors will least affect the performance of the offspring after it has been produced?
- Level of feeding
 - Type of housing
 - General management
 - Genetic make-up
54. The role of a farm manager includes the following **except**
- planning farm operation.
 - coordinating the various farm activities.
 - reporting any new findings to the Agricultural Research Stations.
 - deciding on adjustments to make on the farm.
55. The supply of a farm produce to markets is **mostly** dictated by
- the government.
 - the farmers.
 - climatic conditions.
 - its perishability.

56. Farmers are unable to obtain credit from banks due to their inability to provide
- A. collateral.
 - B. interest.
 - C. subsidies.
 - D. implements.
57. The wear and tear of farm structures over time is described as
- A. appreciation.
 - B. depreciation.
 - C. capitalisation.
 - D. salvage value.
58. Which marketing agent normally makes the biggest profit margin? The
- A. processor
 - B. producer
 - C. retailer
 - D. Marketing Board
59. Which of the following marketing agents do not excessively exploit the farmers?
- A. Licensed buying agents
 - B. Middlemen
 - C. Co-operative societies
 - D. Retailers
60. One of the qualities of a good extension agent is that he should
- A. be good at entertainment.
 - B. have innovative ideas.
 - C. not socialize with farmers.
 - D. be a good solicitor.

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PART II

2 hours

ESSAY

[80 marks]

*There are five sections in this part. Answer one question only from each section.**Write your answers in ink, in your answer booklet.**All questions carry equal marks.*

SECTION A

Answer one question only from this section.

1. (a) Define *communal land tenure system*. [2 marks]
- (b) State **three** advantages and **five** disadvantages of the communal land tenure system. [8 marks]
- (c) State **two** other land tenure systems in your country, giving **one** advantage and **one** disadvantage of each. [6 marks]

2. (a) List and discuss **five** limitations of farm mechanisation. [10 marks]
- (b) State **four** ways by which farmers can be encouraged to adopt farm mechanisation. [6 marks]

SECTION B

Answer one question only from this section.

3. Give **two** advantages and **two** disadvantages of **each** of the following farming practices:
 - (a) overgrazing;
 - (b) bush burning;
 - (c) crop rotation;
 - (d) mixed cropping.
 [16 marks]

4. (a) Describe **five** ways by which crop nutrients are lost from the soil. [10 marks]
- (b) State **six** roles of organic fertilizers to the soil. [6 marks]

SECTION C*Answer one question only from this section.*

5. (a) Describe the following processes as methods of forest development:
(i) regeneration;
(ii) afforestation. [8 marks]
- (b) List eight benefits of forestry. [8 marks]
6. Describe eight side effects of various preventive and control measures of pests. [16 marks]

SECTION D*Answer one question only from this section.*

7. (a) Explain the term *lactation*. [2 marks]
- (b) With the aid of a well labelled diagram, describe the structure of a farm animal mammary gland. [14 marks]
8. (a) Describe pig management under the following headings:
(i) housing;
(ii) creep feeding. [11 marks]
[4 marks]
- (b) Mention one method of preventing anaemia in piglets. [1 mark]

SECTION E

Answer one question only from this section.

9. (a) Define
(i) *supply*;
(ii) *demand*. [4 marks]
- (b) List four factors each that affect:
(i) *supply*; [4 marks]
(ii) the price of an agricultural produce. [4 marks]
- (c) State one importance of the law of diminishing returns to farmers. [.2 marks]
- (d) Explain the term *income elasticity*. [2 marks]
10. (a) Define *Agricultural Extension*. [2 marks]
- (b) State eight aims of Agricultural Extension. [8 marks]
- (c) List and explain two main types of extension methods. [6 marks]

11. The most active agent of physical weathering of rocks in arid regions is
- ice.
 - water.
 - wind.
 - animals.
12. The chemical weathering that is responsible for changing haematite to limestone is
- hydration.
 - solution.
 - oxidation.
 - hydrolysis.
13. Liming is used to correct soil's
- neutrality.
 - acidity.
 - cation exchange capacity.
 - porosity.
14. A vertical section through the soil is referred to as soil
- profile.
 - horizon.
 - structure.
 - texture.
15. In the determination of soil texture, a soil sample was found to be smooth and powdery when dry and formed a cast when wet. That soil is
- clay.
 - silt.
 - loam.
 - sand.
16. Which of the following mineral elements is essential for chlorophyll formation?
- Sodium
 - Molybdenum
 - Boron
 - Magnesium
17. Replenishing soil nutrients involves the following except
- leaching.
 - fallowing.
 - cover cropping.
 - liming.

18. Which of the following is **not** a source of farm power?
- A. Wind
 - B. Bull
 - C. Tractor
 - D. Plough
19. Which of the following sources of farm power will assist in the tillage of more land per unit time?
- A. Man
 - B. Animal
 - C. Wind
 - D. Machine
20. A farm tool used for harvesting heads of rice is the
- A. shear.
 - B. secateur.
 - C. sickle.
 - D. rake.
21. Which of the following gives the correct order of usage of tillage implements on a virgin land?
- A. Harrow → Ridger → Plough
 - B. Ridger → Plough → Harrow
 - C. Harrow → Plough → Ridger
 - D. Plough → Harrow → Ridger
22. *Farm surveying* can be defined as the
- A. levelling of land during road construction.
 - B. sighting of structures through a theodolite.
 - C. making measurements on land from which maps are drawn.
 - D. estimation of the type and properties of soil on a farm.
23. Farm survey equipment include the following **except**
- A. cross staff.
 - B. Abney level.
 - C. datum.
 - D. chain.
24. The type of survey used in determining the flatness or steepness of a farmland is
- A. chain survey.
 - B. topographical survey.
 - C. soil survey.
 - D. traverse survey.

25. Which of the following cereal crops most requires nursery practices?

- A. Maize
- B. Rice
- C. Millet
- D. Guinea corn

26. The maturity period of groundnut in months is

- A. 1 – 2.
- B. 2 – 3.
- C. 4 – 5.
- D. 6 – 7.

27. Oil palm trees do well in soils with pH level of

- A. 2.5 – 3.5.
- B. 3.5 – 4.5.
- C. 5.5 – 6.5.
- D. 6.5 – 7.5.

28. The optimum temperature for storing yam tuber under cold storage is

- A. 7°C.
- B. 9°C.
- C. 13°C.
- D. 15°C.

29. Which of the following is **not** an agricultural significance of stems to crops?

- A. Modified forms serve as food for man.
- B. Provision of timber
- C. Useful as materials for propagation
- D. Useful for cross-breeding in crops.

30. During the production of palm oil, the oil palm fruits are boiled in order to

- A. extract the raw oil from the epicarp.
- B. prevent high level of oil rancidity.
- C. ease separation of mesocarp from the endocarp.
- D. extract oil from the kernel.

31. If the recommended seed rate of maize is 20 kg per hectare, calculate the amount of seeds required for 1.8 hectares of farmland.

- A. 11.0 kg
- B. 16.0 kg
- C. 26.0 kg
- D. 36.0 kg

32. The main vertebrate pests of rice are

- A. squirrels.
- B. quela birds.
- C. bush fowls.
- D. monkeys.

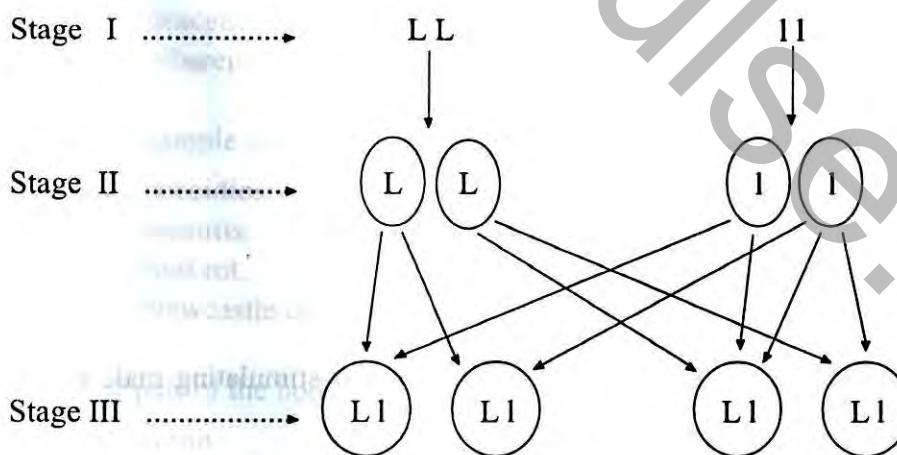
33. Which of the following statements is true about the effect of nematodes on plants?

- A. The plants wilt.
- B. Flowering is induced.
- C. The roots grow faster.
- D. Leaves develop a mosaic appearance.

34. Which of the following statements is **not** true about weeds?

- A. Some weeds are parasitic on crop plants.
- B. Weeds may harbour crop diseases.
- C. All weeds are grasses.
- D. Weeds reduce the nutritional value of a pasture.

Below is the crossing of a long fruited tomato (L) with a round fruited tomato plant (l). Use it to answer questions 35 to 38.



35. What will be the genotype ratio of the second filial generation?

- A. 3:1
- B. 1:3
- C. 1:2:1
- D. 1:1:2

36. The production of L and I in stage II is achieved through the process of
- segregation.
 - assortment.
 - mutation.
 - recessiveness.
37. Assuming complete dominance, the tomato fruits in stage III are all
- long.
 - short.
 - oval.
 - shapeless.
38. The plants in stage III are all
- heterozygotes.
 - homozygotes.
 - mutants.
 - polyhybrids.
39. In a tannery, the raw materials for the manufacture of leather are
- hides and hair.
 - skin and fur.
 - hides and skin.
 - hair and fur.
40. The part of the digestive tract of birds which secrete gastric juice is the
- oesophagus.
 - proventriculus.
 - gizzard.
 - crop.
41. The hormone which is secreted by the testes and is responsible for stimulating male sexual characteristics is known as
- progesterone.
 - testosterone.
 - gonadotropin.
 - oestrogen.
42. Production of chicks on a large scale can be achieved using a/an
- incubator.
 - broiler.
 - candler.
 - debeaker.

43. A broiler starter feed should contain
- high protein but low carbohydrate content.
 - low protein but high carbohydrate content.
 - low protein and carbohydrate content.
 - high protein and carbohydrate content.
44. In animal nutrition, iodine is essential for the production of
- thyroxin.
 - oxytocin.
 - insulin.
 - progesterone.
45. The natural ability of the body of farm animals to resist invasion of diseases is called
- quarantine.
 - vaccination.
 - immunity.
 - isolation.
46. In cattle, constant coughing with production of blood stained sputum are signs of
- rinderpest.
 - anthrax.
 - brucellosis.
 - tuberculosis.
47. An example of a viral disease of farm animals is
- coccidiosis.
 - mastitis.
 - foot rot.
 - Newcastle disease.
48. The part of the body normally affected by fowl pox disease is the
- comb.
 - beak.
 - feather.
 - vent.
49. The eradication of tsetse flies can prevent
- coccidiosis.
 - aspergillosis.
 - tuberculosis.
 - trypanosomiasis.

