



CANDIDATE PLEASE NOTE!
PRINT your name on the line below and return this booklet with the answer sheet. Failure to do so may result in disqualification.

TEST CODE **01207010**

JANUARY 2017

FORM TP 2017001

**CARIBBEAN EXAMINATIONS COUNCIL
CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION**

BIOLOGY

Paper 01 – General Proficiency

1 hour 15 minutes

18 JANUARY 2017 (a.m.)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This test consists of 60 items. You will have 1 hour and 15 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.
4. On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

Sample Item

Which of the following diseases is due to a dietary deficiency?

- (A) Malaria
- (B) Diabetes
- (C) Influenza
- (D) Anaemia

Sample Answer



The best answer to this item is “Anaemia”, so (D) has been shaded.

5. If you want to change your answer, erase it completely before you fill in your new choice.
6. When you are told to begin, turn the page and work as quickly and as carefully as you can. If you cannot answer an item, go on to the next one. You may return to that item later.
7. Figures are not necessarily drawn to scale.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.



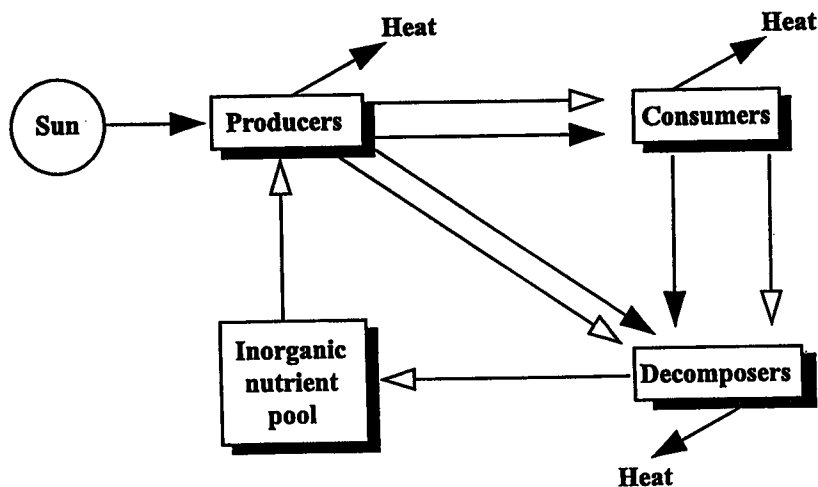
1. Which of the following features is used to classify a group of organisms as Class Insecta?
 - (A) Size
 - (B) Shape
 - (C) Colour
 - (D) Number of segments

2. Commensalism is illustrated by the relationship between a
 - (A) dog and a flea
 - (B) hen and a chick
 - (C) cow and an egret
 - (D) human and a mosquito

3. Living organisms, such as plants, are affected by abiotic factors which determine where they become established. Which of the following describes some of these determining factors?
 - (A) Parasitism, commensalism, mutualism
 - (B) Sunlight availability, soil pH, minerals
 - (C) Sediment size, shape and colour
 - (D) Deforestation, slash and burn, shifting cultivation

4. Bacteria play an important role in the cycling of nitrogen. Which of the following organisms is NOT a part of this cycle?
 - (A) *Nitrobacter*
 - (B) *Streptococcus*
 - (C) *Rhizobium*
 - (D) *Nitrosomonas*

Item 5 refers to the following diagram.



5. Energy flow through ecosystems is not 100% efficient. This is so because energy is
 - (A) linear, moving from one organism to the next
 - (B) circular, moving in and out of organisms
 - (C) lost through respiration and excretion
 - (D) recycled from plants to the atmosphere

Items 6–7 refer to the following food chain which shows the feeding relationships in a freshwater habitat.

