

WAEC Past Questions and Answers on Biology

2016 WAEC Past Questions

Question 1

In evolution, analogous structures are significant because they show

Options

- A) physiological diversity
- B) functional diversity
- C) genetic

diversity

D) structural
diversity

The correct answer is

A.

Explanation

:

In evolutionary biology, the term analogous structures pertain to the various structures in different species having the same function but have evolved separately, thus do not share common ancestor. In comparison, the homologous structures pertain to the structures that show similar morphology and anatomy but have different functions. Moreover, the homologous structures are believed to have evolved from a common ancestor since they show similar development pattern during embryonic development.

Question

2

Which of the following statements reflects the mechanism of natural selection?

Options

- A) There are variations within every species
- B) Individuals of every species are genetically identical
- C) No organism in a species dies before sexual maturity
- D) Organisms with selective advantages are less likely to survive

The correct answer is

A.

Explanation: Natural selection is the process whereby organisms better adapted to their environment tend to survive and produce more offspring. The theory of its action was first fully expounded by Charles Darwin, and it is now regarded as be the main process that brings about evolution.

Question

3

Which of the following animals exhibits territoriality?

Options

A)
Rabbit

B)
Earthworm

C)
Lizard

D)
Toad

The correct answer is
C.

Explanation

:

Territoriality is a type of intraspecific or interspecific competition that results from the behavioral exclusion of others from a specific space that is defended as territory. This well-defined behavior is exhibited through songs and calls, intimidation behavior, attack and chase, and marking with scents.

Question 4

The branch of Biology that deals with the principles of classification of organisms

is
known
as

Options

A) biological
index

B)
nomenclature

C)
taxonomy

D)
ecology

The correct answer is
C.

Explanation

:

Taxonomy is the science of defining groups of biological organisms on the basis of shared characteristics and giving names to those groups.

Question 5

Which of the following structures is a tissue

Options

- A) Vessel element
- B) Blood
- C) Sieve tube element
- D) Erythrocyte

The correct answer is
B.

Explanation

:

In biology, tissue is a cellular organizational level intermediate between cells and a complete organ. A tissue is an ensemble of similar cells from the same origin that together carry out a specific function. Organs are then formed by the functional grouping together of multiple tissues.

Question 6

Which of the following cells are not regarded as specialized?

Options

- A) Sperm cells
- B) Root tip cells
- C) Muscle cells
- D) Somatic cells

The correct answer is

D.

Explanation

:

Some cells in multicellular organisms are modified to carry out a particular function, such as transporting a certain substance or executing a specific task. These cells are

called specialized cells. A somatic or vegetal cell is any biological cell forming the body of an organism; that is, in a multicellular organism, any cell other than a gamete, germ cell, gametocyte or undifferentiated stem cell.

Question

7

Which of the following pairs of cells carry out the same function?

Options

- A) Check cell and red blood cell
- B) Spermatozoon and ovum
- C) Palisade cell and epidermal cell
- D) Root tip cell and guard cell

The correct answer is
B.

Explanation

A spermatozoon is a motile sperm cell, or moving form of the haploid cell that is the male gamete. A spermatozoon joins an ovum to form a zygote. A zygote is a single cell, with a complete set of chromosomes, that normally develops into an embryo. The egg cell, or ovum, is the female reproductive cell gamete in oogamous organisms. The egg cell is typically not capable of active movement, and it is much larger (visible to the naked eye) than the motile sperm cells. When egg and sperm fuse, a diploid cell (the zygote) is formed, which rapidly grows into a new organism.

Question

8

If Amoeba is placed in a salt solution. the contractile vacuoles would **Options**

- A) be bursting more frequently
- B) be more numerous
- C) be formed less frequently
- D) grow bigger before they burst

The correct answer is
C.

Question 9

In which of the following habitats is paramecium not found?

Options

- A)
Pond
- B)
Aquarium
- C)
Lake
- D)
Puddle

The correct answer is
B.

Question

10

The following processes are involved in water movement in the endodermis except

Options

- A)
osmosis
- B) vacuolar
pathway
- C)
diffusion
- D) active
transport

The correct answer is

C.

From 2015 WAEC Past Questions

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Question 10

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Option

s

A) osmosis

B) vacuolar
pathway

C)

diffusion

D) active
transport

The correct answer is C.

Question 11

Cells that utilise a lot of energy are characterized by the presence of a large number of

Option s

- A)
vacuoles
- B)
mitochondria
- C) endoplasmic reticulum
- D) ribosomes

The correct answer is

B.

Question 12

Secondary growth is brought about by the activities of
the

**Option
s**

A) phellogen and phelloderm

B) phellogen and
procambium.

C) vascular cambium and
phelloderm

D) vascular cambium and
phellogen

The correct answer is D.

Question 13

A monocot root is different from a dicot root by having

Option s

A)
endodermis

B) cambium

- C) wide pith
- D) root hair.

The correct answer is C.

Question 14

Which of the following statements best describes haemoglobin? It is

Option

s

A) yellowish in colour

B) a red blood
cell

C) an oxygen carrying pigment

D) needed for blood clotting

The correct answer is C.

Question 15

Inhaled air is made warm and moist in the

Option

s

A)
epiglottis

B) nasal

cavity

C)
trachea

D)
mouth

The correct answer is

B.

Question 16

Which of the following structures is not involved in respiration?

**Option
s**

A) Lung books

B)
Mouth

C) Stomach

D)
Trachea

The correct answer is C.

Question 17

Filtrate in the Bowman's capsule contains vitamins because

**Option
s**

A) only all the amount is required by the

body

B) they can be reabsorbed into the blood

C) they have low molecular weight

D) most of them are fat soluble.

The correct answer is C.

Question 18

Pore sweat is produced during muscular exercise because

**Option
s**

A) the contracting muscles produce water

B) fermentation occurs in
muscles

C) the temperature of the body
rises

D) the muscle fatigues

The correct answer is C.

P5042 Nov.
WASSCE 2011
BIOLOGY 2
 $2\frac{1}{2}$ hours

2

Name:

Index Number:

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination

November 2011

BIOLOGY 2

$2\frac{1}{2}$ 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 sections. Answer Section A on your Objective Test answer sheet and Section B in your answer booklet. Section A will last for 1 hour 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 $1\frac{1}{2}$ hours.

SECTION A
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', '2011 NOV.', 'BIOLOGY' 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 504213 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 Biology 2.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: CIROMA CHUKWUMA ADEKUNLE Examination: WASSCE Year: 2011 NOV.
Surname Other Names
Subject: BIOLOGY Paper: 2

INDEX NUMBER	
5	0 1 2 3 4 5 6 7 8 9
2	0 1 2 3 4 5 6 7 8 9
5	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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SEX	
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] []
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.

Which part of the gill of fish is involved in gaseous exchange?

