

P5042 Nov.
WASSCE 2011
BIOLOGY 2
2 ½ hours

2

Name:

Index Number:

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination

November 2011

BIOLOGY 2

2 ½ 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 ½ 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

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

INSTRUCTIONS TO CANDIDATES

1. Use grade **HB pencil** throughout.
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.

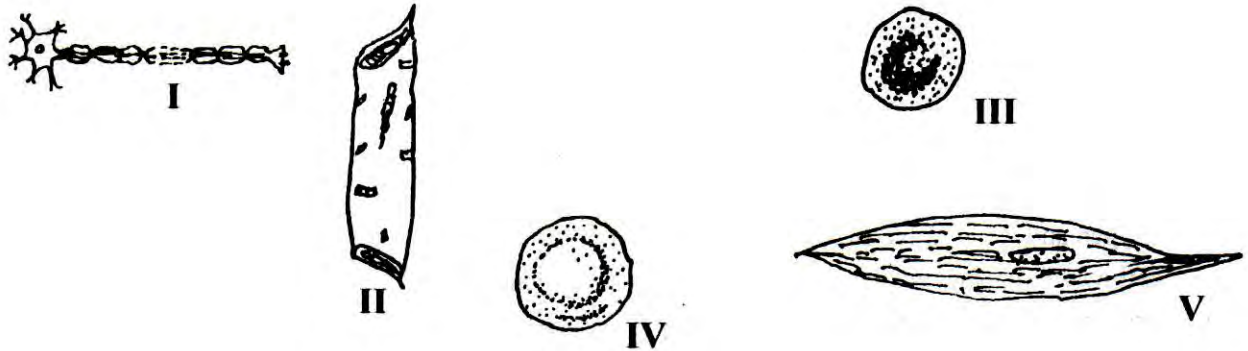
Do all rough work on this question paper.

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-bounded 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 enters 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.

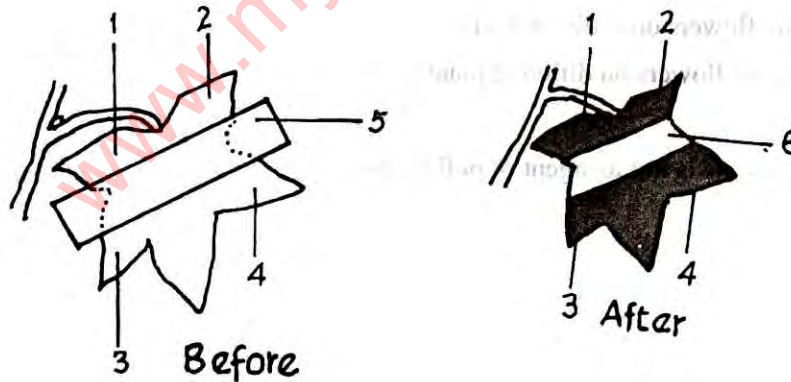


12. Which of the following cells is **not** an animal cell?
- A. I
 - B. II
 - C. IV
 - D. V
13. Which pair of cells perform similar functions?
- A. I and II
 - B. II and III
 - C. III and IV
 - D. II and IV
14. Which of the following cells transmits impulses?
- A. I
 - B. II
 - C. III
 - D. V
15. In 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
- semilunar and bicuspid valves.
 - tricuspid and bicuspid valves.
 - bicuspid and vena cava valves.
 - semilunar and tricuspid valves.
17. Which of the following hormones is used to prevent stored potatoes from sprouting?
- Auxin
 - Cytokinin
 - Ethylene
 - 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?
- Self pollination
 - Cross pollination
 - Wind pollination
 - Water pollination
19. A *monoecious* plant bears
- perfect staminate flowers on the same plant.
 - staminate and pistillate flowers on the same plant.
 - perfect and pistillate flowers on different plants.
 - pistillate and staminate flowers on different plants.
20. Which of the following insects is **not** an agent of pollination?
- Bees
 - Butterflies
 - Termites
 - 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
- dicotyledonous.
 - a gymnosperm.
 - monocotyledonous.
 - 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.
 - lose 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?
- A. 1, 2, 3 and 4
 - B. 1, 2, 3 and 6
 - C. 1, 2, 4 and 5
 - D. 1, 2, 5 and 6
27. Attachment of the leaf to the parent plant enables it to obtain
- A. chlorophyll.
 - B. water and mineral salts.
 - C. carbon dioxide.
 - D. oxygen.
28. The title which could be given to the above experiment is
- A. starch is formed after photosynthesis.
 - B. water is necessary for photosynthesis.
 - C. sunlight is necessary for photosynthesis.
 - D. 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
- A. C.
 - B. D.
 - C. E.
 - D. K.
30. A person suffering from exophthalmic goitre would have all of the following symptoms **except**
- A. bleeding gums.
 - B. nervousness.
 - C. swollen neck.
 - D. sluggishness.
31. Which of the following organisms passes more energy to its consumer per unit gram consumed?
- A. Beans
 - B. Insects
 - C. Chickens
 - D. Goats
32. The **ultimate** source of energy is
- A. food.
 - B. sun.
 - C. coal.
 - D. 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.
 - nictating 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
- takes place in newly formed habitats.
 - involves gradual progressive increase of species over a period of time.
 - always involves competition among organisms.
 - can start with complex communities.
40. The following statements are true about climax communities **except** that
- the community is at its equilibrium.
 - the community is stable.
 - species of plants and animals can change from year to year.
 - the vegetation reaches the highest development.
41. Poisonous substances produced by bacteria in plants or animal bodies are called
- antibodies.
 - antiseptics.
 - hormones.
 - toxins.
42. Which of the following natural resources is non-renewable?
- Soil
 - Water
 - Solid mineral
 - Wildlife
43. Which of the following occurrences is **not** an advantage of forest conservation?
- Increased rainfall
 - Purification of the atmosphere
 - Production of timber
 - Preservation of natural habitats
44. Importance of conservation of wildlife include the following **except**
- generation of income through tourism.
 - preservation of natural habitats.
 - generation of income through sale of ivory.
 - 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
- A. is made up of anti-parallel chains.
 - B. is made up of nucleotides.
 - C. has the ability to replicate.
 - D. is made up of a sugar, an acid and a base.
52. Which of the following statements is **correct** about genes? They
- A. diminish with ageing.
 - B. are usually affected by the environment.
 - C. remain constant throughout life.
 - D. grow with ageing.
53. The **major** difference between genotype and phenotype is that phenotype
- A. is an observable trait while genotype is a dominant character.
 - B. is an observable trait while genotype is a recessive character.
 - C. is the sum total of observable traits while genotype is the sum total of dominant and recessive genes.
 - D. 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?
- A. They are often short of blood
 - B. They have joint pains
 - C. They are resistant to malaria
 - D. 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. **A**
 - B. **B**
 - C. **AB**
 - D. **O**
56. The caste that carries out tail-wagging dance in bees is the
- A. drone.
 - B. queen.
 - C. worker.
 - D. soldier termite.

57. The process of natural selection results in
- cattle with high milk yield.
 - disease resistant crops.
 - insecticide resistant mosquitoes.
 - seedless oranges.
58. Larmack's theory of evolution consists of the following **except**
- influence of the environment.
 - use and disuse of body parts.
 - survival of the fittest.
 - inheritance of acquired characters.
59. The **major** reason why Mendel covered artificially pollinated flowers with small paper bag was to
- prevent pollen grains from being carried away by insects.
 - provide suitable temperature for germination.
 - prevent pollen grains from being carried away by rainwater.
 - 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
- location
 - shape
 - size
 - 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.**

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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]

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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]