50. A tapeworm absorbs food from its host through the
- mouth.
 - scolex.
 - hook.
 - body surface.
51. A herbivorous fish species which breeds fast and is suitable for culture in a pond is
- Clarias lazera*.
 - Tilapia zillii*.
 - Gymnarchus niloticus*.
 - Chrysichthys nigrodigitatus*.
52. Which of the following is **not** true about adding organic manure to a fish pond? It
- reduces the pH of water considerably.
 - accelerates the growth of planktons.
 - leads to water pollution.
 - leads to the depletion of oxygen.
53. The type of labour available to peasant farmers is
- family labour.
 - paid labour.
 - skilled labour.
 - migrant labour.
54. The factor of production whose reward is profit is
- land.
 - labour.
 - capital.
 - entrepreneurship.
55. The demand for agricultural produce is generally
- elastic.
 - inelastic.
 - unitary.
 - static.
56. Given a normal situation, what effect will an increase in the supply of cowpea have on its market price? The price
- increases.
 - decreases.
 - is unaffected.
 - is unpredictable.

57. Which of the following is an effect of stability of market price in agricultural production?
- A. Profit of the producer would be constant with constant input cost.
 - B. Wholesalers earn more from sales.
 - C. Profit of the retailer will be decreased.
 - D. Consumers will look for cheaper alternatives.
58. Rural farmers mostly obtain loans from
- A. Government.
 - B. International Monetary Fund.
 - C. Merchant Banks.
 - D. Money lenders.
59. Marketing processes do not include
- A. production.
 - B. assembling.
 - C. distribution.
 - D. processing.
60. Artificial scarcity of agricultural produce is often caused by the following marketing agents except
- A. farmers.
 - B. wholesalers.
 - C. middlemen.
 - D. co-operatives.

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PART II

2 hours

ESSAY

[80 marks]

Answer five questions in all, one question from each section.

Write your answers in ink, in your answer booklet.

All questions carry equal marks.

SECTION A

Answer one question from this section.

1. (a) State four merits of each of the following:

- (i) agriculture;
- (ii) forestry;
- (iii) wildlife conservation.

[12 marks]

- (b) List four non-agricultural uses of land.

[4 marks]

2. (a) Describe briefly four types of individual land tenure systems.

[8 marks]

- (b) List four advantages and four disadvantages of the land use act.

[8 marks]

SECTION B

Answer one question from this section.

3. (a) Discuss three effects of each of the following factors on crop production:

- (i) water;
- (ii) air;
- (iii) soil microbes.

[9 marks]

- (b) List three edaphic and four climatic factors that affect crop productivity.

[7 marks]

4. (a) Explain briefly the processes of formation of
 (i) igneous rocks;
 (ii) sedimentary rocks;
 (iii) metamorphic rocks. [9 marks]
- (b) Give **two** examples of **each** of igneous and metamorphic rocks and **three** examples of sedimentary rocks. [7 marks]

SECTION C

Answer one question from this section.

5. Explain pasture management practices under the following sub-headings:
 (a) land preparation; [3 marks]
 (b) **three** methods of propagation; [3 marks]
 (c) **two** methods of sowing; [2 marks]
 (d) fertilizer application; [1 mark]
 (e) grazing; [3 marks]
 (f) **four** management practices other than fertilizing and grazing. [4 marks]
6. Give an account of the production of banana, using the following sub-headings:
 (a) **one** common variety; [1 mark]
 (b) planting materials; [2 marks]
 (c) propagation; [3 marks]
 (d) husbandry; [3 marks]
 (e) **two** common pests; [2 marks]
 (f) **two** common diseases and how **each** is controlled; [4 marks]
 (g) maturity period. [1 mark]

SECTION D

Answer one question from this section.

7. (a) Write short notes on the following:

- (i) maintenance ration;
- (ii) production ration;
- (iii) balanced ration;
- (iv) malnutrition.

[8 marks]

(b) Mention four factors normally considered when deciding the type of feed an animal should be placed on.

[8 marks]

8. (a) Describe with the aid of a diagram the stomach of a **named** ruminant. [13 marks.]

(b) State **three** functions of the first compartment of the stomach of a ruminant. [3 marks]

SECTION E

Answer one question from this section.

9. (a) Explain the following terms:

- (i) appreciation;
- (ii) depreciation;
- (iii) salvage value.

[2 marks]

[2 marks]

[2 marks]

(b) List **two** items on the farm which will normally appreciate in value. [2 marks]

(c) A farmer bought a fairly used Fiat tractor for ₦12,000.00 in 1988. He later sold it for ₦3,000.00 in 1997 when he discovered that it was expensive to maintain.

Find the tractor's:

- (i) salvage value;
- (ii) overall depreciation;
- (iii) annual depreciation.

[8 marks]

10. (a) Briefly explain

- (i) agricultural finance;
- (ii) agricultural credit.

[2 marks]

[2 marks]

(b) Explain **four** significance of agricultural finance.

[8 marks]

(c) Mention **one** problem farmers encounter in obtaining credits from the following credit sources:

- (i) commercial banks;
- (ii) community banks;
- (iii) money lenders;
- (iv) family sources.

[4 marks]

SECTION D

Answer one question from this section.

7. (a) Enumerate **six** problems militating against rabbit production in West Africa. [6 marks]
- (b) (i) Name **four** common diseases of rabbits. [4 marks]
- (ii) Discuss briefly **two** of the following diseases: Enteritis, Bloat and Helminthiasis under the headings below:
- | | |
|----------------------|-------------|
| I — causative agent; | [2 marks] |
| II — symptoms; | [2 marks] |
| III — control . | [2 marks] |
8. (a) State **four** advantages of siting a fish pond in the savannah area. [4 marks]
- (b) State and explain briefly **six** conditions which must be avoided in the siting of a fish pond. [12 marks]

SECTION E

Answer one question from this section.

9. (a) Differentiate between **marketing** and **marketing functions** in agriculture. [4 marks]
- (b) Mention **four** characteristics of agricultural produce in relation to marketing. [4 marks]
- (c) List and explain briefly any **four** marketing functions in agriculture. [8 marks]
10. (a) Mention **four** desirable qualities of a farm manager. [4 marks]
- (b) State **four** problems that can be encountered by a farm manager. [6 marks]
- (c) Write short notes on the following:
- | | |
|-----------------------------|-------------|
| (i) farm assets, | [3 marks] |
| (ii) farm income statement. | [3 marks] |

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AGRICULTURAL
SCIENCE 2
3 hours

2

Name.....

Identification Number.....

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination

June 2004

AGRICULTURAL SCIENCE 2

3 hours

Do not open this booklet until you are told to do so. While you are waiting, write your name and identification number in the spaces provided at the top right-hand corner of this booklet and thereafter, read the following instructions carefully.

This paper consists of two parts. Answer Part I in your Objective Test answer sheet and Part II in your answer booklet. Part I will last for 1 hour after which the Objective Test answer sheet will be collected. Do not start Part II until you are told to do so. Part II will last for 2 hours.

PART 1
OBJECTIVE TEST
[60 marks]

1 hour

1. Use HB pencil throughout.
2. If you have got a blank answer sheet, complete its top section as follows:
 - (a) In the space marked *Name*, write in capital letters your **surname** followed by your **other names**.
 - (b) In the spaces marked *Examination*, *Year*, *Subject* and *Paper*, write '**W.A.S.S.C.E.**' '**2004 JUNE**', '**AGRICULTURAL SCIENCE**' and '**2**' respectively.
 - (c) In the box marked *Identification Number*; write your **identification number** vertically in the spaces on the left-hand side. There are numbered spaces in line with each digit. Shade carefully the space with the same number as each digit.
 - (d) In the box marked *Subject Code*, write the digits **502213** in the spaces on the left-hand side. Shade the corresponding numbered spaces in the same way as for your identification number.
 - (e) In the box marked *Sex*, shade the space marked **M** if you are male or **F** if you are female.
3. If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in 2 above. In the boxes marked *Identification Number*; *Subject Code* and *Sex*, **reshade** each of the shaded spaces.
4. An example is given below. This is for a male candidate, whose **name** is **Chukwuma Adekunle CIROMA**, whose **identification number** is **4251102068**, and who is offering **Agricultural Science 2**.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: <u>CIROMA CHUKWUMA ADEKUNLE</u>	Examination: <u>W.A.S.S.C.E.</u>	Year: <u>2004 JUNE</u>
Surname	Other Names	

Subject: <u>AGRICULTURAL SCIENCE</u>	Paper: <u>2</u>
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IDENTIFICATION NUMBER	
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For Supervisors only.	
If candidate is absent shade this space: <input type="checkbox"/>	

SUBJECT CODE	
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3	502213
INSTRUCTIONS TO CANDIDATES	
1. Use grade HB pencil throughout.	
2. Answer each question by choosing one letter and shading it like this: [A] [B] [C] <input checked="" type="checkbox"/>	
3. Erase completely any answers you wish to change.	
4. Leave extra spaces blank if the answer spaces provided are more than you need.	
5. Do not make any markings across the heavy black marks at the right hand edge of your answer sheet.	

SEX	
Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box: M <input checked="" type="checkbox"/> F <input type="checkbox"/>	



Answer all the questions.

Each question is followed by four options lettered A to D. Find out the correct option for each question and shade in pencil on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only one answer to each question.

An example is given below.

To which of the following crops does the term ginning apply?

- A. Kenaf
- B. Cocoa
- C. Groundnut
- D. Cotton

The correct answer is cotton which is lettered D and therefore answer space D would be shaded.

[A]

[B]

[C]

[D]

Think carefully before you shade the answer spaces; erase completely any answer you wish to change.
Do all rough work on this question paper.

Now answer the following questions.

1. One factor which differentiates a subsistence from a commercial farmer is that the former produces
 - A. for the benefit of his community.
 - B. only one type of crop.
 - C. for the benefit of his family.
 - D. raw materials for agro-based industries.

2. Which of the following land tenure systems encourages the establishment of permanent crops?
 - A. Freehold system
 - B. Tenancy
 - C. Leasehold system
 - D. Pledging

3. The land tenure system that results in fragmentation of land is
 - A. freehold.
 - B. government tenancy.
 - C. inheritance.
 - D. leasehold.

4. The use of land for agriculture is not influenced by

- A. labour.
- B. climate.
- C. topography.
- D. population.

5. Igneous rocks formed within the crust are called

- A. quartzite.
- B. volcanic.
- C. plutonic.
- D. stratified.

6. The chemical reaction in rocks represented by $KAlSi_3O_8 + H_2O \rightarrow KAlSi_3O_8 + KOH$ is an example of

- A. hydrolysis.
- B. hydration.
- C. oxidation.
- D. carbonation.

7. Clay particles are able to attract cations in the soil because they

- A. are positively charged.
- B. have excess negative charges.
- C. are sticky.
- D. can be moulded.

8. What is the percentage porosity of a soil sample whose volume is 250 cm^3 when the volume of air is 200 cm^3 ?

- A. 20
- B. 25
- C. 50
- D. 80

9. The most important soil micro-organisms causing decay and nutrient recycling are

- A. bacteria and fungi.
- B. fungi and algae.
- C. algae and actinomycetes.
- D. bacteria and algae.

10. Which of the following soil water is tightly held to the surface of soil particles?

- A. Hygroscopic water
- B. Gravitational water
- C. Capillary water
- D. Superfluous water

11. Which of the following process will **not** lead to the loss of nutrients from the soil?

- A. Erosion
- B. Mulching
- C. Harvesting
- D. Leaching

12. A disadvantage of using organic manure on the soil is that

- A. it decreases the potassium content of the soil.
- B. diseases spread fast.
- C. it increases the humus content of the soil.
- D. it reduces the rate of soil water evaporation.