- A. Gill slits
- B. Gill bars
- C. Gill covers
- D. Gill filaments

The correct answer is Gill filaments, 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 structures is found in animal cells?
 - A. Cell wall
 - B. Ribosome
 - C. Middle lamella
 - D. Pyrenoids

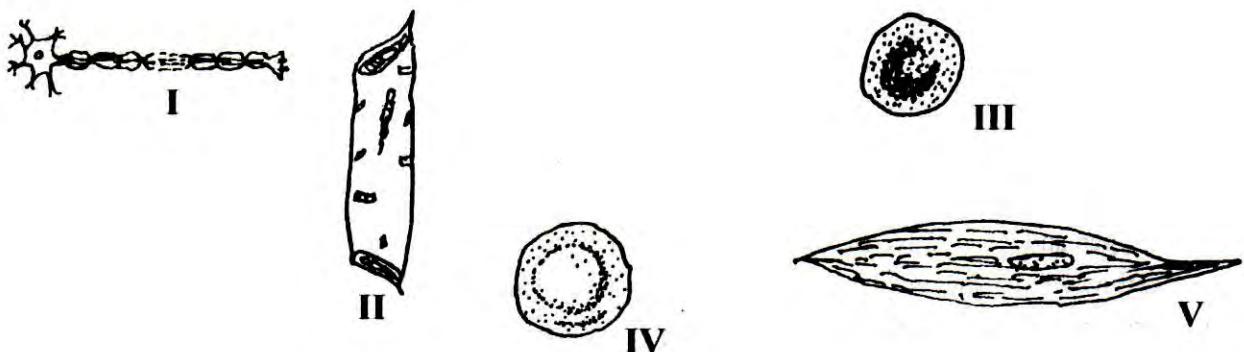
2. An organism with no membrane-bound organelles in its cell, belongs to the kingdom
 - A. Protista.
 - B. Monera.
 - C. Animalia.
 - D. Plantae.

3. Which of the following attributes can be regarded as an advantage of complexity in higher organisms?
 - A. There is no cellular differentiation
 - B. Cellular differentiation leads to loss of independence of cells
 - C. Cellular differentiation leads to internal structural specialization
 - D. Cellular differentiation occurs in only few cells

4. One characteristic feature of *Chlamydomonas* is
 - A. its star-shaped chloroplast.
 - B. the presence of pseudopodia.
 - C. its cup-shaped chloroplast.
 - D. the presence of nucleus in its cell.

5. Movement in *Euglena* is brought about by
- rhythmic movement of endoplasm.
 - hairs on the flagellum.
 - whip-like action of the flagellum.
 - contraction of pellicle.
6. The **major** difference between osmosis and diffusion is that in osmosis
- cells take up nutrients and water.
 - oxygen and water move from one part of the organism to another.
 - carbon dioxide and water are eliminated from the organism.
 - water moves through the cell membrane.
7. The smell of perfume perceived from a distance is made possible by the process of
- osmosis.
 - haemolysis.
 - cyclosis.
 - diffusion.
8. Aerobic respiration in the cell takes place in the
- cytoplasm.
 - lysosome.
 - nucleus.
 - mitochondrion.
9. The mimosa plant shows nastic movement whenever it is touched, this is due to changes in
- transpiration pull on the petal base.
 - turgor pressure at the leaf base.
 - suction pressure at the roots.
 - root pressure at the base.
10. Which of the following statements is **not** true of asexual reproduction in a living organism? It
- results in the formation of two daughter cells.
 - involves only division of somatic cells.
 - involves fusion of opposite gametes.
 - involves mitotic division of a cell.
11. In which of the following vessels will a drug injected into the upper arm enter the heart?
- Inferior vena cava
 - Superior vena cava
 - Renal artery
 - Pulmonary artery

The diagram below shows five types of cells (not drawn to scale). Study the diagram and use it to answer questions 12 to 15.



12. Which of the following cells is **not** an animal cell?
 - A. I
 - B. II
 - C. IV
 - D. V

13. Which pair of cells perform similar functions?
 - A. I and II
 - B. II and III
 - C. III and IV
 - D. II and IV

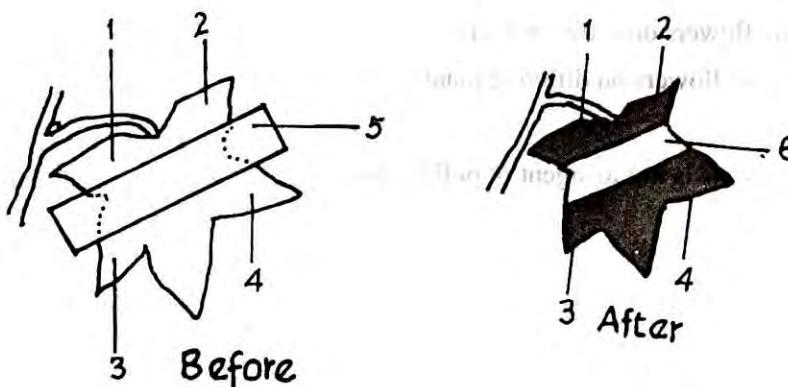
14. Which of the following cells transmits impulses?
 - A. I
 - B. II
 - C. III
 - D. V

15. In which of the cells is anaerobic respiration likely to take place?
 - A. I
 - B. III
 - C. IV
 - D. V

16. The 'Lub' sound of the heartbeat is due to the flapping close of the
A. semilunar and bicuspid valves.
B. tricuspid and bicuspid valves.
C. bicuspid and vena cava valves.
D. semilunar and tricuspid valves.
17. Which of the following hormones is used to prevent stored potatoes from sprouting?
A. Auxin
B. Cytokinin
C. Ethylene
D. Abscisic acid
18. A flower has its stigma above the anther and the anther always ripens before the stigma. What type of pollination will be possible in this type of floral arrangement?
A. Self pollination
B. Cross pollination
C. Wind pollination
D. Water pollination
19. A *monoecious* plant bears
A. perfect staminate flowers on the same plant.
B. staminate and pistillate flowers on the same plant.
C. perfect and pistillate flowers on different plants.
D. pistillate and staminate flowers on different plants.
20. Which of the following insects is **not** an agent of pollination?
A. Bees
B. Butterflies
C. Termites
D. Moths
21. A plant with one seed leaf in its seed and the floral parts of its flowers in groups of three will likely be
A. dicotyledonous.
B. a gymnosperm.
C. monocotyledonous.
D. a fern.

22. A boy puts a straw inside a bottle of coke and observed that the liquid moved up the straw to a level higher than that of the liquid in the bottle. What is the importance of the observed process to the movement of water in plants? It helps plants to
- absorb water from the soil.
 - move water up the xylem vessels.
 - loose water through the leaves.
 - move water from the root hairs to the cortex.
23. Energy is required for **each** of the following activities **except**
- oxidation of digested food.
 - active transport.
 - muscular contraction.
 - gaseous exchange.
24. The elements necessary for the formation of chlorophyll in the leaf of a plant are
- nitrogen, iron and magnesium.
 - nitrogen, calcium, sulphur and iron.
 - potassium, calcium and nitrogen.
 - manganese, sulphur and phosphorus.

