

S451/2 June  
S.S.C.E. 1994  
BIOLOGY 2  
2 hours 5 minutes

2

THE WEST AFRICAN EXAMINATIONS COUNCIL

NIGERIA

Senior School Certificate Examination

June 1994

BIOLOGY 2

2 hours 5 minutes

Do not open this booklet until you are told to do so. While you are waiting, read the following instructions carefully. This paper consists of two sections. Answer Section A on your Objective Test answer sheet, and Section B in your answer book. Section A will last for 50 minutes after which the answer sheets will be collected. Do not start Section B until you are told to do so. Section B will last for  $1\frac{1}{4}$  hours.

SECTION A

50 minutes

OBJECTIVE TEST

[60 marks]

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 'S.S.C.E.', '1994 June', 'BIOLOGY' and '2', respectively.
  - (c) In the box marked *Index Number*, write down 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 *Subject Code*, write down the digits 451014 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*, *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 **index number** is 41230068 and who is offering *Biology 2*.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: OBI CHIDERA NKIRUKA Examination: S.S.C.E. Year: 1994 June  
Subject: BIOLOGY Paper: 2

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

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

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

☐ M ☒ F

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 ☒ E
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 five options lettered A to E. 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 cells that surround the stoma are called

- A. stomatal cells.
- B. leaf parenchyma.
- C. epidermal cells.
- D. substomatal cells.
- E. guard cells.

The correct answer is guard cells, which is lettered E, and therefore answer space E would be shaded.

[ A ]

[ B ]

[ C ]

[ D ]

[ ~~E~~ ]

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

Do all rough work on this question paper.

Now answer the following questions.

1. All animals are dependent on green plants because, plants

- A. shelter them from excessive heat from the sun.
- B. give them protection from enemies.
- C. are used for building houses and furniture.
- D. beautify their surroundings.
- E. manufacture food for animals.

2. The scientist who discovered the cell while examining a thin slice of cork under the microscope was

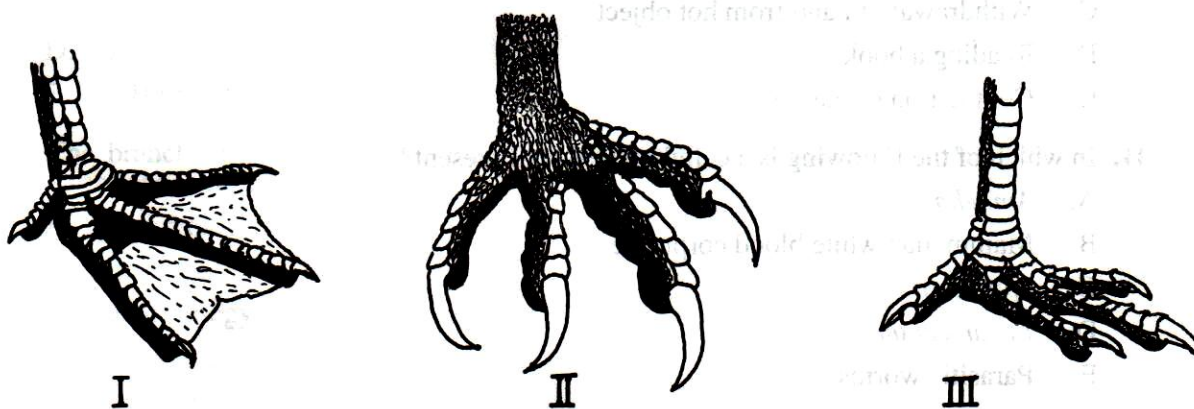
- A. Robert Hooke.
- B. Anton van Leeuwenhoek.
- C. Matthias Schleiden.
- D. Theodor Schwann.
- E. Alexander Fleming.

3. The two important physical processes involved in the absorption and transport of materials in plants are

- A. diffusion and plasmolysis.
- B. cohesion and diffusion.
- C. flaccidity and turgidity.
- D. osmosis and diffusion.
- E. plasmolysis and capillarity.