13. Leguminous cover crops do **not**

- A. bind the soil particles together through their roots.
- B. increase the nitrogen content of soils.
- C. aid in improving the soil organic matter content.
- D. reduce the soil microbial population.

14. In the nitrogen cycle, nitrite is oxidized to nitrate by

- A. *nitrobacter*.
- B. *nitrosomonas*.
- C. *azotobacter*.
- D. *rhizobium*.

15. Which of the following will **not** lead to loss of nitrogen compounds from the soil?

- A. Crop removal
- B. Burning
- C. Lodging
- D. Leaching

16. Farm drainage does not lead to
- A. improvement in soil structure.
 - B. improvement of soil temperature.
 - C. increased soil aeration.
 - D. reduction of soil alkalinity.
17. Which of the following methods of irrigation is best for a farm with an undulating landscape?
- A. Sprinkler
 - B. Flooding
 - C. Furrow
 - D. Basin
18. The most unreliable source of farm power is
- A. wind.
 - B. water.
 - C. electricity.
 - D. machine.
19. Water power is harnessed and converted into electrical power by
- A. blades.
 - B. cranes.
 - C. turbines.
 - D. hover craft.
20. A farm implement used for planting grains is the
- A. drill.
 - B. ridger.
 - C. harrow.
 - D. plough.
21. Which of the following parts of a tractor is most essential in operating a mower?
- A. Steering wheel
 - B. Top link
 - C. Power-take-off shaft
 - D. Stabilizer chains
22. Farm mechanisation in West Africa is not limited by
- A. the large population of farmers.
 - B. poverty among the farmers.
 - C. inadequate infrastructural facilities.
 - D. seasonality of agricultural production.

23. Mechanisation in West Africa is limited by the following except

- A. size of farm holding.
- B. technical know-how.
- C. capital.
- D. labour.

24. A fruit which will not normally be used in the manufacture of jam is

- A. orange.
- B. pineapple.
- C. garden egg.
- D. pawpaw.

25. The following crops are common staple foods in West Africa except

- A. coconut.
- B. maize.
- C. cassava.
- D. cowpea.

26. In cassava farming, rapid growth is promoted at the expense of tuber formation by the application of

- A. potassium fertilizer.
- B. nitrogen fertilizer.
- C. complete fertilizer.
- D. phosphate fertilizer.

27. *Ananas comosus* is a

- A. fruit crop.
- B. oil crop.
- C. beverage crop.
- D. pasture crop.

28. The best way to preserve maize grains on a large scale is by

- A. storing under the sun.
- B. storing in earthen pots.
- C. hanging over fire places.
- D. storing in silos.

29. *Parboiling* is a term associated with the processing of
- A. cowpea.
 - B. melon.
 - C. sorghum.
 - D. rice.
30. Maize is a very important crop because apart from serving as a staple, it
- A. is ploughed into the soil to increase fertility.
 - B. can be processed into corn flakes.
 - C. forms the base of most livestock feeds.
 - D. is used for producing germ oil.
31. A variety of oil palm is
- A. *Trinitario*.
 - B. *Tenera*.
 - C. *Criollo*.
 - D. *Amelonado*.
32. *Andropogon gayanus* is commonly called
- A. Guinea grass.
 - B. elephant grass.
 - C. gamba grass.
 - D. spear grass.
33. Pasture crops are best used in preparing hay
- A. when they are two weeks old.
 - B. just before flowering.
 - C. just after seed maturation.
 - D. after they have started to dry up.
34. Which of the following is **not** a characteristic of a good pasture?
- A. High quality grass
 - B. Provision of balance nutrients
 - C. Ability to withstand trampling
 - D. High stem to leaf ratio
35. Black pod disease of cocoa is controlled by
- A. fumigation of soil.
 - B. farm sanitation.
 - C. application of herbicide.
 - D. application of fungicide.

36. The side effects of chemical control of diseases and pests include the following except

- A. environmental pollution.
- B. poisoning of livestock and man.
- C. destruction of some plant species.
- D. increased cost of production.

37. Plant breeders aim at obtaining the following except

- A. tolerance to climatic extremes.
- B. resistance to pests.
- C. adaptation to pollination.
- D. uniformity in the time of maturity.

38. Which of the following are breeds of cattle?

- A. Muturu and Sahel
- B. Ouda and white Fulani
- C. Ndama and Keteku
- D. Gudali and Red Sokoto

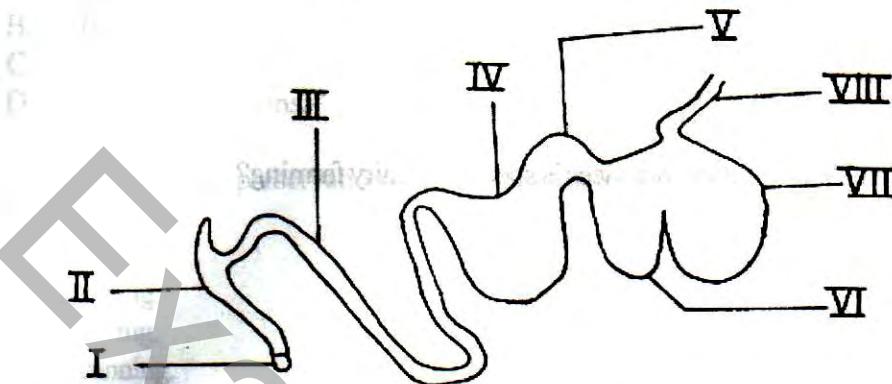
39. An adult female goat is a/an

- A. gilt.
- B. heifer.
- C. ewe.
- D. doe.

40. The interval from the beginning of one heat period to the beginning of another is known as

- A. gestation period.
- B. incubation period.
- C. reproductive cycle.
- D. oestrus cycle.

The diagram below represents the digestive tract of a farm animal. Use it to answer questions 41-43.



41. Which of the following animal possesses the illustrated digestive tract?

- A. Sheep
- B. Fowl
- C. Pig
- D. Duck

42. The part where gastric juice is secreted is labelled

- A. II.
- B. IV.
- C. V.
- D. VIII.

43. Water is largely reabsorbed in the part labelled

- A. II.
- B. IV.
- C. VI.
- D. VIII.

44. The act of parturition in ewe is known as

- A. farrowing.
- B. hatching.
- C. lambing.
- D. calving.

45. The pregnancy hormone in female animal is

- A. oestrogen.
- B. oxytocin.
- C. progesterone.
- D. relaxin.

46. Which of the following management practices is specific to dairy farming?

- A. Milking
- B. Deticking
- C. Castration
- D. Deworming

47. Which of the following is the main reason for **not** keeping birds meant for commercial egg production under the extensive system of management? Birds

- A. are exposed to attack by predators.
- B. waste a lot of productive energy roaming about.
- C. are exposed to sufficient green forage.
- D. are exposed to theft.

48. Newcastle disease is caused by

- A. virus.
- B. bacterium.
- C. protozoon.
- D. fungus.

49. A viral disease of ruminants in which the affected animal shows symptoms of high fever and blood stained diarrhoea is likely to be

- A. pleuropneumonia.
- B. rinderpest.
- C. gastroenteritis.
- D. babesiosis.

50. The following are practical measures of controlling trypanosomiasis **except**

- A. spraying against the vector.
- B. modification of vector's habitat.
- C. use of drug on diseased livestock.
- D. vaccinating against trypanosomes.

51. The following factors are necessary for siting fish ponds except

- A. reliable source of water supply.
- B. type of soil.
- C. topography.
- D. climatic conditions.

52. The method of fish preservation in which most of the moisture is lost is

- A. frying.
- B. salting.
- C. drying.
- D. canning.

53. Which of the following statements is not true of agricultural production?

- A. Land is an immobile asset.
- B. A fishing ground is a factor of production.
- C. Human resource constitute a factor of production.
- D. Availability of land is more important than its quality.

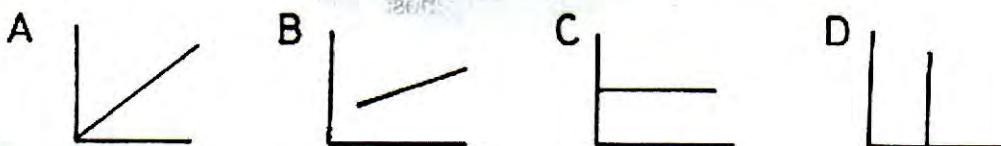
54. The functions of a farm manager include the following except

- A. decision making.
- B. coordination of farm activities.
- C. supervision of farm labourers.
- D. financing agricultural projects.

55. In the event of increased government subsidies, the farmer's production cost

- A. falls, hence supply increases.
- B. falls, hence supply decreases.
- C. rises, hence supply increases.
- D. rises, hence supply decreases.

56. The curve for unitary elasticity of supply for maize flour is given by



57. The equilibrium price of rice is the price at which

- A. its demand exceeds supply.
- B. its supply exceeds demand.
- C. its supply equals demand.
- D. consumers cannot buy the quantity they want.

58. Which of the following activities is **not** correct about extension agents?

- A. Educating farmers on the use of improved techniques.
- B. Teaching farmers how to plan their planting.
- C. Training school leavers to become professional farmers.
- D. Teaching farmers how to prepare and apply compost manure.

59. One of the functions of agricultural extension is

- A. cultivation of farmers' farmlands.
- B. construction of farmers' farmsteads.
- C. organization and coordination of credit sources.
- D. running of the country's formal education system.

60. Why would an Extension Officer prefer the use of television to radio when introducing a new technology to farmers?

- A. The extension officer can get immediate feedback.
- B. The farmer can observe the various steps involved.
- C. Radio programmes are not reliable and clear enough.
- D. It is cheaper to use television than radio.

**DO NOT TURN OVER THIS PAGE
UNTIL YOU ARE TOLD TO DO SO.**

**YOU WILL BE PENALIZED SEVERELY IF YOU ARE FOUND
LOOKING AT THE NEXT PAGE BEFORE
YOU ARE TOLD TO DO SO.**

- (a) Describe the construction of a dam.
Give eight measures necessary to prevent soil erosion.

- (b) Explain the following:
i) Landlocked countries
ii) Rural-urban migration
iii) Marginalization
iv) Agroforestry
v) Irrigation
vi) Crop rotation
vii) Farmers' income
viii) Income from farming
ix) Subsistence agriculture

- (c) Explain the following:
i) Marketing of agricultural products
ii) Marketing of handicrafts
iii) Marketing of services
iv) Marketing of food products
v) Marketing of industrial products

PART II

2 hours

ESSAY

[80 marks]

There are five sections in this part. Answer one question only from each section.

Write your answers in ink, in your answer booklet.

All questions carry equal marks.

SECTION A

Answer one question from this section.

1. (a) State **four** effects of feed shortage on animal production. [4 marks]
- (b) List **four** areas of specialization in agriculture and state **two** contributions of each to agricultural development. [12 marks]

2. (a) State **eight** reasons why agriculture has not been fully mechanized in West Africa. [8 marks]
- (b) List **four** characteristics of each of
 - (i) subsistence agriculture;
 - (ii) commercial agriculture.
[4 marks]
 [4 marks]

SECTION B

Answer one question from this section.