A leaf attached to a plant was partly covered with a strip of paper and left outside. After twenty-four (24) hours, it was tested for starch using iodine. The diagrams below are the illustrations of the leaf before and after it was tested for starch. Use the diagrams to answer questions 25 to 28.



25. The function of number 5 in the experiment is to eliminate
- carbon dioxide.
 - oxygen.
 - light rays.
 - water.

26. Which parts of the leaf tested positive for starch at the end of the experiment?
- 1, 2, 3 and 4
 - 1, 2, 3 and 6
 - 1, 2, 4 and 5
 - 1, 2, 5 and 6
27. Attachment of the leaf to the parent plant enables it to obtain
- chlorophyll.
 - water and mineral salts.
 - carbon dioxide.
 - oxygen.
28. The title which could be given to the above experiment is
- starch is formed after photosynthesis.
 - water is necessary for photosynthesis.
 - sunlight is necessary for photosynthesis.
 - carbon dioxide is necessary for photosynthesis.
29. A patient's blood was unable to clot on time so the doctor advised him to take more of vitamin
- C.
 - D.
 - E.
 - K.
30. A person suffering from exophthalmic goitre would have all of the following symptoms except
- bleeding gums.
 - nervousness.
 - swollen neck.
 - sluggishness.
31. Which of the following organisms passes more energy to its consumer per unit gram consumed?
- Beans
 - Insects
 - Chickens
 - Goats
32. The **ultimate** source of energy is
- food.
 - sun.
 - coal.
 - petrol.

33. Organisms that occupy the second trophic level are called
- herbivores.
 - carnivores.
 - decomposers.
 - scavengers.
34. The feature that prevents water loss from the body of a lizard is the
- nuchal crest.
 - gular fold.
 - nectating membrane.
 - horny scales.
35. Which of the following characteristics is **not** found in arid land animals?
- Nocturnal habits
 - Hard impermeable body covering
 - Production of dry waste materials
 - Broad flattened body
36. The following conditions are associated with smoking of cigarettes **except**
- heart diseases.
 - slow reflexes.
 - poor development of foetus.
 - arthritic pains.
37. Which of the following organisms may bring about reduction in human population?
- Trees
 - Butterflies
 - Houseflies
 - Shrubs
38. Population is defined as
- the number of individual organisms per unit area.
 - a progressive series of changes over a period of time in a human community.
 - the total number of organisms of the same species living together in a given period of time.
 - the total number of different species of communities living in an environment in a given period of time.

39. The following statements are characteristic of succession **except** that it
- A. takes place in newly formed habitats.
 - B. involves gradual progressive increase of species over a period of time.
 - C. always involves competition among organisms.
 - D. can start with complex communities.
40. The following statements are true about climax communities **except** that
- A. the community is at its equilibrium.
 - B. the community is stable.
 - C. species of plants and animals can change from year to year.
 - D. the vegetation reaches the highest development.
41. Poisonous substances produced by bacteria in plants or animal bodies are called
- A. antibodies.
 - B. antiseptics.
 - C. hormones.
 - D. toxins.
42. Which of the following natural resources is non-renewable?
- A. Soil
 - B. Water
 - C. Solid mineral
 - D. Wildlife
43. Which of the following occurrences is **not** an advantage of forest conservation?
- A. Increased rainfall
 - B. Purification of the atmosphere
 - C. Production of timber
 - D. Preservation of natural habitats
44. Importance of conservation of wildlife include the following **except**
- A. generation of income through tourism.
 - B. preservation of natural habitats.
 - C. generation of income through sale of ivory.
 - D. maintaining the balance of the ecosystem.

45. A mother is likely to be able to distinguish between her identical twin daughters because of
- physiological variations.
 - morphological variations.
 - character variations.
 - genetic variations.
46. Which of the following factors does **not** contribute to variations in living organisms?
- Mitosis
 - Meiosis
 - Mutation
 - Environment
47. Which of the following traits shows clear-cut differences with no intermediate forms?
- Intelligence
 - Sex
 - Skin colour
 - Comb shape
48. Variation in organisms can be described as when the
- organisms feed on different types of food.
 - organisms show different traits from each other.
 - offspring resemble the parents.
 - organisms are living in different communities.
49. The simplest unit for transfer of character from parents to offspring is the
- chromosome.*
 - gene.*
 - DNA.*
 - ribosome.*
50. Which of the following statements about chromosomes is **correct**?
- In kidney cells of diploid organisms, chromosomes occur singly
 - In gametes, chromosomes occur in pairs
 - A given species always has a varying number of homologous chromosomes
 - In gonads, chromosomes occur in pairs

51. Deoxyribonucleic acid is **most** suitable for the transmission of information from generation to generation through chromosomes because it
- is made up of anti-parallel chains.
 - is made up of nucleotides.
 - has the ability to replicate.
 - is made up of a sugar, an acid and a base.
52. Which of the following statements is **correct** about genes? They
- diminish with ageing.
 - are usually affected by the environment.
 - remain constant throughout life.
 - grow with ageing.
53. The **major** difference between genotype and phenotype is that phenotype
- is an observable trait while genotype is a dominant character.
 - is an observable trait while genotype is a recessive character.
 - is the sum total of observable traits while genotype is the sum total of dominant and recessive genes.
 - is an observed feature in female offspring while genotype is the sum total of genes inherited in male offspring.
54. Which of the following statements is **true** about carriers of sickle cell trait?
- They are often short of blood
 - They have joint pains
 - They are resistant to malaria
 - All their blood cells are sickle-shaped
55. A pregnant woman was successfully transfused with blood from her husband who has blood group **AB**. What is the blood group of the woman?
- A**
 - B**
 - AB**
 - O**
56. The caste that carries out tail-wagging dance in bees is the
- drone.
 - queen.
 - worker.
 - soldier termite.

57. The process of natural selection results in
- A. cattle with high milk yield.
 - B. disease resistant crops.
 - C. insecticide resistant mosquitoes.
 - D. seedless oranges.
58. Larmack's theory of evolution consists of the following **except**
- A. influence of the environment.
 - B. use and disuse of body parts.
 - C. survival of the fittest.
 - D. inheritance of acquired characters.
59. The **major** reason why Mendel covered artificially pollinated flowers with small paper bag was to
- A. prevent pollen grains from being carried away by insects.
 - B. provide suitable temperature for germination.
 - C. prevent pollen grains from being carried away by rainwater.
 - D. prevent the chance of natural pollution.
60. A student defined chromosome as a thread-like material found in the cytoplasm. What is wrong with the definition? Its
- A. location
 - B. shape
 - C. size
 - D. structure

**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 $\frac{1}{2}$ hours

Answer three questions in all: two questions in Part I and one question in either Part II or Part III.
No marks will be awarded for answering questions not peculiar to your own country.

