

WASSCE / WAEC MAY / JUNE 2016 ELECTIVE BIOLOGY PAPER 2 & 1 (THEORY & OBJECTIVES)

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SC 5042 & 1
WASSCE 2016
BIOLOGY 2 & 1
Essay and Objective
2½ hours

2 & 1

Name:

Index Number:

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination for School Candidates

SC 2016

BIOLOGY 2 & 1

2½ hours

Do not open this booklet until you are told to do so. While you are waiting, read the following instructions carefully.

Write your name and index number in the spaces provided at the top right-hand corner of this booklet.

This booklet consists of two papers. Answer Paper 2, which comes first, in your answer booklet and Paper 1 in your Objective Test answer sheet. Paper 2 will last for 1 hour 40 minutes after which the answer booklet will be collected. Do not start Paper 1 until you are told to do so. Paper 1 will last for 50 minutes.

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2

PAPER 2

ESSAY

1 hour 40 minutes

[70 marks]

Answer **three** questions in all: **two** questions from Section A and **one** compulsory question in either Section B or Section C. 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.

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

SECTION A

FOR ALL CANDIDATES.

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

1. (a) (i) List **three** forms in which living cells exist. [3 marks]
(ii) Give **one** example **each** of the forms listed in 1(a)(i). [3 marks]
- WWW.LARNEDU.COM**
- (b) Make a diagram, 5 cm – 10 cm long, of a typical plant cell and label fully. [8 marks]
- (c) (i) In a tabular form, state **three** differences between a plant cell and an animal cell. [3 marks]
(ii) State **three** similarities between a plant cell and an animal cell. [3 marks]
2. (a) In sequence, name the organs that constitute the alimentary canal of humans. [6 marks]
- (b) State:
(i) **three** structural differences;
(ii) **three** structural similarities;
between the alimentary canal of a bird and human. [6 marks]
- (c) Explain **briefly** how the dentition of herbivores is adapted for feeding. [6 marks]
- (d) State **two** roles of the pancreas in digestion. [2 marks]
3. (a) (i) What is a *habitat*? [2 marks]
(ii) Explain **briefly** **three** roles of a decomposer in an ecosystem. [3 marks]
- (b) Explain **briefly** energy flow in a freshwater habitat. [6 marks]
- (c) (i) State **three** harmful effects of microorganisms to plants. [3 marks]
(ii) State **six** beneficial effects of microorganisms to humans. [6 marks]

4. (a) (i) Explain the term *agglutination* as used in blood transfusion. [3 marks]

- (ii) The table below represents blood transfusion between blood donors and recipients. Copy and complete the table using the keys (+) to represent compatibility and (-) to represent incompatibility.

Donor	Recipient			
		A	B	AB
	A			
	B			
	AB			
	O	+		

[7 marks]

- (b) Explain how **each** of the following organisms are adapted for obtaining food:

- (i) Mosquito larva;
- (ii) *Dodder* plant;
- (iii) Grasshopper.

[10 marks]

SECTION B

FOR CANDIDATES IN GHANA ONLY.

Answer **all** the questions in this section.

5. (a) Describe **briefly** how the capture - mark - release - recapture method of population sampling is used to estimate population density of animals in a field. [4 marks]

- (b) State **four** ways of caring for the teeth in humans. [4 marks]

- (c) State **three** reasons why *Paramecium* is considered more advanced than *Amoeba* in the evolutionary trend. [3 marks]

- (d) Describe how the following stem modifications serve their different purposes, giving **one** example in **each** case:
- (i) food storage stem;
 - (ii) water - storage stem.
- [6 marks]

- (e) (i) Explain **briefly** the term *respiratory quotient*. [2 marks]
- (ii) For **each** of the following respiratory quotient values in a green plant, state the type of substrate used.

Respiratory quotient	Respiratory substrate
1.0	
0.7	
0.5	

[3 marks]

- (f) State **two** ways in which the Krebs cycle is important in respiration. [2 marks]

4

- (g) State **three** ways in which **excessive** consumption of alcohol affects the:
- (i) human body;
 - (ii) society.

[6 marks]

SECTION C

FOR CANDIDATES IN NIGERIA, SIERRA LEONE, THE GAMBIA AND LIBERIA.

Answer **all** the questions in this section.

