

S5022 June
W.A.S.S.C.E. 2004
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 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 '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: CIROMA CHUKWUMA ADEKUNLE Examination: WASSCE Year: 2004 JUNE
Surname Other Names

Subject: AGRICULTURAL SCIENCE Paper: 2

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

SEX	
M	F
<input type="checkbox"/>	<input type="checkbox"/>

Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box:

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.

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 $\text{KAlSi}_3\text{O}_8 + \text{H}_2\text{O} \rightarrow \text{H}_4\text{Si}_3\text{O}_8 + \text{KOH}$ 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?
- Hygroscopic water
 - Gravitational water
 - Capillary water
 - Superfluous water
11. Which of the following process will **not** lead to the loss of nutrients from the soil?
- Erosion
 - Mulching
 - Harvesting
 - Leaching
12. A disadvantage of using organic manure on the soil is that
- it decreases the potassium content of the soil.
 - diseases spread fast.
 - it increases the humus content of the soil.
 - it reduces the rate of soil water evaporation.
13. Leguminous cover crops do **not**
- bind the soil particles together through their roots.
 - increase the nitrogen content of soils.
 - aid in improving the soil organic matter content.
 - reduce the soil microbial population.
14. In the nitrogen cycle, nitrite is oxidized to nitrate by
- nitrobacter*.
 - nitrosomonas*.
 - azotobacter*.
 - rhizobium*.
15. Which of the following will **not** lead to loss of nitrogen compounds from the soil?
- Crop removal
 - Burning
 - Lodging
 - Leaching

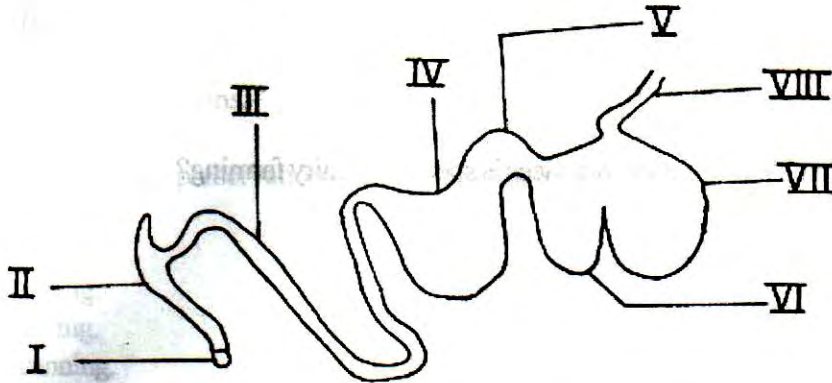
16. Farm drainage does **not** lead to
- A. improvement in soil structure.
 - B. improvement of soil temperature.
 - C. increased soil aeration.
 - D. reduction of soil alkalinity.
17. Which of the following methods of irrigation is **best** for a farm with an undulating landscape?
- A. Sprinkler
 -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

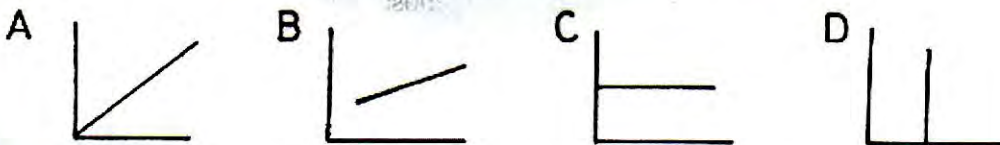
54. The functions of a farm manager include the following **except**

- 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.

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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) 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; [4 marks]
 - (ii) commercial agriculture. [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; [6 marks]
 - (ii) subsurface irrigation method. [2 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]
- (a) transplanting; [4 marks]
 - (b) shading; [2 marks]
 - (c) supplying/filling-in; [5 marks]
 - (d) nursery. [4 marks]
6. (a) Define the terms *budding* and *grafting*. [2 marks]
- (b) List **four** materials required for budding.
- (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: [3 marks]
- (i) circulatory system; [2 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: [2 marks]
- (i) demand affects agricultural production given that supply is constant; [2 marks]
 - (ii) supply affects agricultural production when demand is constant.
- (c) State **two** effects of [2 marks]
- (i) demand on farmers' income when price is constant; [2 marks]
 - (ii) supply on farmers' income when demand is constant. [5 marks]
- (d) State **five** roles expected of a farm manager in a farm enterprise.
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]