4. The process by which plants manufacture food from carbon dioxide and water, using energy from the sun is termed
- chemosynthesis.
  - photosynthesis.
  - autotrophism.
  - heterotrophism.
  - transpiration.
5. The process in which insects undergo conspicuous changes in form and appearance during development is known as
- ecdysis.
  - metamorphosis.
  - aestivation.
  - migration.
  - hibernation.

Diagrams I, II and III below illustrate the feet of birds adapted to various modes of feeding and movement. Use them to answer Questions 6 to 8.



6. What is the foot labelled I adapted to?
- Feeding on flesh
  - Eating grains
  - Swimming in water
  - Perching on trees
  - Catching insects in flight
7. The foot labelled III is strong and has blunt claws on its digits. This implies that the bird
- is a scavenger.
  - is a bird of prey.
  - is a marine bird.
  - uses the foot to scratch the soil.
  - uses the foot to supplement wing action in flight.

8. The long and sharp claws in the foot labelled II show that the bird uses them to
- hold onto its prey.
  - paddle in water.
  - glide in the air.
  - scratch the earth for worms.
  - burrow into the soil.
9. Conventional method of sewage disposal involves all the following **except** defaecating
- into pit latrines.
  - in open fields.
  - into cesspit.
  - into bucket latrine.
  - into water borne sewage system.
10. Which of the following actions is **not** an example of a simple reflex action?
- Knee jerk
  - Blinking of the eye
  - Withdrawal of hand from hot object
  - Reading a book
  - Contraction of the iris
11. In which of the following is a cellulose cell wall present?
- Amoeba*
  - Mammalian white blood corpuscle
  - Spirogyra*
  - Paramecium*
  - Parasitic worms
12. Which of the following organisms exists as a filament?
- Euglena*
  - Amoeba*
  - Volvox*
  - Paramecium*
  - Spirogyra*
13. All the following can illustrate the dynamic nature of the ecosystem **except**
- nitrogen cycle.
  - carbon cycle.
  - water cycle.
  - nutrient cycle.
  - locomotion in organisms.



14. Which of the following measures does **not** ensure conservation?
- Establishing forest and game reserves
  - Encouraging people to plant trees
  - Founding societies that promote conservation
  - Enacting conservation laws and bye-laws
  - Enclosing fishes in ponds where they will not be stolen
15. Which of the following is **not** required for primary production to occur in plants?
- Chlorophyll
  - Sugar
  - Water
  - Carbon dioxide
  - Solar energy
16. Which of the following blood group(s) is/are the universal donor(s)?
- O
  - A
  - B
  - AB
  - AB and O
17. The branch of science which deals with resemblances, origin and expression of biological variations is called
- embryology.
  - ecology.
  - entomology.
  - genetics.
  - taxonomy.
18. Which of the following can cause desert encroachment?
- Afforestation
  - Irrigation
  - Planting of trees
  - Establishment of game reserve
  - Overgrazing
19. The morphological, physiological and behavioural characteristics which enable an organism to survive in its environment is called
- heredity.
  - ecology.
  - competition.
  - adaptation.
  - variation.



20. Which of the following performs the same function as the contractile vacuole of a unicellular organism?

- A. Kidney
- B. Alimentary canal
- C. Liver
- D. Pancreas
- E. Bladder

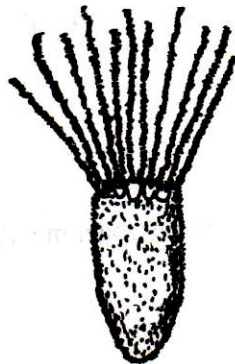
21. Which of the following represents the correct order in a possible food chain?