6. (a) State **two** differences between *tactic* and *nastic* movements in plants. [2 marks]
- (b) Give **two** examples **each** of organisms that show:
- (i) tactic movement;
 - (ii) nastic movement.
- [4 marks]
- (c) (i) State **three** ways of caring for the mammalian skin. [3 marks]
- (ii) List **three** stimuli to which the mammalian skin is sensitive. [3 marks]
- (d) State **five** effects of high temperature on a terrestrial habitat. [5 marks]
- (e) (i) What is *courtship behaviour* in animals? [3 marks]
- (ii) List **three** courtship behaviours in animals. [3 marks]
- (f) Name **three** organisms that carry out holozoic mode of nutrition. [3 marks]
- (g) Explain **briefly** how fingerprinting can be used to detect crime. [4 marks]

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**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.**

**WHILE YOU ARE WAITING, READ THE
FOLLOWING INSTRUCTIONS CAREFULLY.**

Paper 1

50 minutes

OBJECTIVE TEST
[50 marks]

- Use **HB pencil** throughout.
- If you have got a blank answer sheet, complete its top section as follows.
 - In the space marked *Name*, write in capital letters your **surname** followed by your **other names**.
 - In the spaces marked *Examination*, *Year*, *Subject* and *Paper*, write 'WASSCE', 'SC 2016', 'BIOLOGY' and '1' respectively.
 - 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.
 - In the box marked *Paper Code*, write the digits **504113** in the spaces on the left-hand side. Shade the corresponding numbered spaces in the same way as for your index number.
 - In the box marked *Sex*, shade the space marked **M** if you are **male**, or **F** if you are **female**.
- 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.
- An example is given below. This is for a **male** candidate, whose **name** is **Chukwuma Adekunle CIROMA**, whose **index number** is **4251102068** and who is offering **Biology 1**.

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS

Name: CIROMA CHUKWUMA ADEKUNLE Examination: WASSCE Year: SC 2016
Surname Other Names

Subject: BIOLOGY Paper: 1

INDEX NUMBER	
4	0 0 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9
2	0 0 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9
5	0 0 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9
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6	0 0 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9
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5	0 0 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9
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SEX	
Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box:	<div style="display: flex; justify-content: space-around;"> <div>M <input type="checkbox"/></div> <div>F <input type="checkbox"/></div> </div>

INSTRUCTIONS TO CANDIDATES

- Use grade **HB pencil** throughout.
- Answer each question by choosing one letter and shading it like this: [A] [B] [C] ☒
- Erase completely any answer(s) you wish to change.
- Leave extra spaces blank if the answer spaces provided are more than you need.
- 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. An example of an organism that exists as a colony is
 - A. *Spirogyra*.
 - B. *Paramecium*.
 - C. *Euglena*.
 - D. *Volvox*.
2. Gymnosperms bear naked seeds because they lack
 - A. ovary.
 - B. colourful flowers.
 - C. pollen grains.
 - D. stigma.
3. DNA formation is associated with
 - A. Golgi bodies.
 - B. lysosomes.
 - C. mitochondria.
 - D. nucleus.

7

Plant A was seen to appear as plant B after seven hours.
Study the diagrams carefully and answer questions 4 and 5.



A



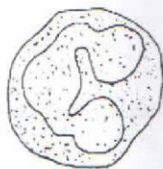
B

4. The term that can be used to describe what happened to plant A after seven hours is
 - A. wilting.
 - B. competition.
 - C. transpiration.
 - D. osmosis.
5. The environmental factors responsible for the condition in plant B are
 - A. low humidity and low temperature.
 - B. high humidity and low temperature.
 - C. low humidity and high temperature.
 - D. high humidity and high temperature.
6. *Hydra* is considered to be at a tissue level of organization of life because it
 - A. has numerous cells that perform different functions.
 - B. has developed organs and systems.
 - C. has a poorly developed nervous system.
 - D. reproduces by budding.

Study the diagrams below and answer questions 7 and 8.



I



II

7. Which of the following statements about the diagrams is correct?
 - A. They are both organs
 - B. One of them is an organism
 - C. They both form part of tissues
 - D. They are harmful to humans

8. A decrease in the number of **II** will result in
- A. an increase in urine production.
 - B. an increase in energy production.
 - C. a decreased population.
 - D. decreased immunity.
9. Flaccidity in plants is associated with
- A. cessation of photosynthesis.
 - B. wilting.
 - C. turgidity.
 - D. discolouration of leaves.
10. Which of the following substances is **not** usually present in the urine of a healthy person?
- A. Urea
 - B. Mineral salts
 - C. Glucose
 - D. Water
11. Muscles act in opposite directions in order to
- A. cause a bone to move.
 - B. prevent dislocation at joints.
 - C. prevent muscle fatigue.
 - D. regulate bodily activities.
12. Lateral meristem in flowering plants is found in the
- A. cortex.
 - B. pericycle.
 - C. cambium.
 - D. pith.
13. The cells and tissues of the nose, throat, chest diaphragm and lungs form the
- A. circulatory system.
 - B. respiratory system.
 - C. transport system.
 - D. digestive system.