Write your answers in ink in your answer booklet.

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.

Credit will be given for clarity of expression and orderly presentation of answers.

PART I

FOR ALL CANDIDATES

Answer two questions only from this part.

1. (a) (i) What is *primary growth* in flowering plants? [2 marks]
 (ii) State **four** ways in which primary growth is of importance to plants. [4 marks]
 (b) Describe growth in a named insect. [8 marks]
 (c) Make a drawing of a growth curve of an:
 (i) insect;
 (ii) annual herbaceous plant. [6 marks]
2. (a) (i) Name **two** types of moveable joints in mammals. [2 marks]
 (ii) Name the features of the moveable joint and how they serve to protect the joint. [6 marks]
 (b) (i) Define *translocation* in plants. [3 marks]
 (ii) Describe the ringing experiment to demonstrate translocation in plants. [9 marks]
3. (a) Explain the following terms:
 (i) *test cross*;
 (ii) *recessive allele*;
 (iii) *homozygote*. [8 marks]
 (b) (i) Why is *sickle-cell anaemia* considered a deadly disease? [5 marks]
 (ii) Explain **briefly** how sickle-cell anaemia can be reduced in a population. [6 marks]
 (iii) State **one** advantage which a carrier of the sickle-cell anaemia trait has. [1 mark]
4. (a) Explain the following terms:
 (i) *pollution*;
 (ii) *overcrowding*. [4 marks]
 (b) List **three** pollutants **each of**
 (i) *water*;
 (ii) *air*. [6 marks]
 (c) State **five** ways **each of** preventing:
 (i) water pollution;
 (ii) air pollution. [10 marks]

PART II

FOR CANDIDATES IN GHANA, SIERRA LEONE AND THE GAMBIA

Answer one question only from this part.

5. (a) (i) State **three** reasons why organisms are classified. [3 marks]
- (b) (i) Name **three** kingdoms into which living organisms are classified. [3 marks]
- (ii) Give **one** example **each** of organisms belonging to the kingdoms named in 5(b)(i) above. [3 marks]
- (c) (i) Describe the structure of a named fungus. [8 marks]
- (ii) Outline **three** activities of fungi which are beneficial to man. [3 marks]
6. (a) (i) Name **three** organisms found in the soil. [3 marks]
- (ii) State **two** ways by which **each** of the organisms named in 6(a)(i) above maintain soil fertility. [6 marks]
- (b) (i) Outline the role of DNA in protein synthesis. [6 marks]
- (ii) If a cell actively synthesizes proteins, name **three** organelles that are likely to be abundant in the cell. [3 marks]
- (c) What is *first aid*? [2 marks]

PART III

FOR CANDIDATES IN NIGERIA ONLY

Answer one question only from this part.

7. (a) Define the following terms:
- (i) *parasitism*;
 - (ii) *saprophytism*;
 - (iii) *symbiosis*; giving **one** example of each. [12 marks]
- (b) Describe the external features of a named animal ecto-parasite and how the features adapt it to its mode of life. [8 marks]
8. (a) State **three** ways by which water is of importance to mammals. [3 marks]
- (b) Name:
- (i) **two** structures in plants;
 - (ii) **three** structures in mammals; that excrete water. [5 marks]
- (c) How does the mammalian body respond to low water content? [8 marks]
- (d) List **four** plant hormones. [4 marks]

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 1½ 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 CHIDEREA NKIRUKA Examination: S.S.C.E. Year: 1994 June
 Surname Other Names
 Subject: BIOLOGY Paper: 2

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

M	F
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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:
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.

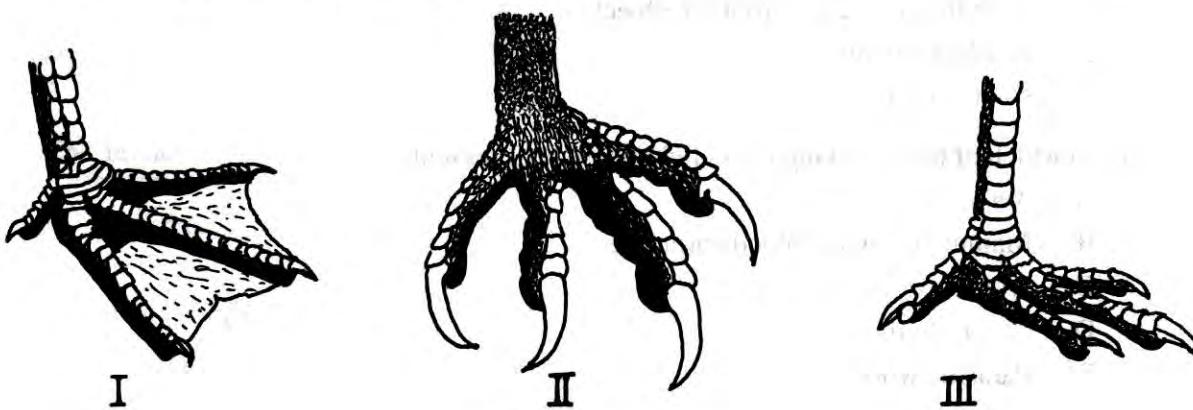
Do all rough work on this question paper.

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?

- A. Establishing forest and game reserves
- B. Encouraging people to plant trees
- C. Founding societies that promote conservation
- D. Enacting conservation laws and bye-laws
- E. 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?

- A. Chlorophyll
- B. Sugar
- C. Water
- D. Carbon dioxide
- E. Solar energy

16. Which of the following blood group(s) is/are the universal donor(s)?

- A. O
- B. A
- C. B
- D. AB
- E. AB and O

17. The branch of science which deals with resemblances, origin and expression of biological variations is called

- A. embryology.
- B. ecology.
- C. entomology.
- D. genetics.
- E. taxonomy.

18. Which of the following can cause desert encroachment?

- A. Afforestation
- B. Irrigation
- C. Planting of trees
- D. Establishment of game reserve
- E. Overgrazing

19. The morphological, physiological and behavioural characteristics which enable an organism to survive in its environment is called

- A. heredity.
- B. ecology.
- C. competition.
- D. adaptation.
- E. 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

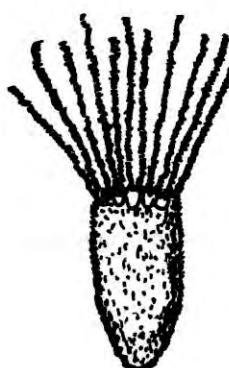
21. Which of the following represents the correct order in a possible food chain?

- 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.