- A. Crustacea ———→ diatom ———→ fish ———→ man
- B. Fish ———→ crustacea ———→ man ———→ diatom
- C. Man ———→ fish ———→ crustacea ———→ diatom
- D. Diatom ———→ crustacea ———→ fish ———→ man
- E. Man ———→ diatom ———→ fish ———→ crustacea

22. Which of the following relationships illustrates competition?

- A. Cattle egret moving along with cattle
- B. Goats and cows grazing on a small grass lawn
- C. Mosses succeeding lichens in a rocky terrain
- D. Red mangrove swamp dying and replaced by white mangrove
- E. Forest trees, shrubs and grasses replacing white mangrove in a swamp

Use the diagram below to answer Question 23.

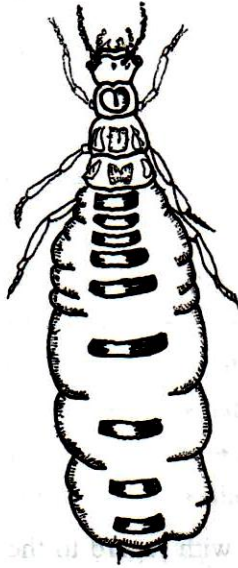


23. Which of the following agents is responsible for the dispersal of the seed shown above?

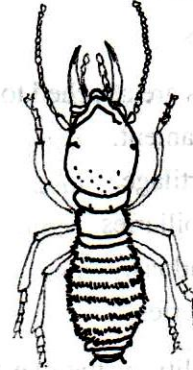
- A. Man
- B. Water
- C. Wind
- D. Explosive mechanism
- E. Animal

24. The structure used by fishes to detect the presence and movement of other animals by the vibration they produce is the
- eye.
  - nostril.
  - lateral line.
  - scales.
  - fins.
25. Muscles are attached to bones by means of
- ligament.
  - cartilage.
  - capillaries.
  - tendons.
  - arteries.
26. The ability of the eye to alter the focal length of the lens, with regard to the distance of the object from the eye is known as
- binocular vision.
  - nocturnal vision.
  - distortion.
  - accommodation.
  - focusing.
27. What is the fate of the ovary of a flower after fertilization? It
- becomes the seed.
  - withers away.
  - becomes the fruit.
  - develops more nuclei.
  - develops into sepals.

Use the diagrams below to answer Questions 28 and 29.



I



II

28. The diagrams above represent a group of insects known to be

- A. colonial.
- B. parasitic.
- C. social.
- D. carnivorous.
- E. symbiotic.

29. In their system of organisation, the diagram labelled II plays the role of a

- A. worker.
- B. soldier.
- C. queen.
- D. drone.
- E. reproductive.



The table below is a Punnett square for sex determination in man. Use it to answer Questions 30 and 31.

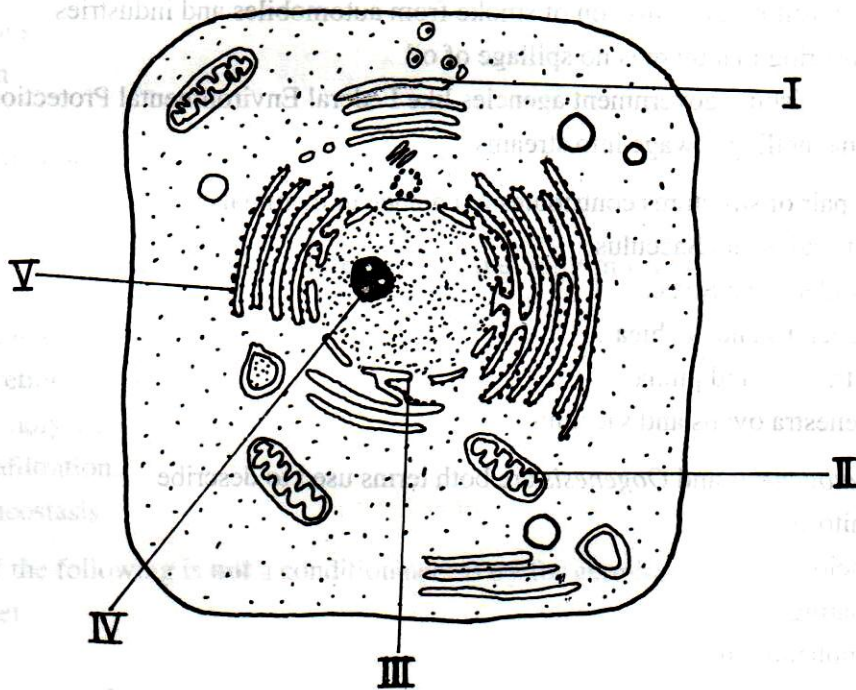
		EGG	
		(X)	(X)
SPERM	(X)	XX	XX
	(Y)	XY	XY