14. The exchange of gases between the environment and the respiratory organs of vertebrates is referred to as
- A. inhalation.
 - B. respiration.
 - C. expiration.
 - D. breathing.
15. The maintenance of a constant internal environment in an organism is known as
- A. homeostasis.
 - B. homoiothermy.
 - C. diuresis.
 - D. dialysis.
16. Which of the following organs is responsible for the production of insulin?
- A. Spleen
 - B. Adrenal gland
 - C. Thyroid gland
 - D. Pancreas
17. Which of the following actions is **not** a voluntary action?
- A. Stealing
 - B. Sneezing
 - C. Fighting
 - D. Cheating
18. In both dicotyledonous and monocotyledonous plants, the root hairs originate from the
- A. piliferous layer.
 - B. epidermal layer.
 - C. endodermal layer.
 - D. cortical layer.
19. Which of the following parts of the ear does **not** contain endolymph?
- A. Semi - circular canals
 - B. Utriculus
 - C. Tympanum
 - D. Sacculus

20. The type of placentation illustrated in the diagram below is



- A. marginal.
- B. parietal.
- C. axile.
- D. basal.

The steps below are involved in the testing of a leaf for starch.

Study them carefully and answer questions 21 and 22.

- I. Decolorize leaf
- II. Dip decolorized leaf in warm water
- III. Place leaf in boiling water
- IV. Add iodine solution

21. The correct order for the test is

- A. I, II, III and IV.
- B. I, III, II and IV.
- C. II, III, I and IV.
- D. III, I, II and IV.

22. The best time to pluck the leaf for the experiment is

- A. after being exposed to sunlight.
- B. three hours after sunset.
- C. before sunrise.
- D. six hours after sunset.

23. In which of the plant tissues are guard cells located?

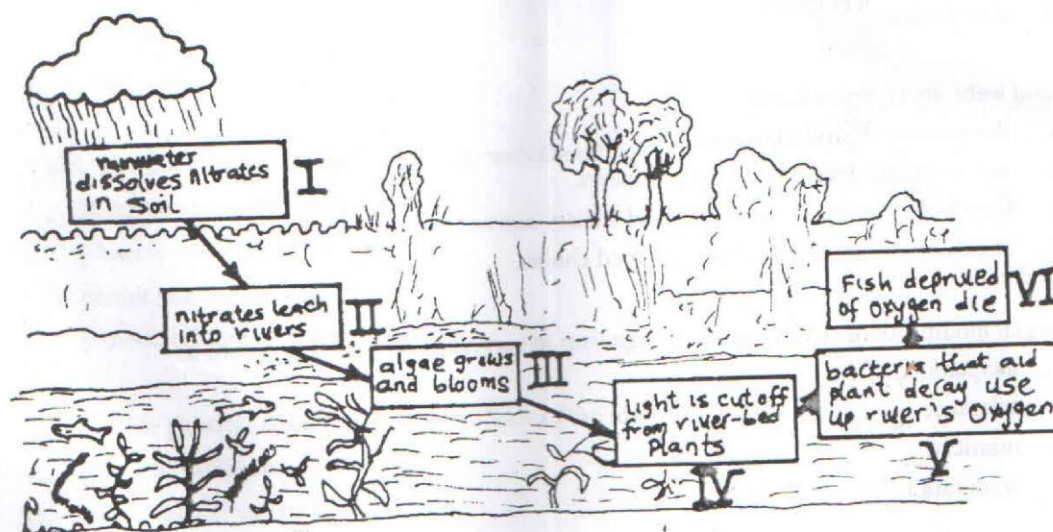
- A. Epidermis
- B. Mesophyll
- C. Vascular bundles
- D. Meristems

24. The association between two organisms in which one of the organisms gains and the other loses is referred to as

- A. saprophytism.
- B. commensalism.
- C. mutualism.
- D. parasitism.

25. The function of the villi in the alimentary canal is to
- secrete gastric juice.
 - curdle milk.
 - emulsify fat.
 - increase the surface area for absorption.
26. Which of the following structures is **not** an organ of the digestive system?
- Oesophagus
 - Pancreas
 - Stomach
 - Kidney

The diagram below shows the effect of nitrates on water bodies.
Study it carefully and answer questions 27 to 29.



27. The source of the nitrates in the part labelled I is the
- root nodules of legumes.
 - cloud.
 - fertilizers.
 - organic matter.
28. The phenomenon in the diagram is termed
- denitrification.
 - conservation.
 - eutrophication.
 - global warming.