Microscopic → Mosquito → Small → Large
Alga Larva Fish Fish

6. The organism to which the LEAST amount of energy is available is the

- (A) large fish
- (B) small fish
- (C) mosquito larva
- (D) microscopic alga

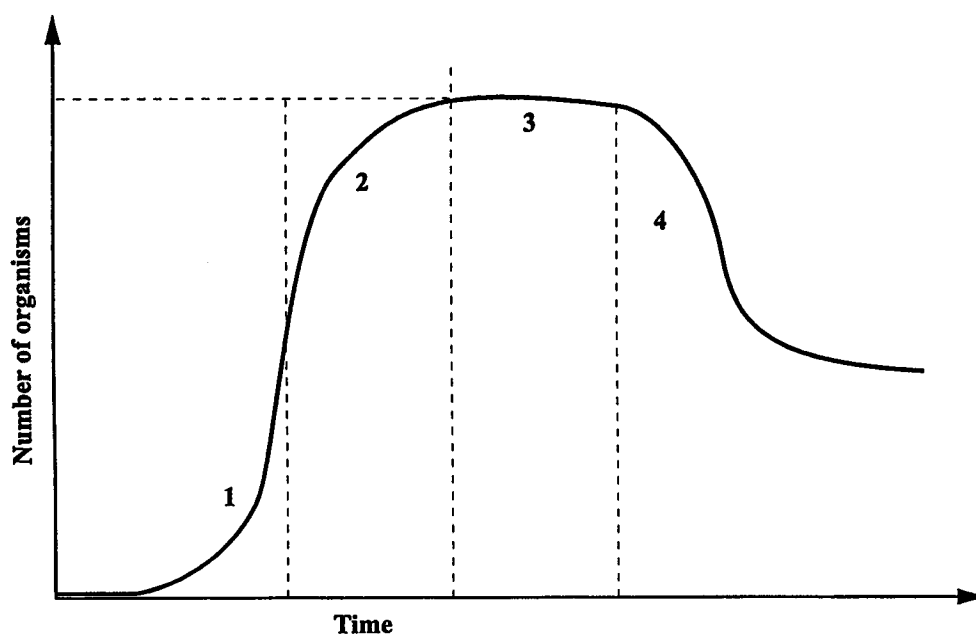
7. The GREATEST number of individuals in the food chain would be the

- (A) large fish
- (B) small fish
- (C) mosquito larva
- (D) microscopic alga

8. Which of the following effects of climate change pose the GREATEST threat to small islands?

- (A) Rising sea levels
- (B) Ocean acidification
- (C) Increased greenhouse gases
- (D) Increased global temperatures

Item 9 refers to the following graph of population growth.



9. Phase 4 of the graph of population growth is MOST likely due to

- (A) disease resistance
- (B) high natural birth rates
- (C) adequate food and space
- (D) competition from invasive species



10. Which of the following statements about recycling manufactured materials are true?

- I. Less energy is used in the manufacturing of new products by using the raw materials from recycled products.
- II. All manufactured products can be recycled.
- III. Recycling of some non-biodegradable materials prevents landfill sites from filling up too quickly and for a long time.

- (A) I and II only
- (B) I and III only
- (C) II and III only
- (D) I, II and III

11. Which of the following are effects of pollutants on coral reefs in the Caribbean?

- I. Increase in macroalgal and seagrass growth
- II. Less reef fish
- III. More branching corals

- (A) I and II only
- (B) I and III only
- (C) II and III only
- (D) I, II and III

12. Which of the following organelles in a cell is the site of aerobic respiration?

- (A) Nucleus
- (B) Cytoplasm
- (C) Chloroplast
- (D) Mitochondrion

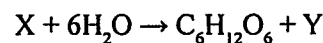
13. Which of the following is caused by a lack of Vitamin A in the diet?

- (A) Rickets
- (B) Scurvy
- (C) Beri-beri
- (D) Night blindness

14. The role of respiration is the

- (A) release of energy
- (B) absorption of oxygen
- (C) liberation of carbon dioxide
- (D) breakdown of carbohydrates

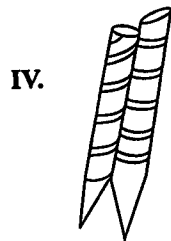
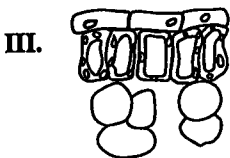
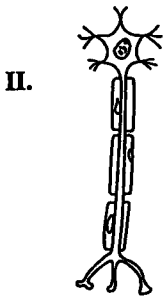
15. The chemical equation for photosynthesis shown below is incomplete.



Which of the following combinations would accurately complete the equation?

	X	Y
(A)	$6CO_2$	$6O_2$
(B)	$6O_2$	$6CO_2$
(C)	O_2	CO_2
(D)	CO_2	O_2

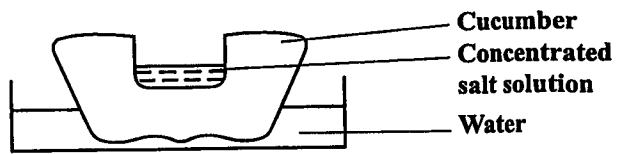
Item 16 refers to the following diagrams of different structures taken from plants and animals.