3. (a) Define *land*. [2 marks]
- (b) State the **two** major classification of land based on uses and give **two** examples in each case. [4 marks]
- (c) List **six** factors that influence the availability of land for agricultural production and explain **two** of the factors. [10 marks]

4. (a) State **three** methods of irrigating a small nursery. [3 marks]
- (b) Enumerate **three** factors to be considered in the choice of each of:
 - (i) surface irrigation method;
 - (ii) subsurface irrigation method.
[6 marks]
- (c) State **two** advantages of subsurface irrigation. [2 marks]
- (d) Enumerate **five** ways by which the build up of diseases could be reduced on an irrigated farm. [5 marks]

SECTION C

Answer one question from this section.

5. Discuss the following practices in crop production: [5 marks]
- transplanting; [4 marks]
 - shading; [2 marks]
 - supplying/filling-in; [5 marks]
 - nursery. [5 marks]
6. (a) Define the terms *budding* and *grafting*. [4 marks]
 (b) List **four** materials required for budding. [2 marks]
 (c) Give **two** reasons why the improvement of crops by selection may not produce the desired results. [2 marks]
 (d) State **four** disadvantages of asexual reproduction and **four** advantages of sexual reproduction in crop plants. [8 marks]

SECTION D

Answer one question from this section.

7. (a) Enumerate **three** major organs in each of the thoracic and abdominal cavities of farm animals. [6 marks]
 (b) State **two** functions of the nervous and **one** function of the reproductive systems. [3 marks]
 (c) Explain the importance of the following systems in farm animals:
 (i) circulatory system; [3 marks]
 (ii) respiratory system; [2 marks]
 (iii) digestive system. [2 marks]
8. (a) Describe the construction of a fish pond. [8 marks]
 (b) State **eight** measures necessary for the efficient operation of an egg incubator. [8 marks]

SECTION E

Answer one question from this section.

9. (a) Discuss the effects of rural-urban migration on agricultural production. [3 marks]
 (b) Explain how:
 (i) demand affects agricultural production given that supply is constant; [2 marks]
 (ii) supply affects agricultural production when demand is constant. [2 marks]
 (c) State **two** effects of
 (i) demand on farmers' income when price is constant; [2 marks]
 (ii) supply on farmers' income when demand is constant. [2 marks]
 (d) State **five** roles expected of a farm manager in a farm enterprise. [5 marks]
10. (a) State **two** methods of calculating depreciation of farm machines. [2 marks]
 (b) List **four** roles of capital in agricultural production. [4 marks]
 (c) Explain **five** major roles played by middlemen in the marketing of agricultural produce. [10 marks]

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination

November 2006

AGRICULTURAL SCIENCE 2

3 hours

Do not open this booklet until you are told to do so. While you are waiting, write your name and index number in the spaces provided at the top right-hand corner of this booklet and thereafter, read the following instructions carefully.

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PART 1
OBJECTIVE TEST
[60 marks]

1 hour

1. Use HB pencil throughout.
2. If you have got a blank answer sheet, complete its top section as follows.
 - (a) In the space marked Name, write in capital letters your surname followed by your other names.
 - (b) In the spaces marked Examination, Year, Subject and Paper, write 'WASSCE', '2006 NOV', 'AGRICULTURAL SCIENCE' and '2' respectively.
 - (c) In the box marked Index Number, write your index number vertically in the spaces on the left-hand side. There are numbered spaces in line with each digit. Shade carefully the space with the same number as each digit.
 - (d) In the box marked Paper Code, write the digits 502213 in the spaces on the left-hand side. Shade the corresponding numbered spaces in the same way as for your index number.
 - (e) In the box marked Sex, shade the space marked M if you are male, or F if you are female.
3. If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in 2 above. In the boxes marked Index Number, Paper Code and Sex, reshade each of the shaded spaces.
4. An example is given below. This is for a male candidate, whose name is Chukwuma Adekunle CIROMA, whose Index Number is 5251102068, and who is offering Agricultural Science 2.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: CIROMA CHUKWUMA ADEKUNLE Examination: WASSCE Year: 2006 NOV.
Surname Other Names

Subject: AGRICULTURAL SCIENCE

Paper: 2

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For Supervisors only.

If candidate is absent shade this space:

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SEX	
Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box: M <input type="checkbox"/> F <input type="checkbox"/>	

INSTRUCTIONS TO CANDIDATES

1. Use grade HB pencil throughout.
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Answer all the questions.

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An example is given below.

To which of the following crops does the term *ginning* apply?

- A. Kenaf
- B. Cocoa
- C. Groundnut
- D. Cotton

The correct answer is Cotton which is lettered D and therefore answer space D would be shaded.

[A] [B] [C] **[D]**

Think carefully before you shade the answer spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. An important role of agriculture to national economy is the provision of

- A. new and improved plant varieties.
- B. feeder roads linking farms and urban centres.
- C. raw materials for industries.
- D. storage facilities for farm produce.

2. Which of the following statements is true about subsistence farming? It

- A. provides surplus capital for investment.
- B. provides enough food for the family.
- C. encourages industrialization.
- D. encourages farm mechanization.

3. What is the purpose of wildlife conservation?

- A. Keeping animals in forests
- B. Preventing the extinction of some wild animals
- C. Ensuring that hunters always have some games
- D. Preventing wild animals from destroying crops

4. Governments of West African countries can promote the production of cash crops by
- promoting the traditional farming methods.
 - offering higher prices to producers.
 - trimming down the number of farmers.
 - restricting the importation of food crops.
5. Which of the following statements is **not** a problem of communal land tenure system?
- Redemption of the land
 - Lack of permanent ownership of land
 - Disagreement among family members
 - Excessive fragmentation of land
6. Which of the following uses of land should be given priority in environmental protection?
- Recreation
 - Forestry
 - Siting industries
 - Road construction
7. The following factors influence the use of land for extensive sheep rearing **except**
- rainfall.
 - light intensity.
 - population density.
 - topography.
8. Which of the following factors will **not** affect availability of land for agriculture?
- Population density
 - Expansion of industries
 - Topography
 - Climate
9. Which of the following conditions will cause the greatest discomfort in livestock?
- High temperature and high humidity
 - Low temperature and high humidity
 - High temperature and high rainfall
 - Low temperature and low pressure

10. An important biotic factor which influences agricultural production is
- soil structure.
 - wind.
 - temperature.
 - predators.
11. In soil formation, the main factor that determines texture is
- vegetation.
 - topography.
 - climate.
 - parent rock.
12. The term *topography* refers to the
- altitude of a land.
 - type of vegetation on a land.
 - soil profile.
 - shape of a land.
13. The following are types of soil structure except
- platy.
 - granular.
 - prismatic.
 - gravel.
14. *Rhizobium* bacteria are important in the nitrogen cycle because they
- burrow into the soil and enhance percolation.
 - destroy the roots of legumes to release nitrogen.
 - fix atmospheric nitrogen in the soil.
 - cause root-knots in legumes.
15. The chemical component of wood ash are
- potassium and carbonate.
 - calcium and chloride.
 - potassium and chloride.
 - calcium and carbonate.

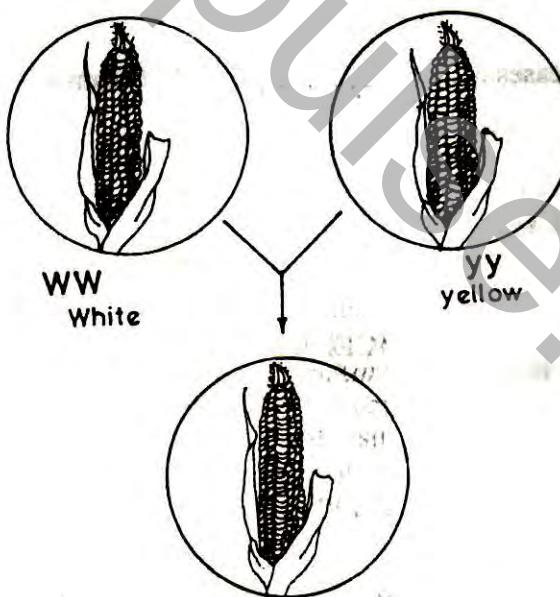
16. Which of the following statements about crop rotation is **not** true?
- A. Use of fertilizer is of paramount importance.
 - B. The land is put under continuous cultivation.
 - C. Legume is always included in the rotation.
 - D. Plants are at minimal level of pest and disease attack.
17. The growing of the same crop on the same piece of land every year is referred to as
- A. monoculture.
 - B. ley farming.
 - C. mixed farming.
 - D. inter-cropping.
18. Which source of farm power is **most** flexible and adaptable to farm operations?
- A. Animal
 - B. Wind
 - C. Human
 - D. Solar
19. A farm tool that is **not** required in the construction of a nesting box is
- A. the hammer.
 - B. the spade.
 - C. a drill.
 - D. a chisel.
20. A tractor derives its power from
- A. an internal combustion engine.
 - B. an external combustion engine.
 - C. a standby generator.
 - D. an electric motor.
21. Which of the following is **not** used for farm survey?
- A. Measuring tape
 - B. Lenses
 - C. Offset staff
 - D. Theodolite

22. A farmer conducts surveying for the following reasons **except**
- A. determining the location of agricultural structures.
 - B. locating sites for drainage canals.
 - C. setting out areas of farm land.
 - D. determining the height of farmstead.
23. Which of the following groups of crops comprises only oil crops?
- A. Groundnut, jute and sunflower
 - B. Soyabean, coconut and groundnut
 - C. Sunflower, cotton and jute
 - D. Coconut, cotton and sisal hemp
24. The yield of latex from a rubber tree depends on the following factors **except**
- A. skill of tapping.
 - B. amount of bark removed at each tapping.
 - C. age of the tree.
 - D. prevailing environmental conditions.
25. The **best** time for transplanting rice seedlings is in the morning or evening hours because
- A. photosynthesis can only take place at these periods.
 - B. there is less heat in the mornings and evenings.
 - C. there is less moisture in the soil at those times of the day.
 - D. transpirational losses are minimal then.
26. The characteristics of a good pasture include the following **except**
- A. ability to withstand extremes of climate.
 - B. ability to produce high quality fresh leaves.
 - C. high palatability.
 - D. high stem to leave ratio.
27. Which of the following maintenance **practices** will ensure proper utilization of a cultivated pasture
- A. Allowing animals to graze pasture freely
 - B. Burning pasture periodically
 - C. Allowing forage crops to overgrow
 - D. Regulating grazing by animals

28. Which of the following is **not** a protective function of a forest?
- Wind break
 - Soil conservation
 - Purification of air
 - Reducing impact of raindrops
29. The growing of forest trees and arable crops on the same piece of land at the same time is termed
- ley cropping.*
 - mixed farming.*
 - afforestation.*
 - taungya system.*
30. The **most effective** way of controlling *fusarium wilt* disease in tomatoes is by
- fumigating the soil.
 - removing weeds.
 - spraying plants with insecticides.
 - rouging affected plants.
31. Which of the following plant diseases is correctly matched with its causal organism?
- Damping off-bacteria
 - Rosette-virus
 - Swollen shoot-fungus
 - Leaf mosaic-fungus
32. The *red-rot* disease of sugar cane is caused by
- virus.
 - aphid.
 - fungus.
 - protozoon.
33. Which of the following insect-pests has piercing and sucking mouthparts?
- Cotton stainer
 - Caterpillar
 - Beetle
 - Grasshopper

34. The disease control practice that relies on the introduction of parasites and predators is
- cultural.
 - chemical.
 - biological.
 - host resistance.
35. The term *instar* refers to a developmental stage of a/an
- fish.
 - insect.
 - plant.
 - rabbit.
36. The major field pests of rice are
- birds.
 - army worms.
 - rodents.
 - grasshoppers.