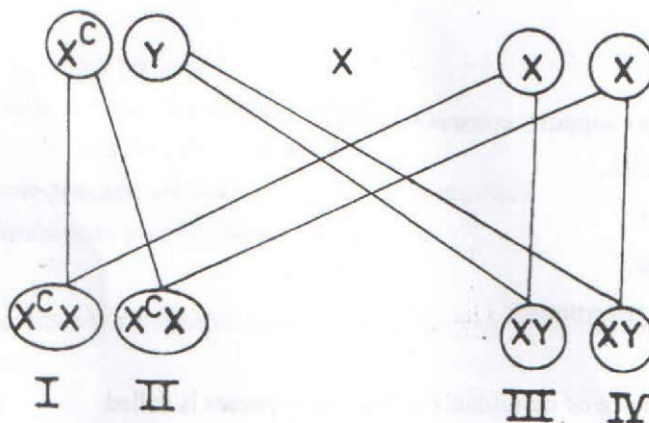
Turn over

29. Another cause that could lead to the phenomenon in the diagram is
- A. exhaust from cars.
 - B. oil spillage.
 - C. dumping of sewage.
 - D. excess rainfall.
30. In ecology, a community refers to
- A. a number of individuals of a given species.
 - B. groups of different organisms living in a habitat.
 - C. existing species in an abandoned farmland.
 - D. the dominant species in a habitat.
31. The direction of wind is determined by
- A. an anemometer.
 - B. a Secchi disc.
 - C. a wind vane.
 - D. a barometer.
32. Food webs are complex because
- A. the number of producers are large.
 - B. many animals feed directly on producers.
 - C. they include primary, secondary and tertiary consumers.
 - D. some animals form part of several food chains.
33. Special modifications which enable an organism to survive in its habitat is known as
- A. adaptation.
 - B. tolerance.
 - C. mimicry.
 - D. colouration.
34. Which of the following relationships does **not** involve **two** organisms?
- A. Commensalism
 - B. Saprophitism
 - C. Symbiosis
 - D. Parasitism
35. Overcrowding in a population does **not** result in
- A. death.
 - B. commensalism.
 - C. competition.
 - D. migration.

36. A pandemic is an outbreak of disease that
- A. is confined to a town.
 - B. is widespread.
 - C. will not spread.
 - D. has limited spread.
37. The rational and prudent use of natural resources is known as
- A. preservation.
 - B. conservation.
 - C. utilization.
 - D. management.
38. Which of the following natural resources **cannot** be conserved?
- A. Soil
 - B. Water
 - C. Wildlife
 - D. Air
39. Which of the following actions supports conservation? To
- A. protect endangered species.
 - B. preserve trees for timber.
 - C. permit hunting activities.
 - D. provide income for the government.
40. A noticeable physical appearance of individuals of the same species is called
- A. physical variation.
 - B. physiological variation.
 - C. morphological variation.
 - D. discontinuous variation.
41. A blend of inherited and acquired characteristics shows
- A. variation.
 - B. inheritance.
 - C. evolution.
 - D. heredity.

42. A cross between two parents produced four offspring with blood groups AB , BB , BO and AO . What is the blood group of their parents?
- A. AA and BO
 B. BB and AO
 C. AB and BO
 D. AB and AO
43. A sick baby was successfully transfused with blood from the father who has blood group AB . What is the group of the sick baby?
- A. A
 B. B
 C. AB
 D. O

The illustration below represents a cross between a colour - blind male and a normal female. Study it carefully and answer questions 44 and 45.



44. What is the genotypic ratio of carrier females to normal males in the cross?
- A. 1:1
 B. 2:3
 C. 3:4
 D. 4:1
45. Which of the genotypes are carriers of colour blindness?
- A. I and II only
 B. I and III only
 C. II and III only
 D. I, II and III only

46. Scientists who study genetics are known as
- A. genealogists.
 - B. geneticists.
 - C. mendelists.
 - D. genescientists.
47. Which of the following scientists did **not** contribute to the development of genetics?
- A. Wilhem Johannsen
 - B. Thomas Morgan
 - C. Gregor Mendel
 - D. Felix Durjadin
48. Which of following terms is associated with *natural selection*?
- A. Adaptive radiation
 - B. Differential reproduction
 - C. Population variability
 - D. Survival of the fittest
49. In which of the following insects is group instinct **not** displayed?
- A. Soldier ants
 - B. Cockroaches
 - C. Honeybees
 - D. Termites
50. The inability of an organism to adapt to its habitat can lead to
- A. dormancy.
 - B. adaptation.
 - C. extinction.
 - D. survival.

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