16. Which of the above structures is NOT a tissue?

- (A) I
- (B) II
- (C) III
- (D) IV

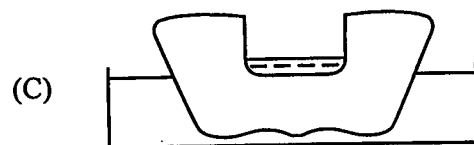
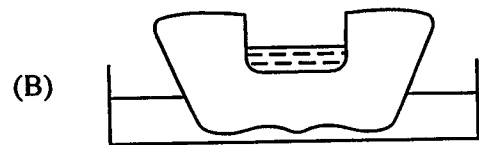
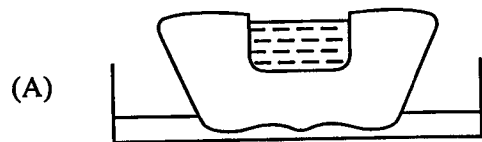
Items 17–18 refer to the following diagram.



17. The process being investigated is

- (A) osmosis
- (B) diffusion
- (C) translocation
- (D) active transport

18. Which diagram BEST illustrates the levels of the liquids if the apparatus is left undisturbed for one hour?



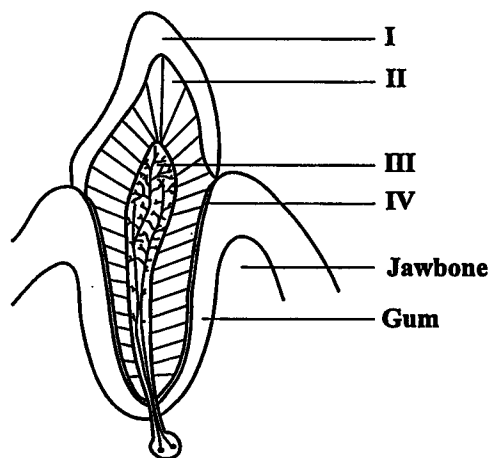
19. Which of the following is NOT necessary for photosynthesis to take place?

- (A) Water
- (B) Energy
- (C) Oxygen
- (D) Chlorophyll



20. A greenhouse plant which is usually kept at a temperature of 25 °C is subjected to a temperature of 30 °C for 24 hours. The MOST likely effect of this change is that the plant would
- (A) lose less water and wilt
 - (B) close the stomata and reduce water loss
 - (C) lose more water and become turgid
 - (D) open the stomata and increase water loss

Items 21–22 refer to the following diagram of a section through an incisor tooth.



21. The region of the tooth sensitive to temperature is labelled
- (A) I
 - (B) II
 - (C) III
 - (D) IV
22. The region labelled IV is the
- (A) root
 - (B) cement
 - (C) dentine
 - (D) enamel

23. The diet of a body builder should contain large amounts of
- (A) fat
 - (B) protein
 - (C) vitamins
 - (D) carbohydrate

24. Which of the following is the BEST definition for excretion?
- (A) Loss of excess materials
 - (B) Loss of indigestible materials
 - (C) Removal of metabolic wastes
 - (D) Removal of unwanted substances

25. Which of the following enzymes works BEST in an acid pH?
- (A) Pepsin
 - (B) Lipase
 - (C) Trypsin
 - (D) Amylase

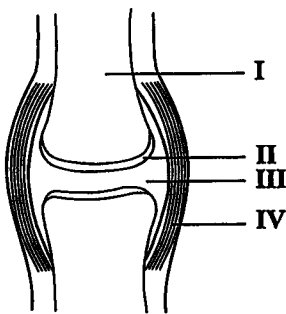
26. Carbon monoxide in cigarettes MOST likely causes
- (A) increased beating of cilia
 - (B) an increase in heart rate
 - (C) a decrease in oxygen transported by the blood
 - (D) increased mucus production in the cells lining the respiratory passages

27. In the transport of solutes in the phloem, the source is defined as any area of the plant where
- (A) water is taken out of the phloem
 - (B) sucrose is loaded into the phloem
 - (C) water is loaded into the phloem
 - (D) sucrose is loaded into the phloem

28. Which of the following parts of the human skeleton contributes the LEAST to its protective function?

- (A) Rib
- (B) Cranium
- (C) Humerus
- (D) Pelvic girdle

Item 29 refers to the following diagram of a synovial joint.