Study the diagrams below and use them to answer questions 37 to 39.



37. From the cross between a white maize and a yellow maize, a white maize was produced, this indicates that the gene for white colour is
- heterozygous.
 - recessive.
 - dominant.
 - homozygous.

38. The genotype of the maize plant resulting from the cross is
- A. Wwy.
 - B. ww.
 - C. Wy.
 - D. yy.
39. The gametes from the parent white maize plant are
- A. W and W.
 - B. y and y.
 - C. W and y.
 - D. y and W.
40. The length of the oestrous cycle in sow is
- A. 7 days.
 - B. 14 days.
 - C. 21 days.
 - D. 28 days.
41. When the vulva of a farm animal is observed to be red and swollen with mucous discharge, it should be
- A. introduced to a mature male animal.
 - B. treated for sexually transmitted disease.
 - C. treated for mastitis.
 - D. slaughtered and buried.
42. Progesterone is otherwise called
- A. pregnancy hormone.
 - B. placental hormone.
 - C. oestrus hormone.
 - D. follicle stimulating hormone.
43. A cattle breed with huge and bulbous horns found around Lake Chad is the
- A. Bororo.
 - B. Bornu Red.
 - C. White Fulani.
 - D. Kuri.

44. Which of the following is **not** a breed of rabbit?
- A. New Zealand white
 - B. California white
 - C. *N'dama*
 - D. *Chinchilla*
45. Which of the following farm animals is **not** a castrate?
- A. Bullock
 - B. Wether
 - C. Hog
 - D. Buck
46. Ruminants should be fed hay ration before turning them onto lush pasture to prevent
- A. ricket.
 - B. bloat.
 - C. red-water disease.
 - D. pleuropneumonia.
47. The two blind sacs at the junction of the small and large intestines of birds is/are known as
- A. caeca.
 - B. colon.
 - C. jejunum.
 - D. cloaca.
48. The process by which grasses are cut, fermented and later fed to livestock is termed
- A. *composting*.
 - B. *hay-making*.
 - C. *ensiling*.
 - D. *green manuring*.
49. The number of animals that can be conveniently fed on a hectare of pasture in a given time is known as
- A. carrying capacity.
 - B. stocking density.
 - C. herd size.
 - D. stock distribution.

50. Which of the following insects is a vector of *Trypanosomiasis*?

- A. Housefly
- B. Mosquito
- C. Tsetsefly
- D. Blackfly

51. Which of the following livestock parasites possesses proglottides?

- A. Roundworm
- B. Tick
- C. Tapeworm
- D. Liver fluke

52. The term *Fingerling* refers to a young

- A. rabbit.
- B. duck.
- C. fish.
- D. goat.

53. The practice of mating a sire to its female offspring is known as

- A. *inbreeding*.
- B. *cross breeding*.
- C. *line-breeding*.
- D. *out-breeding*.

54. Cross breeding in livestock results in the following effects except

- A. suppression of recessive genes.
- B. production of hybrid vigour in offspring.
- C. higher yield in offspring than the parents.
- D. complete removal of recessive genes from a herd.

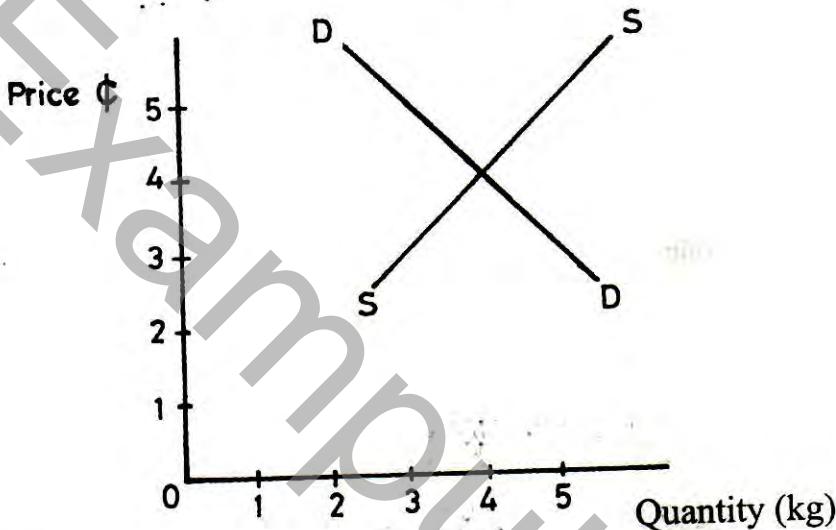
55. In a farm enterprise, which of the following is a fixed capital?

- A. Drums of insecticide
- B. Labour force on the farm
- C. Money for running the farm
- D. Combine harvester

56. In agricultural production, the law of diminishing returns sets in when

- A. an increase in the variable factor leads to a decrease in the marginal returns.
- B. an increase in the variable factor leads to an increase in the marginal returns.
- C. the total product increases as more variable factor is added.
- D. there is no change in the farmer's revenue.

57. From the diagram below, determine the equilibrium price



- A. ₦1.00
- B. ₦2.00
- C. ₦3.00
- D. ₦4.00

58. Determine the equilibrium quantity of the produce from the diagram above in question 57

- A. 4.00 kg.
- B. 3.00 kg.
- C. 2.00 kg.
- D. 1.00 kg.

59. The flow of farm produce from farmers to consumers can be referred to as

- A. financing.
- B. marketing.
- C. extension.
- D. promotion.

60. The best method of introducing a new herbicide to rural farmers is through
- A. mass media.
 - B. farmers' cooperatives.
 - C. demonstration.
 - D. circular letters.

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FOUND LOOKING AT THE NEXT PAGE BEFORE
YOU ARE TOLD TO DO SO.**

PART II

2 hours

ESSAY

[80 marks]

*There are five sections in this part. Answer one question only from each section.
Write your answers in ink, in your answer booklet.*

All questions carry equal marks.

SECTION A

Answer one question from this section.

1. (a) List six agro-based industries in your country and state the raw materials used in each industry. [6 marks]
- (b) (i) Discuss five problems normally experienced in the supply of raw materials to agro-based industries. [5 marks]
(ii) Suggest five possible ways of solving the problems. [5 marks]
2. (a) State two functions of each of the following implements:
(i) sprayers;
(ii) harrows;
(iii) ploughs. [6 marks]
- (b) Outline six ways by which tractor-coupled implement may be maintained. [6 marks]
- (c) State four precautions to take when using a knapsack sprayer. [4 marks]

SECTION B

Answer one question from this section.

3. (a) Define
(i) soil structure;
(ii) soil profile;
(iii) soil pH. [6 marks]
- (b) Discuss five ways in which soil structure influences crop production. [5 marks]
- (c) State five reasons for studying soil profile. [5 marks]
4. (a) Describe each of the following methods of irrigation:
(i) sprinkler;
(ii) furrow;
(iii) drip. [2 marks]
- (b) List five factors to consider when choosing an irrigation system. [5 marks]
- (c) State five problems associated with irrigation practices. [5 marks]

SECTION C

Answer one question from this section.

5. (a) Explain the following terms as used in crop production:
(i) seed rate;
(ii) plant density. [1 mark]
- (b) List five factors that determine the spacing of crops in the field. [5 marks]

- (c) If the number of yam setts required to plant 0.04 hectare is 215 and the weight of each yam sett is 0.80 kg. What is the seed rate per hectare in tonnes? [7 marks]
- (d) Name one pest and one disease of yam. [2 marks]
6. (a) List three advantages each of asexual and sexual methods of propagation. [6 marks]
- (b) Describe the steps involved in budding a *citrus* plant. [7 marks]
- (c) State three precautions in a budding operation. [3 marks]

SECTION D

Answer one question from this section.

7. (a) Explain the term *malnutrition*. [2 marks]
- (b) State three symptoms of malnutrition in farm animals. [3 marks]
- (c) List five factors to consider in formulating rations for farm animals. [5 marks]
- (d) State two functions of each of the following nutrients in farm animals:
- (i) proteins;
 - (ii) vitamins;
 - (iii) minerals.
- [6 marks]
8. (a) Define the term *disease* in livestock production. [1 mark]
- (b) State the causal organism, prevention and two control measures of each of the following livestock diseases:
- (i) *Newcastle disease*;
 - (ii) *Anthrax*;
 - (iii) *Rinderpest*.
- [12 marks]
- (c) Name three predisposing factors of livestock diseases. [3 marks]

SECTION E

Answer one question from this section.

9. (a) Write short notes on the following sources of farm finance:
- (i) agricultural banks;
 - (ii) co-operative societies;
 - (iii) savings and thrift societies;
 - (iv) money lenders.
- [8 marks]
- (b) If a seed planter bought by a farmer at the cost of ₦120,000.00 is to last for 3 years, calculate the
- (i) annual depreciation if the value is assumed to fall by $\frac{1}{5}$ of the original cost at the beginning of each year.
 - (ii) salvage value of the seed planter at the end of the third year.
- [6 marks]
- [2 marks]
10. (a) Mention five agricultural development programmes in West Africa. [5 marks]
- (b) State five general objectives of agricultural development programmes. [5 marks]
- (c) Suggest six reasons why agricultural extension programmes are ineffective in your country. [6 marks]

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination

June 2008

AGRICULTURAL SCIENCE 2

3 hours

Do not open this booklet until you are told to do so. While you are waiting, write your name and index number in the spaces provided at the top right-hand corner of this booklet and thereafter; read the following instructions carefully.

This paper consists of two parts. Answer Part I in your Objective Test answer sheet and Part II in your answer booklet. Part I will last for 1 hour after which the Objective Test answer sheet will be collected. Do not start Part II until you are told to do so. Part II will last for 2 hours.

PART I
OBJECTIVE TEST
[60 marks]

1 hour

1. Use HB pencil throughout.
2. If you have got a blank answer sheet, complete its top section as follows.
 - (a) In the space marked *Name*, write in capital letters your **surname** followed by your **other names**.
 - (b) In the spaces marked *Examination, Year, Subject and Paper*, write 'WASSCE', '2008 JUNE' '**AGRICULTURAL SCIENCE**' and '2' respectively.
 - (c) In the box marked *Index Number*, write your **index number** vertically in the spaces on the left-hand side. There are numbered spaces in line with each digit. Shade carefully the space with the same number as each digit.
 - (d) In the box marked *Paper Code*, write the digits 502213 in the spaces on the left-hand side. Shade the corresponding numbered spaces in the same way as for your index number.
 - (e) In the box marked *Sex*, shade the space marked M if you are male, or F if you are female.
3. If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in 2 above. In the boxes marked *Index Number, Paper Code and Sex*, reshade each of the shaded spaces.
4. An example is given below. This is for a male candidate, whose name is **Chukwuma Adekunle Ciroma**, whose **index number** is **4251102068**, and who is offering Agricultural Science 2.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: CIROMA CHUKWUMA ADEKUNLE Examination: WASSCE Year: 2008 JUNE

Surname

Other Names

Subject: AGRICULTURAL SCIENCE

Paper: 2

INDEX NUMBER	
4	c0:c1:c2:c3:c4:c5:c6:c7:c8:c9:
2	c0:c1:c3:c4:c5:c6:c7:c8:c9:
5	c0:c1:c2:c3:c4:c6:c7:c8:c9:
1	c0:c2:c3:c4:c5:c6:c7:c8:c9:
1	c0:c2:c3:c4:c5:c6:c7:c8:c9:
0	c1:c2:c3:c4:c5:c6:c7:c8:c9:
2	c1:c2:c3:c4:c5:c6:c7:c8:c9:
0	c1:c2:c3:c4:c5:c6:c7:c8:c9:
6	c0:c1:c2:c3:c4:c5:c7:c8:c9:
8	c0:c1:c2:c3:c4:c5:c6:c7:c9:

For Supervisors only.
If candidate is absent shade this space:

PAPER CODE	
5	c0:c1:c2:c3:c4:c5:c6:c7:c8:c9:
0	c0:c1:c2:c3:c4:c5:c6:c7:c8:c9:
2	c0:c1:c2:c3:c4:c5:c6:c7:c8:c9:
2	c0:c1:c2:c3:c4:c5:c6:c7:c8:c9:
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3	c0:c1:c2:c3:c4:c5:c6:c7:c8:c9:

INSTRUCTIONS TO CANDIDATES

1. Use grade HB pencil throughout.
2. Answer each question by choosing one letter and shading it like this: [A] [B] [C]
3. Erase completely any answers you wish to change.
4. Leave extra spaces blank if the answer spaces provided are more than you need.
5. Do not make any markings across the heavy black marks at the right-hand edge of your answer sheet.