30. Which of the following determines a normal male offspring?
- X
  - Y
  - XX
  - XY
  - YY
31. What is the theoretical probability that a normal male child will be born?
- $\frac{1}{2}$
  - $\frac{1}{4}$
  - $\frac{1}{3}$
  - 1
  - $\frac{2}{3}$
32. Which of these is **not** part of the appendicular skeleton?
- Clavicle
  - Vertebral column
  - Scapula
  - Femur
  - Humerus
33. Which of the following factors does **not** control population growth?
- Food shortage
  - Emigration
  - Abundance of food
  - Predation
  - Natural disaster

34. The following conditions form the basis of competition in a habitat **except**
- food.
  - space.
  - reproductive mate.
  - light.
  - body structure.
35. The part of the ear which equalises air pressure on either side of the eardrum is the
- auditory meatus.
  - malleus.
  - Eustachian tube.
  - oval window.
  - stapes.
36. Mutation leads to evolution in that it
- gives rise to offspring which have the same characteristics as the parents.
  - kills all organisms where it has occurred.
  - gives rise to new individuals which differ considerably from their parents.
  - always confers adaptability to the offspring.
  - does not confer adaptability to the offspring.
37. The process whereby poisonous compounds are made harmless in the liver is called
- deamination.
  - glycolysis.
  - dehydration.
  - detoxification.
  - denitrification.
38. The deficiency of calcium in a plant may result in
- stunted growth and poor root development.
  - poor growth, leaves become orange or brown.
  - stunted growth, slender stem and yellowing of leaves.
  - very small leaves and yellowing of leaves.
  - tall weedy and reddish leaves.
39. Which of the following is the least safe method of birth control? Using
- spermicide creams.
  - contraceptive pills.
  - barriers such as condoms.
  - intrauterine device.
  - the withdrawal method.

40. Which of the following does **not** imply attempt at conservation?
- Limit on the size of nets used in fishing
  - Limit on the size of vessels to be used in fishing
  - Prohibition of hunting or fishing at a certain season
  - Prudent management of natural resources
  - Refraining from the use of the natural resource
41. The gradual, cumulative, adaptive and heritable changes in an organism over a long period of time resulting in emergence of new species is known as
- adaptation.
  - survival.
  - regeneration.
  - variation.
  - organic evolution.

The diagram below illustrates the structure of a cell. Use it to answer Questions 42 and 43.



42. The structure that produces the energy required by the cell is labelled

- I.
- II.
- III.

- IV.
- V.



43. The structure labelled V is the
- mitochondrion.
  - ribosome.
  - nucleus.
  - centriole.
  - nucleolus.
44. In which of the following organisms is the siphon found?
- Tadpole
  - Pupa of mosquito
  - Tilapia*
  - Crayfish
  - Butterfly
45. Which of the following is **not** a pollution control measure?
- Penalising those who dump refuse on water or land
  - Controlling the emission of smoke from automobiles and industries
  - Ensuring that there is no spillage of oil
  - Establishing government agencies like Federal Environmental Protection Agency (FEPA)
  - Channelling sewage into streams
46. Which pair of structures contributes to balance in mammals?
- Utriculus and Sacculus
  - Malleus and Stapes
  - Sacculus and cochlea
  - Utriculus and pinna
  - Fenestra ovalis and sacculus
47. *Spermatogenesis* and *Oogenesis* are both terms used to describe
- mitosis.
  - meiosis.
  - mating.
  - implantation.
  - gametogenesis.
48. Which of the following is **not** a continuous variation?
- Height of plants
  - Skin colour
  - Ability to roll tongue
  - Length of fingers
  - Leaf size