29. Which of the labelled parts represents the ligament?

- (A) I
- (B) II
- (C) III
- (D) IV

30. Which of the following are involved in the formation of blood clots?

- (A) Platelets
- (B) Antibodies
- (C) Lymphocytes
- (D) Phagocytes

31. Large organisms cannot depend solely on diffusion for the uptake and transport of gases. This is because as organisms get larger the

- (A) surface area to volume ratio increases
- (B) surface area to volume ratio decreases
- (C) surface area and the volume both increase
- (D) surface area and the volume both decrease

Item 32 refers to the following actions.

- I. Withdrawal of an earthworm into its burrow when touched
- II. Bending of shoots towards light
- III. Rolling up of a millipede when touched with a needle
- IV. Movement of maggots away from light

32. All of these actions are examples of

- (A) stimuli
- (B) responses
- (C) locomotion
- (D) growth movements

Item 33 refers to the following events that occur when a student reacts to touching a hot object by withdrawing her hand.

Hot object → Pain → Effector → Response

33. The receptor is the

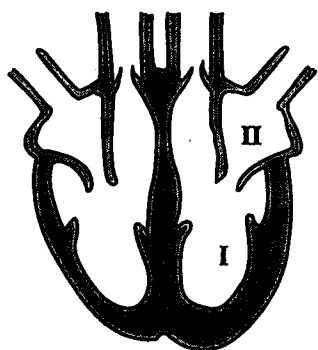
- (A) hot object touched
- (B) heat from the hot object
- (C) sensory endings in the skin
- (D) muscles that contract

34. Fats are good food reserves because they

- (A) are easily digested
- (B) have a high energy value
- (C) melt at low temperatures
- (D) are more bulky than other foods



Item 35 refers to the following diagram of a heart.



35. In a patient with a certain defective heart condition, it was found that blood flowed from Point I to Point II in the diagram above. This was MOST likely due to malfunction of the

- (A) left atrium
- (B) left ventricle
- (C) semi-lunar valve
- (D) bicuspid (mitral) valve

36. Which of the following comparisons between arteries and veins is NOT correct?

	Arteries	Veins
(A)	Valves present	Valves absent
(B)	Blood flows in pulses	Blood flows smoothly
(C)	Have thick muscular walls	Have thin walls
(D)	Blood low in carbon dioxide	Blood high in carbon dioxide

37. Glaucoma is a result of

- (A) the cornea being too thin
- (B) the cornea being too thick
- (C) the lens becoming opaque
- (D) too much fluid in front of the lens

38. Which of the following is true about how the muscles of the iris respond to dim light?

	Circular Muscle	Radial Muscle
(A)	Contracts	Contracts
(B)	Contracts	Relaxes
(C)	Relaxes	Contracts
(D)	Relaxes	Relaxes

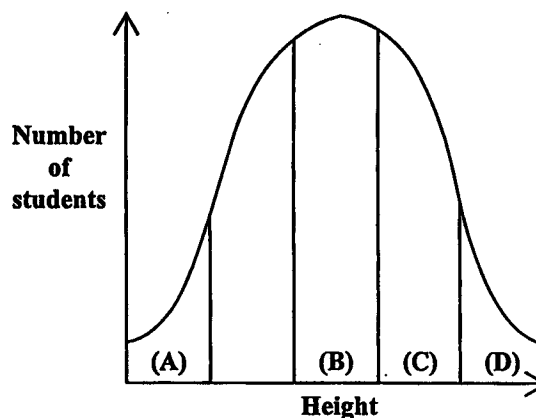
39. Which of the following is a spinal reflex?

- (A) Blinking
- (B) Salivating
- (C) Pupil reflex
- (D) Knee jerk reflex

40. Which of the following is NOT a distinguishing feature of the nervous system?

- (A) Rapid response
- (B) Localized reaction
- (C) Long-lasting effect
- (D) Temporary response

Item 41 is based on the following graph which shows the height of some students in a class.



41. Which labelled portion of the graph represents the unusually SHORT students?

42. The following statements describe the processes taking place within a seed during germination.

- I. Embryo uses food to develop radical and plumule.
- II. Enzymes break down proteins into amino acids.
- III. Soluble products move into the embryo.