SEX	
Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box: M <input checked="" type="checkbox"/> F <input type="checkbox"/>	



Answer all the questions.

Each question is followed by four options lettered A to D. Find out the correct option for each question and shade in pencil on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only one answer to each question.

An example is given below.

To which of the following crops does the term ginning apply?

- A. Kenaf
- B. Cocoa
- C. Groundnut
- D. Cotton

The correct answer is cotton which is lettered D and therefore answer space D would be shaded.

[A]

[B]

[C]

[D]

Think carefully before you shade the answer spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. Which of the following benefits of agriculture is of least importance to the peasant farmer?
 - A. Materials for shelter
 - B. Employment
 - C. Foreign exchange
 - D. Income

2. Farmers who plant improved maize would harvest
 - A. pest-infested maize grains.
 - B. a high yield of maize.
 - C. plants with long stalks.
 - D. maize cobs with scattered grains.

3. Which of the following land tenure systems allows the owner **greatest** freedom to dispose of the land as he wishes?
 - A. Communal
 - B. Free-hold
 - C. Lease-hold
 - D. Share-cropping

4. Which of the following is **not** a government agricultural programme?
- Operation Feed the Nation
 - Agricultural Development Projects
 - Farm Settlement Schemes
 - West Africa Rice Development Agency
5. The practice of planting one type of annual crop **each** season is referred to as
- monoculture.
 - continuous cropping.
 - mono-cropping.
 - horticulture.
6. The **most** important use of land for agricultural production is
- grazing paddocks.
 - botanical gardens.
 - game reserves.
 - farmstead construction.
7. Which of the following biotic factors are **usually** used to control cassava mealybugs?
- Parasites
 - Predators
 - Pests
 - Pathogens
8. The following are types of sedimentary rocks **except**
- granite.
 - limestone.
 - sandstone.
 - dolomite.
9. A reddish coloured soil indicates the presence of
- copper.
 - sodium.
 - iron.
 - manganese.
10. The three **most** important physical factors that influence rock weathering are
- colour, particle size and hardness of rock.
 - particle size, hardness and degree of cementation.
 - hardness, degree of cementation and colour.
 - particle size, temperature and colour.

11. Which of the following statements is **not** true about waterlogged soils?
- A. Such soils are heavily leached.
 - B. Denitrifying bacteria are more active in such soils than nitrifying bacteria.
 - C. Nitrosomonas yield best in such soils.
 - D. Soil temperature is usually low.
12. Which of the following crops should be planted on a piece of land that has been repeatedly cropped with maize?
- A. Guinea corn
 - B. Millet
 - C. Rice
 - D. Cowpea
13. Sources of nitrogen to the soil include the following **except**
- A. lightning.
 - B. urea.
 - C. blue-green algae.
 - D. residues of burning activities.
14. Which of the following statements about bush burning is **false**?
- A. It releases mineral nutrients bound in plant tissues.
 - B. It encourages the growth of fresh grasses.
 - C. The heat generated destroys pests.
 - D. The heat generated increases the population of soil organisms.
15. A farmer applied NPK 15: 11: 8 at planting. What is the percentage of potassium in the fertilizer?
- A. 23.53%
 - B. 32.35%
 - C. 33.33%
 - D. 44.12%
16. The following equipment can be used for irrigation **except**
- A. bucket.
 - B. watering can.
 - C. knapsack sprayer.
 - D. siphon tube.
17. Excessive drainage of soil water can be checked by the addition of adequate quantities of
- A. N. P. K. 15–15–15.
 - B. sulphate of ammonia.
 - C. single superphosphate.
 - D. compost manure.

18. Considering all costs, the **cheapest** source of energy for domestic use is
- A. electricity.
 - B. sunlight.
 - C. biogas.
 - D. water.
19. The implement used for pulverising the soil is the
- A. planter.
 - B. ridger.
 - C. harrow.
 - D. plough.
20. An incubator is important in supplying
- A. heat for day-old chicks.
 - B. heat for embryo development.
 - C. light for candling eggs.
 - D. feed to chicks.
21. A farm surveying equipment made of steel and used for measuring short distances is **called**
- A. prismatic compass.
 - B. measuring tape.
 - C. gunter's chain.
 - D. theodolite.
22. Which of the following statements about farmstead planning is **false**?
- A. Administrative blocks should not be located close to the entrance of the farmstead.
 - B. Waste disposal unit should be located far away from the main farm area.
 - C. All buildings should be well ventilated with good lightings.
 - D. Animal pens should not be located too close to the worker's house.
23. The term *supplying* in crop production means
- A. pruning excess branches of crops.
 - B. spacing out crops during planting.
 - C. replacing ungerminated seeds on seedbeds.
 - D. adding enough fertilizer to the crops.
24. During photosynthesis, green plants convert carbon dioxide to
- A. chlorophyll.
 - B. carbohydrate.
 - C. protein.
 - D. carbonic acid.

Turn over

- 25. Parboiling in the processing of rice**
- improves its digestibility.
 - increases grain mass.
 - reduces the percentage of breakage.
 - facilitates the polishing of rice.
- 26. The main reason for removing the barks of cassava tubers before processing the tuber is to**
- reduce the water content.
 - improve the protein content of products.
 - improve the shelf life of products.
 - reduce the cyanide content of products.
- 27. Curing is carried out in the processing of**
- cassava.
 - tobacco.
 - okro.
 - tomato.
- 28. Tomato plants are staked for the following reasons except to**
- produce clean fruits.
 - reduce pest damage to fruits.
 - increase the yield.
 - improve the taste.
- 29. A vegetatively propagated citrus plant will produce fruits earlier than the one established from seeds because**
- it would not suffer from gummosis disease.
 - insect pests do not attack it.
 - it is more advanced at the time of establishment.
 - the flowers are wind pollinated.
- 30. Swollen shoot disease of cocoa is caused by**
- virus.
 - fungus.
 - bacteria.
 - nematode.
- 31. Groundnut grows best on a**
- well-drained, light sandy-loam soil.
 - well-drained, clayey friable soil.
 - swampy, sandy-clay soil.
 - well-drained, clayey-loam soil.

32. Which of the following characteristics is **not true** of a good pasture crop?
- High palatability
 - High nutritive value
 - Resistance to trampling
 - Poor digestibility
33. The benefits of establishing forests **do not include**
- derivation of medicine.
 - provision of food.
 - improvement of micro-climate.
 - shading of crops.
34. Floriculture is a subdivision of horticulture which deals with the cultivation of
- fruit crops.
 - vegetables.
 - ornamental plants.
 - spices.
35. Which of the following insect pests causes defoliation in crops?
- Mirid
 - Grasshopper
 - Weevil
 - Aphid
36. Which of the following pesticides effectively control maize stem borers?
- Systemic insecticides
 - Contact poisons
 - Nematicides
 - Fumigants
37. Which of the following combinations of practices **best** controls groundnut *rosette* disease?
- Late planting and spraying of insecticide
 - Early planting and spraying of nematicide
 - Late planting and spraying of fungicide
 - Early planting and spraying of insecticide
38. Determine the number of bottles of a herbicide required to spray 25 hectares of farmland, if one bottle is needed to prepare 100 litres and the diluted product is applied at a rate of 20 litres per hectare.
- 2 bottles
 - 5 bottles
 - 8 bottles
 - 11 bottles

Turn over

39. The milk secreting organ in cattle is the
- dewlap.
 - udder.
 - comb.
 - muzzle.
40. A developing embryo derives its nutrition from the mother
- through the blood vessels located in the placenta.
 - by sucking the mammary glands.
 - by direct diffusion through the blood vessels in the liver.
 - through the blood vessels located in the intestine of the mother.
41. Birds store their food in the
- crop.
 - gizzard.
 - proventriculus.
 - cloaca.
42. The following are examples of natural mating methods except
- pen mating.
 - flock mating.
 - hand mating.
 - block mating.
43. The milk collection vessel of the mammary gland is the
- alveolus.
 - gland cistern.
 - teat.
 - streak canal.
44. Fertile eggs will be produced by breeders if the
- laying units are well illuminated.
 - cocks are always kept with the hens.
 - hens are not allowed to brood.
 - eggs collected are kept at the correct temperature.
45. The rabbit is able to utilize forages because
- it has an enlarged caecum that digests fibre.
 - the small intestine is rich in microbes.
 - the mouth has large molars for grinding.
 - the length of the gut is relatively short.

46. If feed efficiency for egg production is defined as feed consumed per 10 eggs, what will be the feed efficiency for a layer that laid 230 eggs and consumed 26 kg feed?
- A. 0.88
 - B. 1.13
 - C. 1.76
 - D. 2.23
47. When birds are fed on a ration deficient in riboflavin, which of the following symptoms will they show?
- A. Night blindness
 - B. Cataract
 - C. Curled-toe paralysis
 - D. Scurvy
48. Livestock are said to feed on the range when they eat
- A. fresh herbage at the milking parlour.
 - B. fresh herbage directly from the pasture.
 - C. harvested herbage in a stall.
 - D. preserved herbage in the form of silage.
49. Which of the following practices is **not** a method of improving rangeland?
- A. Rotational grazing
 - B. Reseeding of depleted forage species
 - C. Removal of weeds
 - D. Use of inorganic fertilizers
50. Liverfluke infestation causes disturbance in lipid digestion because it
- A. blocks the passage of fat to intestine.
 - B. blocks the bile duct and reduces secretion of bile.
 - C. destroys the lipase enzyme.
 - D. prevents fat excretion.
51. A farmer noticed that one of his cows has high fever, blood-stained diarrhoea and often grinds its teeth. This shows that the cow is infected by
- A. rinderpest.
 - B. anthrax.
 - C. brucellosis.
 - D. aspergillosis.

52. Temperature is an important factor in fish ponds because it
- affects the metabolic processes in fish.
 - determines the sex of fishes.
 - encourages the growth of phytoplanktons.
 - affects the type of species of fish.
53. An illegal method of harvesting fish is by the use of
- drag net.
 - potassium cyanide.
 - hook and line.
 - calcium carbonate.
54. How can the offspring of a bull continue to be produced long after its death? By
- using the preserved semen for artificial insemination
 - collecting the semen of the offspring for use in artificial insemination
 - crossing the male and female offspring
 - preserving the body of the dead animal
55. Which of the following factors of production has profit as its reward?
- Land
 - Labour
 - Capital
 - Management
56. A farm business makes profit when
- total revenue equals total cost.
 - total cost exceeds total revenue.
 - total revenue exceeds total cost.
 - average cost equals total revenue.
57. Agricultural business is difficult to insure in West Africa mainly because
- agricultural production is not very profitable.
 - agricultural production is highly risky.
 - many farmers are very poor.
 - the premium is high.