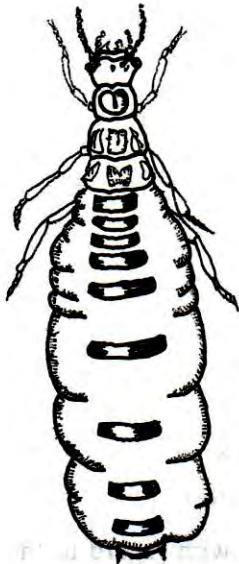


23. Which of the following agents is responsible for the dispersal of the seed shown above?

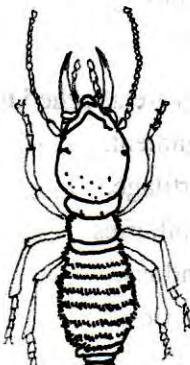
- A. Man
- B. Water
- C. Wind
- D. Explosive mechanism
- E. Animal

24. The structure used by fishes to detect the presence and movement of other animals by the vibration they produce is the
- A. eye.
 - B. nostril.
 - C. lateral line.
 - D. scales.
 - E. fins.
25. Muscles are attached to bones by means of
- A. ligament.
 - B. cartilage.
 - C. capillaries.
 - D. tendons.
 - E. 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
- A. binocular vision.
 - B. nocturnal vision.
 - C. distortion.
 - D. accommodation.
 - E. focusing.
27. What is the fate of the ovary of a flower after fertilization? It
- A. becomes the seed.
 - B. withers away.
 - C. becomes the fruit.
 - D. develops more nuclei.
 - E. 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?

- A. X
- B. Y
- C. XX
- D. XY
- E. YY

31. What is the theoretical probability that a normal male child will be born?

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

32. Which of these is **not** part of the appendicular skeleton?

- A. Clavicle
- B. Vertebral column
- C. Scapula
- D. Femur
- E. Humerus

33. Which of the following factors does **not** control population growth?

- A. Food shortage
- B. Emigration
- C. Abundance of food
- D. Predation
- E. Natural disaster

34. The following conditions form the basis of competition in a habitat **except**

- A. food.
- B. space.
- C. reproductive mate.
- D. light.
- E. body structure.

35. The part of the ear which equalises air pressure on either side of the eardrum is the

- A. auditory meatus.
- B. malleus.
- C. Eustachian tube.
- D. oval window.
- E. stapes.

36. Mutation leads to evolution in that it

- A. gives rise to offspring which have the same characteristics as the parents.
- B. kills all organisms where it has occurred.
- C. gives rise to new individuals which differ considerably from their parents.
- D. always confers adaptability to the offspring.
- E. does not confer adaptability to the offspring.

37. The process whereby poisonous compounds are made harmless in the liver is called

- A. deamination.
- B. glycolysis.
- C. dehydration.
- D. detoxification.
- E. denitrification.

38. The deficiency of calcium in a plant may result in

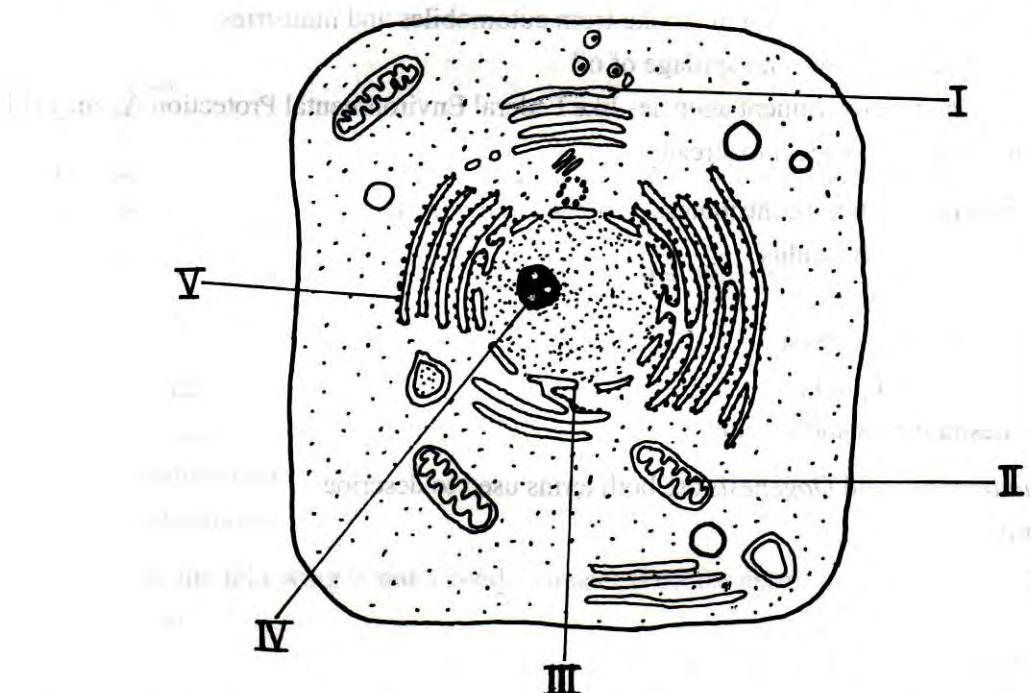
- A. stunted growth and poor root development.
- B. poor growth, leaves become orange or brown.
- C. stunted growth, slender stem and yellowing of leaves.
- D. very small leaves and yellowing of leaves.
- E. tall weedy and reddish leaves.

39. Which of the following is the least safe method of birth control? Using

- A. spermicide creams.
- B. contraceptive pills.
- C. barriers such as condoms.
- D. intrauterine device.
- E. 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.

S 452 June
S.S.C.E. 1993
BIOLOGY 2
2 hours 5 minutes

2

WEST AFRICAN EXAMINATIONS COUNCIL
NIGERIA

Senior School Certificate Examination

June 1993

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 1½ 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.', '1993 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 451024 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 *male* candidate, whose **name** is Kehinde Adeolu KOLADE, whose **index number** is 41230068 and who is offering *Biology*.

WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: KOLADE KEHINDE ADEOLU Examination: S.S.C.E Year: 1993 June
Surname Other Names
Subject: BIOLOGY Paper: 2

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

Indicate your sex by shading the space marked **M** (for Male) and **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:
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

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. parenchyma cells.
- 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. The organ which is sensitive to light in *Euglena* is the

- A. gullet.
- B. chloroplast.
- C. eye spot.
- D. contractile vacuole.
- E. flagellum.