49. Which of the following is **not** a conservable natural resource?
- Water
  - Sunlight
  - Forest
  - Soil
  - Minerals
50. Which of the following plant diseases is indicated when grains of cereals are covered with a mass of spores?
- Smut
  - Mosaic
  - Maize streak
  - Fungal blast
  - Rust
51. Which of the following structural features in animals does **not** affect control of body temperature?
- Scales
  - Skin
  - Fur
  - Capillaries
  - Feathers
52. The control of water and salt requirements of the body in order to maintain a stable internal environment is known as
- osmosis.
  - excretion.
  - plasmolysis.
  - ultrafiltration.
  - homeostasis.
53. Which of the following is **not** a condition necessary for germination to occur in most seeds?
- Water
  - Air
  - Activation of enzymes
  - Temperature
  - Soil fertility
54. Which of the following structural features adapts *Drosera* (Sundew) to its carnivorous mode of nutrition?
- Long root with glandular hairs
  - Club-shaped glandular hairs on leaves
  - Prominent lenticels on the stem
  - Broad leaves with long spines
  - Wide stomata under the leaves

55. Which of the following terms is **not** associated with finger prints?

- A. Arch
- B. Loop
- C. Suture
- D. Whorl
- E. Compound

56. In human beings the albino trait is recessive and the normal skin colour is dominant. Therefore the probability of parents that are heterozygous for albinism, having an albino child is

- A.  $\frac{1}{4}$ .
- B.  $\frac{1}{2}$ .
- C.  $\frac{1}{3}$ .
- D.  $\frac{2}{3}$ .
- E. 1.

57. Which of the following is the carrier of hereditary material?

- A. Centriole
- B. Cytoplasm
- C. Nucleolus
- D. Chromosome
- E. Lysosome

58. Which of these statements is correct in the human ABO blood grouping system?

- A. B is recessive
- B. A is dominant over B
- C. O is recessive
- D. O has antigene A and B
- E. A and B are both recessive

59. In man, adult *Schistosoma* is found in the

- A. blood vessels of the bladder.
- B. red blood corpuscles.
- C. lymphatic vessel.
- D. blood vessels of the lung.
- E. white blood cells.

60. Which of the following structures does **not** function as support in animals?

- A. Cuticle in arthropods
- B. Scales in birds
- C. Cartilage in mammals
- D. Body fluid in earthworms
- E. Bones in vertebrates



**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.**

## SECTION B

## ESSAY

[60 marks]

1 hour 15 minutes

Answer **three** questions **only** from this section.

Write your answers in ink in your answer book.

Large labelled diagrams should be used where they make an answer clearer. The names given for chosen species must be English or Scientific and **not** vernacular.

All questions carry equal marks.

1. (a) List **three** major zones in the marine habitat stating **one** characteristic feature of each zone.  
(b) (i) Give **one** example each of plants and animals in the marine habitat.  
(ii) Explain how each of the plant and animal is adapted to the habitat.  
(c) State **three** behavioural adaptations of animals to seasonal changes in terrestrial habitat.  
(d) State **three** characteristics each of the plant community in the tropical rain forest and savanna.
2. (a) Describe the general arrangement of the viscera of a named mammal.  
(b) Describe the process of feeding in:  
(i) *Hydra*;  
(ii) *Amoeba*.
3. (a) Describe an experiment to demonstrate the effect of auxin on growth of a plant shoot.  
(b) List **three** uses of auxin in agriculture.  
(c) Describe the mechanism of transmission of impulses through a nerve fibre.
4. (a) (i) Explain the term *courtship behaviour* in animals.  
(ii) How does courtship aid reproduction in animals?  
(b) Describe the process of fertilization in flowering plants.