58. A tractor with an expected life of 10 years was bought for Le 15.0m at the end of which it was to be sold for Le 1.0m. Its calculated depreciation is
- A. Le 1.4m.
 - B. Le 1.5m.
 - C. Le 1.6m.
 - D. Le 1.7m.
59. The aims and objectives of agricultural extension education **do not** include
- A. educating farmers on the use of new tools.
 - B. educating farmers on governments' annual budgets.
 - C. encouraging farmers to obtain loans for farming.
 - D. encouraging farmers to use meteorological information in farming.
60. The process which a farmer goes through from the time he hears about a new idea till he finally accepts it, is referred to as
- A. evolution.
 - B. revolution.
 - C. diffusion.
 - D. adoption.

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PART II

ESSAY

[80 marks]

There are five sections in this part. Answer one question only from each section.

Write your answers in ink, in your answer booklet.

All questions carry equal marks.

SECTION A

Answer one question only from this section.

1. (a) (i) Define *agriculture*. [2 marks]
 (ii) List **six** branches of agriculture. [3 marks]

- (b) State **five** differences between commercial agriculture and subsistence agriculture. [5 marks]

- (c) State **three** merits and **three** demerits of using animal power on the farm. [6 marks]

2. (a) (i) Explain the term *farm surveying*. [2 marks]
 (ii) State **four** reasons why farm surveying is important. [4 marks]

- (b) Enumerate **six** problems facing agricultural development in West Africa. [6 marks]

- (c) List **four** factors that may affect the efficiency of draught animals. [4 marks]

SECTION B

Answer one question only from this section.

3. (a) Define the term *soil*. [2 marks]
- (b) (i) List the **four** components of soil. [2 marks]
 (ii) State the percentage of **each** component by volume. [2 marks]

- (c) Describe the process involved in making compost using the pit method under the following headings:
 (i) materials;
 (ii) preparation;
 (iii) storage. [2 marks]
 [6 marks]
 [2 marks]

4. (a) Define *soil erosion*. [2 marks]
- (b) List **four** factors that influence nutrient availability in the soil. [4 marks]
- (c) Explain **two** roles of **each** of the following factors in soil formation:
 (i) climate;
 (ii) living organisms;
 (iii) topography. [6 marks]
- (d) State **four** problems associated with overhead irrigation. [4 marks]

SECTION C

Answer one question only from this section.

5. (a) (i) Define *crop rotation*. [2 marks]
 (ii) Design a four-year crop rotation system using yam, cassava, maize and groundnut. [8 marks]
- (b) State **four** reasons why weeds are difficult to control. [4 marks]
- (c) Mention **two** effects of diseases on crop production. [2 marks]
6. (a) Define *crop improvement*. [2 marks]
 (b) Copy and complete the table below based on Mendel's Law of Independent Assortment of Genes (Dihybrid inheritance).

	TC	Tc	tC	tc
TC	TTCC			
Tc		TTcc		
tC				ttCc
tc			ttcC	

Use the following information:

T = Tall;
C = Coloured;
t = Dwarf;
c = White.

(Where **T** and **C** are dominant characters; while **t** and **c** are recessive characters) [6 marks]

Turn over

(c) Calculate the percentage of plants in 6(b) above that are:

- (i) Tall coloured;
- (ii) Tall white;
- (iii) Dwarf coloured;
- (iv) Dwarf white.

[8 marks]

SECTION D

Answer one question only from this section.

7. (a) Name four breeds of rabbits. [2 marks]

(b) Give two reasons why *oestrus* detection is important in farm animals. [2 marks]

(c) State four functions of each of the following hormones in farm animals:

- (i) androgen;
- (ii) oestrogen.

[8 marks]

(d) (i) List two viral diseases of poultry.
(ii) List two ecto-parasites of poultry. [4 marks]

8. (a) List four methods of identification in cattle production. [4 marks]

(b) State three reasons for carrying out each of the following animal husbandry practices:

- (i) culling of poultry;
- (ii) dehorning of cattle.

[6 marks]

(c) Mention the botanical names of four pasture legumes grown in West Africa. [4 marks]

(d) State four ways of preserving harvested fish. [2 marks]

SECTION E

Answer one question only from this section.

9. (a) Define:

- (i) *demand*;
- (ii) *price elasticity of demand*.

[4 marks]

(b) Explain why the demand curve slopes downwards. [2 marks]

(c) List four agents of agricultural marketing. [4 marks]

- (d) State **two** advantages and **one** disadvantage of **each** of the following agricultural extension teaching methods:
- newspapers;
 - television.

[6 marks]

- 10.** (a) List **four** factors that cause a change in supply of agricultural produce.

[4 marks]

- (b) Distinguish between *fixed cost* and *variable cost* giving **two** examples in **each** case.

[6 marks]

- (c) Explain the following agricultural extension teaching methods:

- posters;
- field trips.

[6 marks]

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination

November 2011

AGRICULTURAL SCIENCE 2

3 hours

Do not open this booklet until you are told to do so. While you are waiting, write your name and index number in the spaces provided at the top right-hand corner of this booklet and thereafter, read the following instructions carefully.

This paper consists of two parts. Answer Part I in your Objective Test answer sheet and Part II in your answer booklet. Part I will last for 1 hour after which the Objective Test answer sheet will be collected. Do not start Part II until you are told to do so. Part II will last for 2 hours.

PART I

1 hour

OBJECTIVE TEST

[60 marks]

1. Use HB pencil throughout.
2. If you have got a blank answer sheet, complete its top section as follows.
 - (a) In the space marked **Name**, write in capital letters your **surname** followed by your **other names**.
 - (b) In the spaces marked **Examination**, **Year**, **Subject** and **Paper**, write '**WASSCE**', '**2011 NOV.**' '**AGRICULTURAL SCIENCE**' and '**2**' respectively.
 - (c) In the box marked **Index Number**, write your **index number** vertically in the spaces on the left-hand side. There are numbered spaces in line with each digit. Shade carefully the space with the same number as each digit.
 - (d) In the box marked **Paper Code**, write the digits **502213** in the spaces on the left-hand side. Shade the corresponding numbered spaces in the same way as for your index number.
 - (e) In the box marked **Sex**, shade the space marked **M** if you are male, or **F** if you are female.
3. If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in 2 above. In the boxes marked **Index Number**, **Paper Code** and **Sex**, reshade each of the shaded spaces.
4. An example is given below. This is for a male candidate, whose name is **Chukwuma Adekunle Ciroma**, whose **index number** is **5251102068**, and who is offering **Agricultural Science 2**.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: <u>CIROMA CHUKWUMA ADEKUNLE</u>	Examination: <u>WASSCE</u>	Year: <u>2011 NOV.</u>
Surname	Other Names	
Subject: <u>AGRICULTURAL SCIENCE</u>		Paper: <u>2</u>

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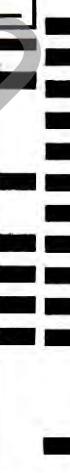
For Supervisors only.
If candidate is absent shade this space:

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INSTRUCTIONS TO CANDIDATES

1. Use grade HB pencil throughout.
2. Answer each question by choosing one letter and shading it like this: [A] [B] [C]
3. Erase completely any answers you wish to change.
4. Leave extra spaces blank if the answer spaces provided are more than you need.
5. Do not make any markings across the heavy black marks at the right-hand edge of your answer sheet.

SEX	
Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box:	
<input checked="" type="checkbox"/> M	<input type="checkbox"/> F



Answer all the questions.

Each question is followed by four options lettered A to D. Find out the correct option for each question and shade in pencil on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only one answer to each question.

An example is given below.

To which of the following crops does the term *ginning* apply?

- A. Kenaf
- B. Cocoa
- C. Groundnut
- D. Cotton

The correct answer is Cotton which is lettered D and therefore answer space D would be shaded.

[A] [B] [C] **D**

Think carefully before you shade the answer spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. The **most** important factor that determines the rate of agricultural development in a country is the
 - A. readiness of farmers to adopt agricultural research results.
 - B. quantity of herbicides used in the country.
 - C. number of machinery available in the country.
 - D. provision of raw materials for industries.

2. Which of the following industries does **not** use an agricultural raw material for its production?
 - A. Textile
 - B. Cement
 - C. Confectionery
 - D. Soap

3. Peasant farmers sell their agricultural produce immediately after harvesting because
 - A. stored produce would be lost to pests.
 - B. storage facilities are inadequate.
 - C. stored produce lose their quality.
 - D. the produce are perishable.

4. Subsistence agriculture involves the use of

- A. agro-chemicals.
- B. crude farm tools.
- C. farm machinery.
- D. fertilizers.

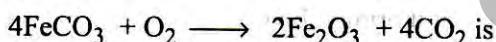
5. Land use is influenced by the following except

- A. fallowing.
- B. population growth.
- C. climatic conditions.
- D. topography.

6. Harmattan wind accelerates

- A. crop growth.
- B. drying of grains.
- C. decomposition.
- D. photosynthesis.

7. The chemical weathering of rocks represented by the equation below



- A. solution.
- B. hydrolysis.
- C. hydration.
- D. oxidation.

8. Which of the following rocks is formed from shale?

- A. Gneiss
- B. Limestone
- C. Slate
- D. Dolomite

9. The following factors affect rock weathering except

- A. water.
- B. carbonation.
- C. temperature.
- D. ammonification.

10. Wind erosion can be controlled by
- ridging across the slope.
 - practising contour farming.
 - planting trees across wind direction.
 - ridging along the direction of wind.
11. A soil is said to be acidic if the pH is
- 6.0 – 6.5.
 - 7.0 – 7.5.
 - 8.0 – 8.5.
 - 9.0 – 9.5.
12. One major element in agricultural lime is
- iron.
 - phosphorus.
 - calcium.
 - sodium.
13. The most important effect of rain on soil nutrients is that it brings about
- leaching.
 - evaporation.
 - transpiration.
 - drainage.
14. The nutrients lost from the soil can be replenished by the following practices except
- cover cropping.
 - continuous cropping.
 - crop rotation.
 - liming.
15. In green manuring, the *mucuna* plant is used because it
- releases nitrogen to the soil.
 - controls leaching of nutrients.
 - checks percolation of water.
 - reduces run-off speed.