2. Which of the following is a similarity between a typical animal cell and a typical plant cell?
Presence of

- A. cellulose cell wall
- B. chlorophyll
- C. centrally-placed nucleus
- D. cell membrane
- E. large vacuole

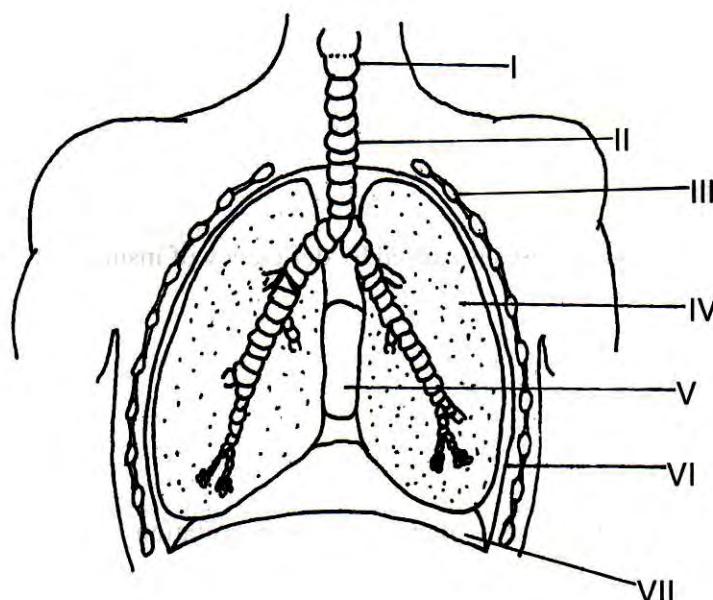
3. The first scientist to describe the cell was

- A. Theodor Schwann.
- B. Felix Dujardin.
- C. Robert Hooke.
- D. Charles Darwin.
- E. Matthias Schleiden.

4. In which of the following parts of a cell is the chromosome found?

- A. Nucleus
- B. Golgi body
- C. Cytoplasm
- D. Cell membrane
- E. Cell wall

Use the diagram below to answer Questions 5 to 8.



5. The part labelled VII is the

- A. pleural cavity.
- B. lung.
- C. rib.
- D. diaphragm.
- E. intercostal muscle.

6. The part labelled I is the

- A. epiglottis.
- B. larynx.
- C. oesophagus.
- D. trachea.
- E. bronchus.

7. Exchange of gases takes place in the air sacs contained in the part labelled
- I.
 - II.
 - IV.
 - V.
 - VI.
8. During the process of breathing, volume and pressure changes occur as a result of the movement of the parts labelled
- I and II.
 - II and IV.
 - III and VII.
 - IV and V.
 - VI and VII.
9. Which of the following diseases is caused by deficiency of insulin in the body?
- Malaria
 - Diabetes mellitus
 - Hepatitis
 - Gonorrhoea
 - Cholera
10. Which of the following is the medium of transportation of nutrients within unicellular organisms?
- Blood
 - Serum
 - Protoplasm
 - Plasma
 - Lymph
11. Which of the following blood vessels carries oxygenated blood into the heart?
- Pulmonary vein
 - Anterior vena cava
 - Pulmonary artery
 - Aorta
 - Posterior vena cava
12. The conditions that ensure successful exchange of gases in multicellular organisms include the following **except**
- concentration gradient across the respiratory surface.
 - presence of thin membrane as the respiratory surface.
 - fast transportation of absorbed gases.
 - presence of large surface area of the respiratory organ.
 - presence of small, dry surface area of the respiratory organ.

13. The respiratory organ found in the cockroach is the

- A. air sac.
- B. trachea.
- C. lung book.
- D. lung.
- E. gill.

14. Which of the following structures functions as an excretory system found in flat worms?

- A. Contractile vacuole
- B. Nephridium
- C. Flame cell
- D. Malpighian tubule
- E. Kidney

15. Which of the following organs is associated with deamination of proteins?

- A. Lung
- B. Stomach
- C. Kidney
- D. Liver
- E. Heart

16. Ultrafiltration in the kidney takes place in the

- A. loop of Henle.
- B. renal vein.
- C. Bowman's capsule.
- D. pelvis.
- E. pyramid.

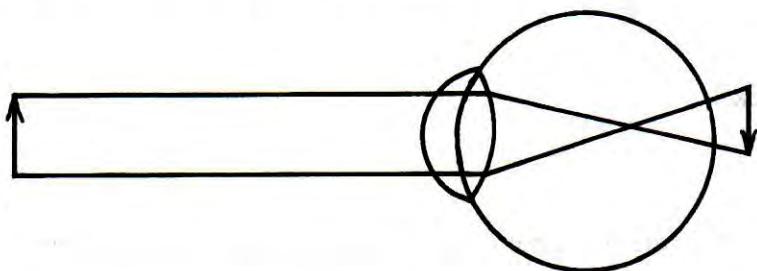
17. When an axon is at rest, the concentration of ions on either side of the membrane are different. Which of the following is correct about the concentrations of ions on either side of the membrane?

- A. There is an excess of potassium ions inside the axon and an excess of sodium ions outside.
- B. The inside of the axon becomes positively charged while the outside is negatively charged.
- C. There is an excess of sodium ions on the inner side of the axon.
- D. Chloride and potassium ions begin to move across the membrane.
- E. Calcium ions accumulate on the inner side of the axon.

18. The groups of sensory cells found on the upper surface of the tongue are called

- A. ampullae.
- B. taste buds.
- C. nerve cells.
- D. somatic cells.
- E. tactile cells.

Use the diagram below to answer Questions 19 and 20.



19. What type of eye defect is illustrated in the diagram above?

- A. Hypermetropia
- B. Myopia
- C. Cataract
- D. Astigmatism
- E. Glaucoma

20. This defect can be corrected by the use of

- A. convex lens.
- B. concave lens.
- C. cylindrical lens.
- D. surgical operation.
- E. biconcave lens.

21. Which of the following is **not** a courtship behaviour exhibited by animals?

- A. Pairing
- B. Display
- C. Seasonal migration
- D. Hibernation
- E. Territorialism

22. Which of the following mineral salts is a trace element?

- A. Zinc
- B. Carbon
- C. Hydrogen
- D. Potassium
- E. Calcium

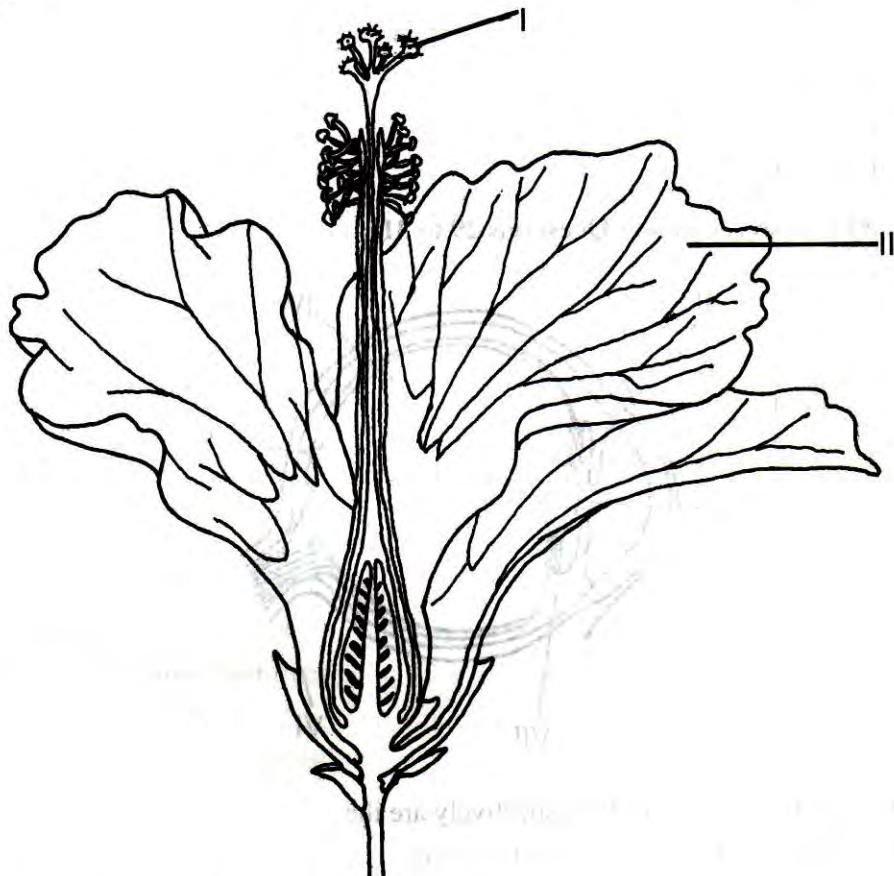
23. Which of the following organisms reduces nitrates in the soil to gaseous nitrogen?