Which of the following correctly identifies the sequence of events during the germination of the seed?

- (A) I → II → III
- (B) I → III → II
- (C) II → I → III
- (D) II → III → I

43. One advantage that sexual reproduction has over asexual reproduction is that sexual reproduction

- (A) is conservative
- (B) leads to variation
- (C) produces disease-resistant crops
- (D) produces greater numbers of offspring

44. Pollen grains which are small, light, odourless and smooth are MOST likely transferred by

- (A) water
- (B) birds
- (C) wind
- (D) insects

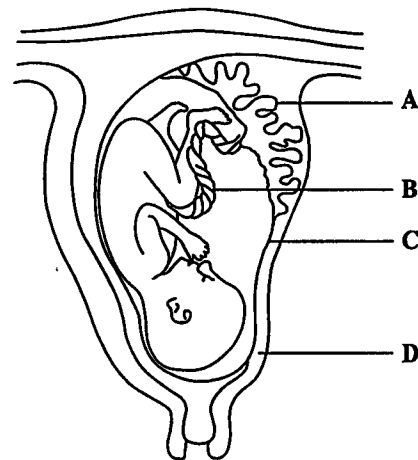
45. Which of the following is NOT necessary for germination to take place?

- (A) Light
- (B) Oxygen
- (C) Moisture
- (D) Food supply

46. Pollination is the process by which pollen is transferred from the

- (A) anther to the stigma
- (B) stigma to the anther
- (C) stamen to the ovary
- (D) pistil to the anther

Items 47–48 refer to the following diagram of the uterus of a pregnant woman.



Which labelled structure is the

47. amnion?

48. placenta?

49. Which of the following organisms transmits the yellow fever virus?

- (A) *Culex*
- (B) *Tsetse*
- (C) *Anopheles*
- (D) *Aedes aegypti*



50. Which of the following methods can be used in the treatment of hypertension?
- I. Diet
 - II. Exercise
 - III. Low sodium intake
- (A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III
51. Which of the following statements about meiosis is NOT true?
- (A) Mixing of genes occurs.
(B) Produces four daughter cells.
(C) Chromosome number is maintained.
(D) Occurs only in the sex organs.
52. The gene for coat colour in cattle shows incomplete dominance. A purebred cow, with red coat, mates with a purebred bull with white coat. All of the offspring have roan coat. Which of the following would represent the genotype of the offspring?
- (A) RR
(B) RW
(C) RO
(D) WW
53. Which of the following processes may be used by humans to change the characteristics of a particular organism in a short time?
- I. Genetic engineering
 - II. Artificial selection
 - III. Natural selection
- (A) I only
(B) I and III only
(C) II and III only
(D) I, II and III
54. Four children born to the same parents have blood groups A, B, AB and O. Which of the following represents the genotypes of the parents?
- (A) $AB \times OO$
(B) $AO \times BO$
(C) $AA \times BO$
(D) $AO \times BB$
55. Variation in populations is due to
- I. mutation
 - II. asexual reproduction
 - III. crossing over
- (A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III
56. In a particular plant, red and white flower colour show codominance. If two heterozygous (pink) flowers are crossed, the expected phenotypic ratio of the offspring is
- (A) all pink
(B) 1 red: 1 white
(C) 3 red: 1 white
(D) 1 red: 2 pink: 1 white
57. Which of the following features of cell division refers to mitosis?
- (A) It is essential for variety within a species.
(B) It results in the haploid number of chromosomes.
(C) It takes place in reproductive structures.
(D) The amount of genetic material in the cells remains the same.

58. Which of the following statements BEST describes a chromosome?
- (A) Two forms of the same gene
 - (B) Structure made up of DNA wrapped around histones
 - (C) Nucleic acid that contains all genetic information
 - (D) Part of the DNA which carries genetic information to produce a protein
59. A species is BEST defined as a group of organisms that
- (A) cannot interbreed
 - (B) are physically similar
 - (C) can interbreed and produce many offspring
 - (D) can interbreed and produce fertile offspring
60. Natural selection differs from artificial selection because in natural selection
- (A) the process is faster
 - (B) the environment determines the beneficial characteristics
 - (C) non-random mating is involved
 - (D) humans determine the individual with the beneficial trait

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