16. A soil sample containing 60% sand, 20% silt and 10% clay particles can be described as
- sandy loam.
 - silty loam.
 - clayey loam.
 - silty clay.
17. The **most** efficient irrigation practice on large scale farms in West Africa is
- overhead irrigation.
 - basin irrigation.
 - underground irrigation.
 - shadoof irrigation.
18. Solar energy assists in checking pests multiplication by
- suffocation.
 - dehydration.
 - decomposition.
 - hydration.
19. Which of the following tools is **not** used in tillage operation?
- Hoe
 - Mattock
 - Pick-axe
 - Mallet
20. An incubator is used for
- candling eggs.
 - brooding chicks.
 - hatching fertile eggs.
 - storing eggs.
21. Which of the following statements about produce storage is **false**?
- Aeration is necessary for stored produce
 - High temperature and high moisture content predispose grains to spoilage
 - The storage life of seeds varies with the species and the environment
 - High moisture content is crucial for prolonged storage

22. Which of the following sources of farm power is the **least** utilized in West Africa?
- A. Human
 - B. Animal
 - C. Electricity
 - D. Biogas
23. Large-scale storage of grains is **best** done in
- A. barns.
 - B. cold rooms.
 - C. cribs.
 - D. silos.
24. One of the planting materials used in propagating yam is
- A. rhizome.
 - B. sett.
 - C. crown.
 - D. sucker.
25. A farmer who has no funds to purchase fertilizer and manure to enrich his farmland is advised to practice
- A. mixed cropping.
 - B. monoculture.
 - C. crop rotation.
 - D. silviculture.
26. *Elaeis guineensis* grows **best** in an area with annual rainfall of about
- A. 760 mm – 800 mm.
 - B. 2,000 mm – 3,000 mm.
 - C. 3,500 mm – 4,000 mm.
 - D. 4,500 mm – 5,000 mm.
27. A crop with parallel leaf venation that completes its life cycle in three months is
- A. a perennial dicotyledonous plant.
 - B. a perennial monocotyledonous plant.
 - C. an annual monocotyledonous plant.
 - D. an annual dicotyledonous plant.

28. Which of the following crops is a forage legume?

- A. Elephant grass
- B. Mucuna
- C. Spear grass
- D. Northern gamba grass

29. *Parboiling* of rice involves

- A. soaking for short time and drying.
- B. boiling for long time and drying.
- C. boiling for short time and drying.
- D. soaking for long time and drying.

The information provided below is about soil and climatic requirements for the production of crop X in a particular area. Use it to answer questions 30 and 31.

Water requirement of crop – 2,000 mm/year

Tolerance to waterlogged condition – Poor

Rainfall in the area – 800 mm/year

Relative humidity of the area – 48%

Average diurnal temperature of the area – 37 °C

30. Which of the following cultural practices would be considered suitable for the successful growth of the crop?

- A. Mulching
- B. Irrigation
- C. Ridging
- D. Manuring

31. Assuming moisture supply and nutrients are adequate, the growth of crop X in the area would likely be

- A. normal.
- B. slow.
- C. fast.
- D. retarded.

32. The main objective of growing ornamental plants is to

- A. provide income for florists.
- B. beautify the environment.
- C. provide medicinal herbs.
- D. control soil erosion.

33. Viral diseases of crops can **best** be managed through
- vector control.
 - planting resistant varieties.
 - carrying out cultural practices.
 - sterilizing farm equipment.
34. *Tikka* is a fungal disease of
- groundnut.
 - plantain.
 - cowpea.
 - citrus.
35. *Root knot* disease of tomato can be controlled by applying
- insecticides.
 - nematicides.
 - avicides.
 - herbicides.
36. Bean beetles cause the following damages **except**
- reduction in market value.
 - spoilage of quality of grains.
 - reduction in germination ability.
 - discolouration of testa.
37. A systemic herbicide is **best** for the control of
- annual weeds.
 - perennial weeds.
 - monocotyledonous weeds.
 - dicotyledonous weeds.
38. The hereditary units of inheritance that are responsible for the transmission of characters from parents to their offspring are the
- chromosomes.
 - genes.
 - ovules.
 - zygotes.
39. In the alimentary canal of poultry, grit could be found in the
- caecum.
 - gizzard.
 - intestine.
 - proventriculus.

40. Lactation in farm animals is **positively** affected by
- A. frightening and irritating the animals.
 - B. subjecting the animals to pain or noise.
 - C. regular extraction of milk from their udders.
 - D. starving the animals of food and water.
41. Good management practices in pastures include the following **except**
- A. continuous grazing.
 - B. rotational grazing.
 - C. control of weeds.
 - D. use of fertilizers.
42. Which of the following diseases is caused by a bacterium?
- A. Foot and mouth disease
 - B. Rinderpest
 - C. Brucellosis
 - D. Newcastle disease
43. Which of the following statements is **false** about the **oestrus cycle**? It is
- A. the end of one heat period to the beginning of another.
 - B. regulated by a hormone called oestrogen.
 - C. different from one animal species to another.
 - D. controlled by a hormone called progesterone.
44. Needle teeth in piglets are removed to
- A. prevent wounding of sow's teats.
 - B. prevent piglets from biting one another.
 - C. make piglets grow faster.
 - D. facilitate suckling by piglets.
45. In the domestic fowl, a cock could be differentiated from a hen by its possession of
- A. small combs.
 - B. prominent spurs.
 - C. dull feathers.
 - D. thin shanks.
46. The system of keeping a goat tied to a pole for grazing is known as
- A. paddocking.
 - B. tethering.
 - C. ranching.
 - D. browsing.

47. The process of mating in sheep is termed
- treading.
 - courting.
 - tutting.
 - servicing.
48. One of the disadvantages of poultry production is that
- return per unit space is high.
 - there are early returns on capital.
 - eggs have quick turn over.
 - capital outlay is high.
49. In animal nutrition, iodine is essential for the production of
- oxygen.
 - thyroxine.
 - insulin.
 - progesterone.
50. In poultry nutrition, the minerals that prevent the laying of thin-shelled eggs are
- calcium and phosphorus.
 - sodium and calcium.
 - phosphorus and sodium.
 - sulphur and phosphorus.
51. Methods of rangeland improvement do **not** include
- controlled grazing.
 - stocking rate.
 - burning.
 - paddocking.
52. The *pox* diseases in livestock are caused by
- bacteria.
 - viruses.
 - protozoa.
 - fungi.
53. Fertilizers are applied to fishponds to serve as
- bait for fish.
 - food for fish.
 - nutrients for plankton.
 - water purifier.

54. Which of the following statements about fish smoking is **false**?
- A. Smoking increases the protein content of fish.
 - B. During smoking the heat cooks the fish.
 - C. The smoke gives the fish a special aroma.
 - D. Smoke kills some of the bacteria present.
55. The **most effective** breeding system for preventing sexually transmitted diseases in farm animals is by
- A. artificial insemination.
 - B. hand mating.
 - C. crossbreeding.
 - D. inbreeding.
56. Determine the weight gained by a lamb within a normal year if its birth weight was 2.800 kg and it gained 53 g per day on the average.
- A. 14.840 kg.
 - B. 16.545 kg.
 - C. 19.345 kg.
 - D. 22.145 kg.
57. Artificial scarcity of agricultural produce is often caused by the following marketing agents **except**
- A. wholesalers.
 - B. middlemen.
 - C. farmers.
 - D. co-operatives.
58. In West Africa, farm labour is on the decline because of
- A. increase in urban-rural migration.
 - B. increase in rural-urban drift.
 - C. increase in cost of hiring labour.
 - D. decrease in white collar jobs.
59. Which of the following statements is **not true** of cooperative societies?
- A. Members cooperate to protect their interest
 - B. They promote thrifting and crediting
 - C. Their operation cost is low
 - D. Membership is restricted to the literate farmers
60. The **best** method for the effective teaching of agriculture in schools is by
- A. instructions and on-farm practical.
 - B. instructions and field trips.
 - C. instructions only.
 - D. laboratory instructions.

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PART II

2 hours

ESSAY

[80 marks]

*There are five sections in this part. Answer one question only from each section.**Write your answers in ink, in your answer booklet.**All questions carry equal marks.*

SECTION A

Answer one question from this section.

1. (a) Define the term *land tenure system*. [2 marks]
- (b) State two advantages of each of the following land tenure systems:
 (i) *leasehold*;
 (ii) *freehold*. [4 marks]
- (c) State two reasons why a disc plough is preferred to a mouldboard plough for land preparation in West Africa. [2 marks]
- (d) (i) Name four parts of a disc plough.
 (ii) State one function of each of the parts named in 1(d)(i). [4 marks]
2. (a) State five ways by which agriculture has contributed to the national economy of your country. [5 marks]
- (b) Write the full meaning of the following acronyms of non-governmental agricultural organisations:
 (i) WARDA;
 (ii) IITA. [2 marks]
- (c) State three functions of each of the following farm machinery:
 (i) *bulldozer*;
 (ii) *mistblower*;
 (iii) *harrow*. [9 marks]

SECTION B

Answer one question from this section.

3. (a) (i) Distinguish between *straight fertilizers* and *compound fertilizers*. [2 marks]
(ii) Give **four** examples of inorganic fertilizers. [4 marks]
- (b) List **three** biotic and **three** climatic factors that influence agricultural production in West Africa. [6 marks]
- (c) State **four** ways by which the carbon cycle is important in agriculture. [4 marks]
4. (a) Explain the term *soil*. [2 marks]
(b) List **four** characteristics of loamy soil. [4 marks]
(c) (i) Draw an annotated diagram of the water cycle. [7 marks]
(ii) List the **three** types of soil water. [3 marks]

SECTION C

Answer one question from this section.

5. (a) Give **two** examples each of crops that belong to the following crop groupings:
(i) *fibres*;
(ii) *vegetables*;
(iii) *tubers*;
(iv) *oil crops*;
(v) *legumes*;
(vi) *cereals*;
(vii) *tree fruits*;
(viii) *beverages*. [8 marks]
- (b) A vegetable crop is planted at a spacing of $40\text{ cm} \times 40\text{ cm}$ on an $80\text{ m} \times 40\text{ m}$ farmland.
Calculate the expected plant population. [4 marks]
- (c) State **four** factors that should be considered in planning crop production. [4 marks]

6. (a) Explain **each** of the following terms as used in crop production:

(i) *grafting*;

(ii) *thinning*;

(iii) *staking*.

[6 marks]

(b) State **two** reasons for adopting **each** of the crop production activities listed in 6(a). [6 marks]

(c) Mention the botanical names of **two** species of yam.

[2 marks]

(d) State **two** uses of ginger.

[2 marks]

SECTION D

Answer one question from this section.

7. (a) (i) Explain the terms *line breeding* and *inbreeding* as used in animal improvement. [4 marks]

(ii) State **three** advantages and **three** disadvantages of inbreeding. [6 marks]

(b) State **four** factors that determine the amount of water required by farm animals. [4 marks]

(c) Give **four** sources of calcium in the diet of livestock.

[2 marks]

8. (a) State **three** characteristics of **each** of the following classes of animal feedstuffs:

(i) *roughage*;

(ii) *basal feeds*;

(iii) *concentrates*.

[9 marks]

(b) Enumerate **four** factors that should be considered in selecting a site for the construction of a fish pond. [4 marks]

(c) State **three** preventive and control measures of diseases in farm animals. [3 marks]

SECTION E

Answer one question from this section.

9. (a) Describe each of the following farm records:
- (i) *farm diary;*
 - (ii) *farm inventory;*
 - (iii) *balance sheet.*
- [9 marks]
- (b) Outline three factors that can affect the price of rice. [3 marks]
- (c) Explain the following agricultural extension teaching methods:
- (i) *print media;*
 - (ii) *film shows.*
- [4 marks]
10. (a) Explain the following terms as used in agricultural production:
- (i) *hired labour;*
 - (ii) *fixed capital;*
 - (iii) *management.*
- [9 marks]
- (b) Give three reasons why the prices of most agricultural produce are unstable in West Africa. [3 marks]
- (c) Describe the following agricultural extension teaching methods:
- (i) *field day;*
 - (ii) *agricultural shows.*
- [4 marks]