- A. *Euglena*
- B. Protozoon
- C. Denitrifying bacterium
- D. Parasitic mould
- E. Nitrifying bacterium

24. The process whereby microorganisms can convert atmospheric nitrogen into nitrogenous compound is known as

- A. nitrogen cycle.
- B. nitrogen fixation.
- C. denitrification.
- D. putrefaction.
- E. decomposition.

Use the diagram below to answer Questions 25 to 27.



25. What is the function of the part labelled II?

- A. Attraction of insects
- B. Secretion of nectar
- C. Protection of the stigma
- D. Formation of fruit wall
- E. Attachment of flower to the shoot

26. The function of the part labelled I is to

- A. receive pollen grains.
- B. produce nectar.
- C. store the pollen grains.
- D. store the ovules.
- E. produce the male gametes.

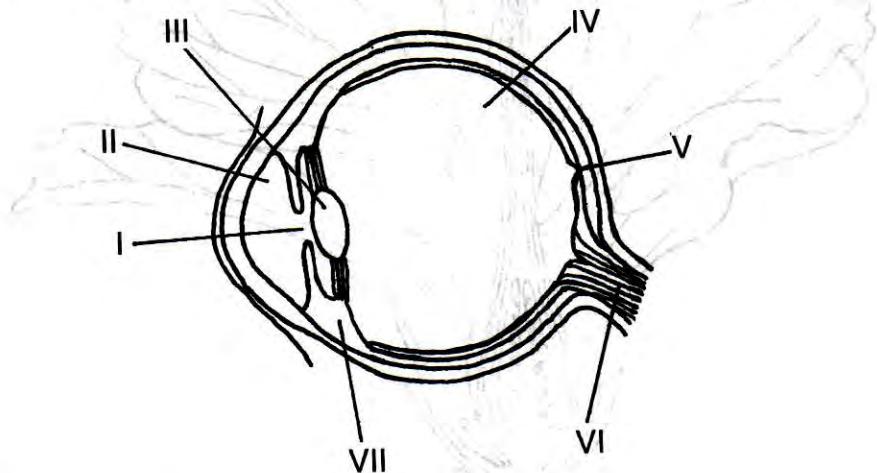
27. How would you describe the position of the ovary in relation to the receptacle?

- A. Superior
- B. Inferior
- C. Semi-inferior
- D. Gamosepalous
- E. Polysepalous

28. What type of relationship exists between a tapeworm and an infected mammal?

- A. Symbiosis
- B. Commensalism
- C. Predation
- D. Parasitism
- E. Saprophytism

Use the diagram below to answer Questions 29 to 31.



29. The parts labelled IV, V, and VI respectively are the

- A. ciliary body, optic nerve and yellow spot.
- B. blind spot, optic nerve and suspensory ligament.
- C. vitreous humour, yellow spot and optic nerve.
- D. blind spot, optic nerve and pupil.
- E. yellow spot, retina and choroid layer.

30. The light ray entering the eye goes through the following route

- A. II → III → I → IV → V.
- B. II → I → VII → III → V.
- C. II → I → III → IV → V.
- D. V → IV → III → I → II.
- E. I → VII → III → IV → V.

31. Which of the following structures are adjusted in focussing the image of a distant or near object on the retina?

- A. I and II
- B. II and III
- C. III and VII
- D. IV and V
- E. V and VII

32. Which of the following best describes a marine habitat? A large body of water

- A. which has no distinctive colour or taste
- B. with high concentration of salt
- C. with little suspended materials
- D. with no water weeds
- E. which sustains no animal life

33. The following are features of the tropical rain forest **except**

- A. abundant water supply.
- B. loose and moist soil.
- C. short trees growing beneath tall trees.
- D. scanty trees with small leaves.
- E. presence of many animals.

34. The following are features of Northern Guinea Savanna **except**

- A. presence of tall trees with thick bark.
- B. bare soil with very few trees.
- C. presence of fire-resistant trees.
- D. abundant herbivores.
- E. predominance of woody trees.

35. Which of the following explains the term *pyramid of numbers*?

- A. The number of organisms in a trophic level
- B. The relationship between plants in different trophic levels
- C. The number of saprophytes and parasites in a habitat
- D. The number of predators in a habitat
- E. Progressive decrease in the number of individuals from lower to higher trophic level

36. In which of the following processes is carbon dioxide **not** given out?

- A. Respiration in plants
- B. Decay of organisms
- C. Burning of organic matter
- D. Burning of fuels
- E. During photosynthesis

- 37.** Sea water taken in by a living organism can be recycled into the atmosphere through all the following processes except
- transpiration.
 - digestion.
 - excretion.
 - respiration.
 - decay.
- 38.** Which of the following water pollutants may contain organisms that cause dysentery?
- Pesticides
 - Sewage
 - Industrial wastes
 - Fertilizers
 - Crude oil
- 39.** Which of the following is **not** an adaptation of plants or animals to desert environment?
- Well developed tap root system
 - Small leaves with thick epidermis
 - Stems with spike-like leaves
 - Metabolic waste in the form of uric acid in some animals
 - Broad leaves for storage
- 40.** A climax community is characterised by
- a stable composition of plant and animal species.
 - rapid changes in the composition of species.
 - constant changes in appearance of the habitat.
 - different species occurring at different times.
 - gradual change in animal population.
- 41.** Which of the following is not a characteristic of overcrowding in plant and animal community?
- Population outstripping available space
 - Population exceeding available food
 - Competition within the population
 - Increase in primary production
 - Population increasing at the same rate as the birth rate
- 42.** The use of predators or parasites to control pests in the farm is known as
- predator control.
 - chemical control.
 - biological control.
 - animal control.
 - parasitic control.

43. Which of the following substances **cannot** control the growth of harmful microorganisms?

- A. Antibiotics
- B. Hypertonic salt solution
- C. Disinfectants
- D. Isotonic sugar solution
- E. Antiseptics

44. Which of the following is the underlining principle in the adoption of biological control of pests?

- A. Knowledge of agricultural practices by the farmer
- B. Relationship between plants and animals
- C. The presence of poisonous chemicals in the farm
- D. The relative population of plants and animals in the farm
- E. The predator-prey relationship in the ecological community

45. The following agencies are responsible for conservation in Nigeria **except**

- A. Forestry Departments.
- B. Nigerian Conservation Society.
- C. Game Reserve Authority.
- D. Nigerian Red Cross Society.
- E. Ministry of Agriculture and Natural Resources.

46. The largest game reserve in Nigeria is the

- A. Kainji Game Reserve in Niger State.
- B. Zamfara Forest Reserve in Sokoto State.
- C. Yankari Game Reserve in Bauchi State.
- D. Borgu Game Reserve in Niger State.
- E. Oban Hills Game Reserve in Cross River State.

47. The table below indicates the result of an experiment during which grains of different colours in two maize cobs were counted.

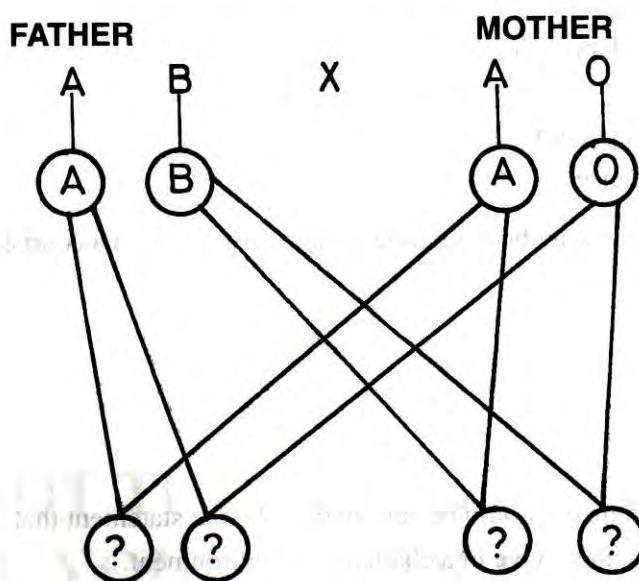
<i>Maize Cob</i>	<i>Colours of Maize Grains</i>		
	White	Pink	Red
I	30	60	30
II	50	99	49

Which of the following ratios agrees with the result?

- A. 9 : 3 : 3
- B. 1 : 2 : 1
- C. 1 : 3 : 1
- D. 2 : 1 : 1
- E. 2 : 3 : 2

- 48.** One of the factors that must be considered for safe blood transfusion is
- social class of the donor.
 - age of the recipient.
 - rhesus factors of the donor and the recipient.
 - nationality of the donor.
 - weight of the recipient.
- 49.** One of the major criticisms against Mendelian laws is that they do **not** recognise that
- one trait is often controlled by many pairs of genes.
 - single factor inheritance is never a reality.
 - complete dominance is always possible.
 - incomplete dominance is not possible.
 - hybrids exist in living organisms.
- 50.** Identical twins inherit their genes from
- the same ovum and different sperms.
 - the same sperm and different ova.
 - different sperms and many ova.
 - the same ovum and the same sperm.
 - many ova and many sperms.
- 51.** The offspring produced when pure strains interbreed is described as
- dominance.
 - phenotype.
 - allele.
 - genotype.
 - hybrid.
- 52.** Which of the following diseases or disorders can be prevented by the application of the knowledge of heredity through marriage counselling?
- Sickle cell anaemia
 - Haemophilia
 - Diabetes mellitus
 - Colour blindness
 - River blindness

53. Study the genetic cross below showing the inheritance of blood groups.



From the cross above, which of the following F_1 offspring does **not** belong to the father?

- A. AA
- B. AO
- C. OB
- D. OO
- E. AB

54. Which of the following is a function of the chromosome?

- A. Transmission of hereditary traits
- B. Protein synthesis
- C. Excretion
- D. Energy production
- E. Manufacture of enzyme

55. Which of the following does **not** illustrate adaptation to the environment?

- A. Colour changes by chameleon
- B. Streamline shape of fishes
- C. Light bones in birds
- D. Development of big muscles by a weight lifter
- E. Possession of fins by fishes

56. The changing of colour by a chameleon to that of the environment is an example of

- A. adaptive radiation.
- B. protective coloration.
- C. courtship display.
- D. display of body colour.
- E. territorial behaviour.

- 57.** The division of labour in social insects is an example of
- structural adaptation.
 - physiological adaptation.
 - commensalism.
 - behavioural adaptation.
 - hormonal influence.
- 58.** The swarming especially at the beginning of the rainy season is a courtship behaviour shown by
- migratory birds.
 - pigeons.
 - crickets.
 - winged termites.
 - bees.
- 59.** Lamarck's evolution theory could be summarised by the statement that
- only the fittest can survive in a challenging environment.
 - species that are unable to adapt become extinct.
 - new characteristics do not arise in organisms in time of need.
 - the changing environment imposes structural, physiological and behavioural changes in organisms.
 - in a changing and unstable environment nature rejects the weak.
- 60.** The property of clay soil that prevents it from supporting thick vegetation is its
- possession of chemically weathered granite rocks.
 - inability to retain much water.
 - tendency of becoming waterlogged.
 - porosity and low water retention ability.
 - high capillary spaces between the soil particles.

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SECTION B

ESSAY

[60 marks]

1 $\frac{1}{4}$ hours

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) (i) List **two** diseases each of plants and animals caused by bacteria.
(ii) State **three** ways in which bacteria are useful.
(b) State **three** methods by which mosquitoes can be controlled and state the reason for each method.
(c) Describe an experiment to demonstrate the presence of bacteria under the finger nails.
2. (a) Describe the process of inhalation in man.
(b) Describe briefly the process of gaseous exchange in the shoot system of flowering plants.
(c) Describe an experiment to demonstrate the effect of distilled water on mammalian red blood cell.
3. (a) Give a brief description of the characteristics of the Northern Guinea savanna.
(b) Describe how you can estimate the density of a plant species using a quadrat.
4. (a) List **four** characters which can be transmitted from parent to offspring in man.
(b) State **two** differences between mitosis and meiosis.
(c) Explain briefly the importance of meiosis and fertilization in the reproduction of organisms.
(d) In a monohybrid cross between a pure breeding plant that produces blue flowers and a pure breeding plant that produces white flowers, the F₁ generation produced only blue flowers.

By means of labelled cross diagrams, state the type of flowers you would expect if the F₁ generation is

- (i) self-pollinated;
- (ii) cross-pollinated with a pure breeding plant that produces white flowers.

Give reasons for your answers in (d)(i) and (ii).

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